UNIVERSITY OF
Miami
FACULTY SENATE

MEMORANDUM

TO: President Edward T. Foote II

FROM: William J. Whelan
Chairman, Faculty Senate

DATE: June 1, 1992

SUBJECT: Faculty Senate Legislation #91015(B) -
Establishment of the Ph.D. Degree in Industrial Engineering

The Faculty Senate, at its meeting of April 27, 1992, voted to approve Faculty Senate Legislation #91015(B) - Establishment of the Ph.D. Degree in Industrial Engineering subject to the condition specified in the attached legislation.

This legislation is now forwarded to you for your action.

6/4/92

Bill,

✓ approved.

Thanks.

WJW/b

Attachment

cc: Provost Glaser
Associate Dean Hecker, Graduate School
Dean Becker, College of Engineering
Dr. Brass, Chair, Ad hoc Review Committee
Dr. Khalil, Department of Industrial Engineering

325 Ashe-Admin. Bldg.
Coral Gables, Florida 33124-4634
305 284-3721

Faculty Senate Action #91015

Class B Legislation

At its meeting on April 27, 1992, the Faculty Senate approved a Doctor of Philosophy (Ph.D.) degree in Industrial Engineering subject to the following condition:

1. That this approval, in accord with Graduate Council and Senate policies, is provisional, requiring a formal review during the third year following approval.

[This review is due by Spring, 1995. Senate action, following a recommendation from the Graduate Council, is required to remove the provisional nature of this approval. Failure to complete the review, or an unsatisfactory review, shall automatically suspend admission to the program.]

CAPSULE: Faculty Senate Legislation #91015(B) -
Establishment of the Ph.D. Degree in Industrial Engineering

RESPONSE BY THE PRESIDENT: DATE: 6/4/92

APPROVED: Yes SJT

OFFICE OR INDIVIDUAL TO IMPLEMENT OR PUBLISH: Provost

EFFECTIVE DATE OF LEGISLATION: _____

NOT APPROVED AND REFERRED TO: _____

REMARKS (IF NOT APPROVED): _____

_____

_____

_____

UNIVERSITY OF Miami

FACULTY SENATE
FEB 19 1996

MEMORANDUM

February 15, 1996

TO: Dr. Kamal Yacoub, Chair
Faculty Senate

FROM: Tarek M. Khalil, Dean
The Graduate School

SUBJECT: Industrial Engineering Ph.D. Program 3-year Review

The Department of Industrial Engineering presented to Graduate Council the attached 3-year report on their Ph.D. program. Council members discussed the report with Dr. Shihab Asfour, Graduate Program Coordinator for the Department. The following motion was made, seconded and passed unanimously.

> The Department of Industrial Engineering has made satisfactory progress in implementing the program over the past three years. They should proceed with their efforts for improvement, with a comprehensive review of the program taking place at the regular Graduate School cycle for review of programs.

TMK:nb

Enclosure
Copy to:
Dr. Luis Glaser, Provost
Dean L. Temares
Dr. N. Einspruch
Dr. S. Asfour

Graduate School
P.O. Box 248125
Coral Gables, Florida 33124-2220
305-284-4154
Fax 305-284-5441

INDUSTRIAL ENGINEERING PH.D. PROGRAM REPORT

Department of
Industrial Engineering
University of Miami
Coral Gables, Florida

Introduction. The Ph.D. degree program in Industrial Engineering received approval in 1992 with the provision there be a formal review in three years. This document was prepared for use in that review, and it is submitted for evaluation and critique leading to enhancement of the quality of the program.

Definition. "Industrial engineering is concerned with the design, improvement, and installation of integrated systems of people, materials, and equipment; drawing upon specialized knowledge and skill in mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design to specify, predict, and evaluate the results to be obtained from such systems." Institute of Industrial Engineers

Faculty. The members of the faculty of the Department of Industrial Engineering and the respective research interests are listed below. All are doctorally prepared and all are members of the Graduate Faculty. A faculty summary for the last five years is given in Table 1.

TABLE 1

NAME	DEGREE/ YEAR INSTITUTION	RANK/ APPOINTMENT DATE	CHAIR DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER EXTRA DEPT'L THESIS (T) DISERTA (D)	NOTABLE ADDITIONS	FULL- LENGTH REFEREED (ONLY) PUBLICATIONS	EXTRA-MURAL (FUNDED) GRANTS & CONTRACTS
Shihab Asfour	Ph.D. - 1980 Texas Tech Univserity	Professor - 1988 Associate Chairman	7(T) 7(D)	8(T) 1(D)	10(T) 13(D)	Edited the book titled "Computer Aided Ergonomics" Secured a $150,000 gift to build an Environmental Chamber	Pub 10 Refereed Articles in the last five years	PL-1990-91-$245,54 CoE Research-1990-$25,000 FL High Tech-1990-$20,000 FPL-1992-$65,005 Bon Secours Hosp-1992-$21,930 FPL-1992-$50,367 Bon Secours Hosp-1992-$15,979 Gov. of Egypt-$3,850 Inter Equip Group-1994-$14,972 FPL-1995-$19,266

TABLE 1

NAME	DEGREE/ YEAR INSTITUTION	RANK/ APPOINTMENT DATE	CHAIR DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER EXTRA DEPT'L THESIS (T) DISERTA (D)	NOTABLE ADDITIONS	FULL- LENGTH REFEREED (ONLY) PUBLICATIONS	EXTRA-MURAL (FUNDED) GRANTS & CONTRACTS
Nourredine	Ph.D.-1983	Associate	4(T)	3(T)	3(C)	AT&T	Pub 9 Refereed	UMQI-1990-$6,000
Boubekri	University of	Professor-1993	1(D)	2(D)	1(D)	Equip with Dr.	Articles in the	
	Nebraska					Narasimhan-	last five years	UMQI-1990-$3,125
						$145,264		
								Southern Gear-1992-
								$9,240
								SME-1992-$220,995
								SME-1993-$205,995-
								with Dr. Iakovou
Sara	Ph.D. - 1980	Professor-1994	4 (T)			6 Book Chpts	Pub 10 Refereed	NIH - 41,905,013 with
Czaja	SUNY at Bufl.		3 (D)			Dir. of Ctr on	Articles in the	C. Eisdorfer
						Aging &	last five years	
						Human		NIH - $1,300,000
						Factors		
								Ryder - $250,000
						Edited one		
						speci issue of		UM - $40,000
						Experimental		
						Aging Research		Stein Inst. - $50,000
								Ryder - $43,000
								with Dr. Iakovou

TABLE 1

NAME	DEGREE/ YEAR INSTITUTION	RANK/ APPOINTMENT DATE	CHAIR DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER EXTRA DEPT'L THESIS (T) DISERTA (D)	NOTABLE ADDITIONS	FULL- LENGTH REFEREED (ONLY) PUBLICATIONS	EXTRA-MURAL (FUNDED) GRANTS & CONTRACTS
Eleftherios Iakovou	Ph.D.- 1992	Assistant Professor- 1992	5 (T) 1 (D)	26(T) 2 (D)	3 (T) 1 (D)		Pub 9 Refereed Articles in the last five years	SME 1993 - $205,995 (Capital Equipment)- with Dr. Boubekri Ryder 1994-95 - $42,900 USCG 1994-95 - $39,962 USCG-1994-95- $96,053 USCG 1994-95 - $57,502 USCG 1994-95 - $39,079 USCG 1994-95 - $50,600 US D.O.T. 1995 - $96,701

TABLE 1

NAME	DEGREE/ YEAR INSTITUTION	RANK/ APPOINTMENT DATE	CHAIR DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER EXTRA DEPT'L THESIS (T) DISERTA (D)	NOTABLE ADDITIONS	FULL- LENGTH REFEREED (ONLY) PUBLICATIONS	EXTRA-MURAL (FUNDED) GRANTS & CONTRACTS
Tarek Khalil	Ph.D.-1969 Texas Tech University	Dean, The Graduate School-1994 Professor-1977	1(T) 2(D)	1(T) 2(D)	2(T) 2(D)	8 Books	Pub. 18 Refereed Articles in the last five years	FL High Tech & Industry Council-1990-$82,000 NIDRR 1990-$178,000 1991-$178,000 FPL-$1,000,000 FL High Tech & Industry Council 1991 - $62,000 NIOSH 1993 - $48,000 1994 - $53,000 1995 - $47,000 MCG Qualified 1994 - $95,000 SAFE-GRIP 1995-1999-$645,000

TABLE 1

NAME	DEGREE/ YEAR INSTITUTION	RANK/ APPOINTMENT DATE	CHAIR DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER EXTRA DEPT'L THESIS (T) DISERTA (D)	NOTABLE ADDITIONS	FULL- LENGTH REFEREED (ONLY) PUBLICATIONS	EXTRA-MURAL (FUNDED) GRANTS & CONTRACTS
Vincent K. Omachonu	Ph.D. - 1988 Polytechnic Institute of New York	Associate Professor-1994	3 (T) 1 (D)	5 (T)	1 (D)	60 Prof. Presentations 7 Book Chap 2 Books P.E. St. of FL Univ. Teaching Award	Pub.1 5 Refereed Publications	CAC Ramsey-1991-9 $40,000 Interim Health Care 1992-$12,000 Roper Hosp, 1993 $35,000 VA Found., 1993-95 $63,000 Brazilian Got/World Bank, 1994-$132,000 Palmetto Gen. Hosp 1994-$25,00 Bascom Palmer Eye Inst-1994-95 $70,000 United Health Care Corp., 1995 - $39,000

TABLE 1

NAME	DEGREE/ YEAR INSTITUTION	RANK/ APPOINTMENT DATE	CHAIR DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER EXTRA DEPT'L THESIS (T) DISERTA (D)	NOTABLE ADDITIONS	FULL- LENGTH REFEREED (ONLY) PUBLICATIONS	EXTRA-MURAL (FUNDED) GRANTS & CONTRACTS
David Sumanth	Ph.D.-1979- Illinois Institution of Technology	Professor- 1988	2 (T) 6 (P) P=Master's Project		2 (D)	Chaired 3 Int'l Conf on Prod & Qual. Res	Pub 6 Refereed Articles in the last five years	UM Institute 1990 - $6,000 Francisco Martoquin 1992 - $40,000 1994 - $40,000
						Edited 3 books		
						Founded the Int'l Society of Prod & Qual Res - Served as Chairman		Citibank 1993 - $6,945 Citibank 1995 - $25,214
						Launching a new refereed journal in Prod & Qual		
						7 Professional Presentations		
						1 Book		

TABLE 1

NAME	DEGREE/ YEAR INSTITUTION	RANK/ APPOINTMENT DATE	CHAIR DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER DEPT'L THESIS (T) DISERTA (D) COMMITTEE	MEMBER EXTRA DEPT'L THESIS (T) DISERTA (D)	NOTABLE ADDITIONS	FULL- LENGTH REFEREED (ONLY) PUBLICATIONS	EXTRA-MURAL (FUNDED) GRANTS & CONTRACTS
Jill A.	Ph.D. - 1987	Assistant	2 (T)	2 (T)		ASQL Certified	Quality Progress	
Swift	Oklahoma	Professor-1987				Qual Engr	1994	
	State	Lecturer-1994				FL P.E.		
	University						Computer & I.E.	
						Who's Who	1995	
						of American		
						Women, 1992		
						Who's Who in		
						The World-1995		

Shihab Asfour	Applied Ergonomics, Biomechanics
Nourredine Boubekri	Manufacturing Engineering, Robotics
Sara J. Czaja	Aging, Human-Computer Interaction
Norman G. Einspruch	Strategic Planning, Technology Management
Eleftherios Iakovou	Manufacturing Systems, Operations Research
Tarek M. Khalil	Ergonomics, Biomechanics
Vincent K. Omachonu	Health Systems, Quality Management
David J. Sumanth	Productivity Engineering & Management
Jill A. Swift	Quality Control, Information Systems

International Conferences. The department has served as organizer and host of five International Conferences on Productivity and Quality (most recently in February 1995) and five International Conferences on Management of technology (next in February/March 1996). The department is in negotiation to host the next conference (1996) on Computers in Industrial Engineering. Drs. Sumanth, Khalil and Swift, respectively, provide the leadership for these conferences.

Students. Prior to approval of the Ph.D. program in Industrial Engineering, students interested in the Ph.D. degree in topics related to Industrial

Engineering enrolled in the Ph.D. degree program in Ergonomics and in the Interdisciplinary Ph.D. program. Students continue to pursue their interests in those programs. A listing of the students currently enrolled in the Industrial Engineering Ph.D. program is given in Table 2. A detailed list of applicants for the Industrial Engineering Ph.D. Program for the last three years is given in Table 3.

The first graduate of the Ph.D. degree program in Industrial Engineering is Ibrahim Jomoah, who is now on the faculty of King Abdul Aziz University in Jeddah, Saudi Arabia with the rank of Assistant Professor. His research was supervised by Dr. Shihab S. Asfour.

Table 2

IEN Students Enrolled in Ph.D. Program

Student	Supervisor	Support
Al-Naqui, A.	Dr. Asfour	Self-Supported
Dilsen, K.	Dr. Czaja	Trauma Center Grant
Eldeeb, H.	Drs. Boubekri & Asfour	Research Assistantship
Forbes, L.	Dr. Omachonu	McKnight Fellowship
Koshla, R.	Dr. Swift	Self-Supported
Korde, A.	Dr. Iakovou	Self-Supported
Siegel, L.	Dr. Iakovou	Departmental Teaching Assistantship
Swaminathan, S.	Dr. Iakovou	Departmental Teaching Assistantship
Yudhbir, L.	Dr. Iakovou	Self-Supported

Table 3.- Applicants List for the Industrial Engineering Ph. D. Program
(1993-1995)

Student's name	*Social Security #*	*Date*	*Term*	*Prime Institution*	*Status*	*GPA*	*Toefl*	*Verbal*	*Quantitative*	*Sum*
Dilsen, Kadir Ercan	237-67-5869	8/24/93	1994/1	Istambul Tech. Univ.	Enrolled	3.5	600	240	730	970
Khosla, Rajesh	595-13-8745	8/26/93	1994/1	UM	Enrolled	3	657	580	780	1360
Baev, Ivan Dimitrov	801-18-9868	4/13/93	1994/1	Technical University	Holding	3.3	560	320	800	1120
Merzeci, Sedef	801-22-9344	2/4/93	1994/1	Middle East Tec.	Holding	3.4	610	390	740	1130
Wu, Weiqi	801-22-4446	3/3/93	1994/1	University of Beijing	Holding	N/A				
Li, Jingshan	801-18-9872		1994/1	Academia Sinica	Pending	N/A				
Qiu, Shiguo	801-23-0114		1994/1	East China Inst.	Pending	N/A				
Saqfelhait, Mensour	135-86-8625		1994/1	Fairleigh Dick i	Pending	N/A				
Xiao, Jun	801-20-2240		1994/1	North China Ins.	Pending	N/A	587	400	800	1200
Yang Hao	594-04-6554		1994/1	Florida A&M Uni	Pending	N/A				
Erdem, Halil Ibrahim	801-42-0983	4/6/94	1995/1	Yildiz universi	Approved	3.7	507	N/A	N/A	N/A
Hashem, Mohamed Khaled	801-40-4072	4/6/94	1995/1	Ain Shams Unive	Approved	3.5	570	390	740	1130
Jiao. Cheng	801-40-2445	4/6/94	1995/1	Nankai Universi	Approved	3.2	573	500	790	1290
Maitra, Amian	801-40-2874	4/6/94	1995/1	Birla Inst of T	Approved	3.5	653	540	680	1220
Masti Balakrishna Nanjappa	497-06-3592	7/5/94	1995/1	Centrl Missouri	Approved	3.1	637	400	610	1010
Xiao, Jizhong	801-35-2493	7/28/94	1995/1	East China Inst	Approved	3.7	617	480	760	1240
Xue, Huanran	801-42-1108	2/10/94	1995/1	Huazhong Univ o	Approved	3.7	587	460	770	1230
Chou, Shi-Shen	058-78-0992	12/6/93	1995/1	New York Inst T	Pending	N/A				
Kim, Tae-Sung	142-92-3204	1/24/94	1995/1	NJ Institute of	Pending	N/A	N/A	460	670	1130
Wang, Yiding	801-42-2562	1/5/94	1995/1	Tianjin univers	Pending					
Jin, Ni	801-40-0825	9/30/94	1995/1	Tsinghua Univer	Rejected	U-3/G-2.7	620	500	790	1290
Ma, Wei	801-38-5166	4/6/94	1995/1	Hangzhou Univer	Rejected	U-3/G-2.6	570	470	790	1260
Wang, Dawei	801-40-2930	4/6/94	1995/1	Shenyang Teache	Rejected	U-3.3/G-2.8	600	430	730	1160
Yudhbir, Lalit	216-06-7584	11/18/93	1995/2	UM	Enrolled	3.7	613	500	610	1110
Han, Fa Bin	801-65-1933	5/3/95	1996/1	Shandong Univer.	Approved	2.8	573	520	730	1250
Shi, Dachun	800-79-2012	5/3/95	1996/1	Tsinghua Univer	Approved	3.4	597	510	780	1290
Sinha, Sanjeev	801-00-0856	2/10/94	1996/1	University of A	Approved	3.9	563	330	560	890
Siegel, Larissa Maia	583-31-4888	8/21/95	1996/1	University of Puerto Rico	Enrolled	3.6	N/R	630	750	1380
Chen, Zongyuan	801-61-9233	1/11/95	1996/1	Tsinghua Univer	Holding	U-3/G-2.8	593	510	770	1280
Kittipichai, Chaiyuth	469-25-1664	4/19/95	1996/1	Westm Michgn U	Holding	U- 2.8	567	380	630	1010
Lee, Jaewoong	801-88-6625	4/26/95	1996/1	Univ. Wisc Stout	Holding	U-3.2	N/A	N/A	N/A	N/A
Zhu, Jing	801-63-7241	2/27/95	1996/1	Chengdu Univ. of	Holding	U-3.1/G-3.6	640			
Chang, Chia-hung	645-30-8033	1/23/95	1996/1	Univ Texas El P	Pending	N/A	553	340	740	1080
Dai, Jianguo	801-64-5604	1/27/95	1996/1	Shanghai Jiao T	Pending	N/A	637	520	800	1320
Jian, Shaohai	299-96-5109	4/7/95	1996/1	Univ Toledo	Pending	N/A	600	450	780	1230

Table 3.- Applicants List for the Industrial Engineering Ph. D. Program
(1993-1995)

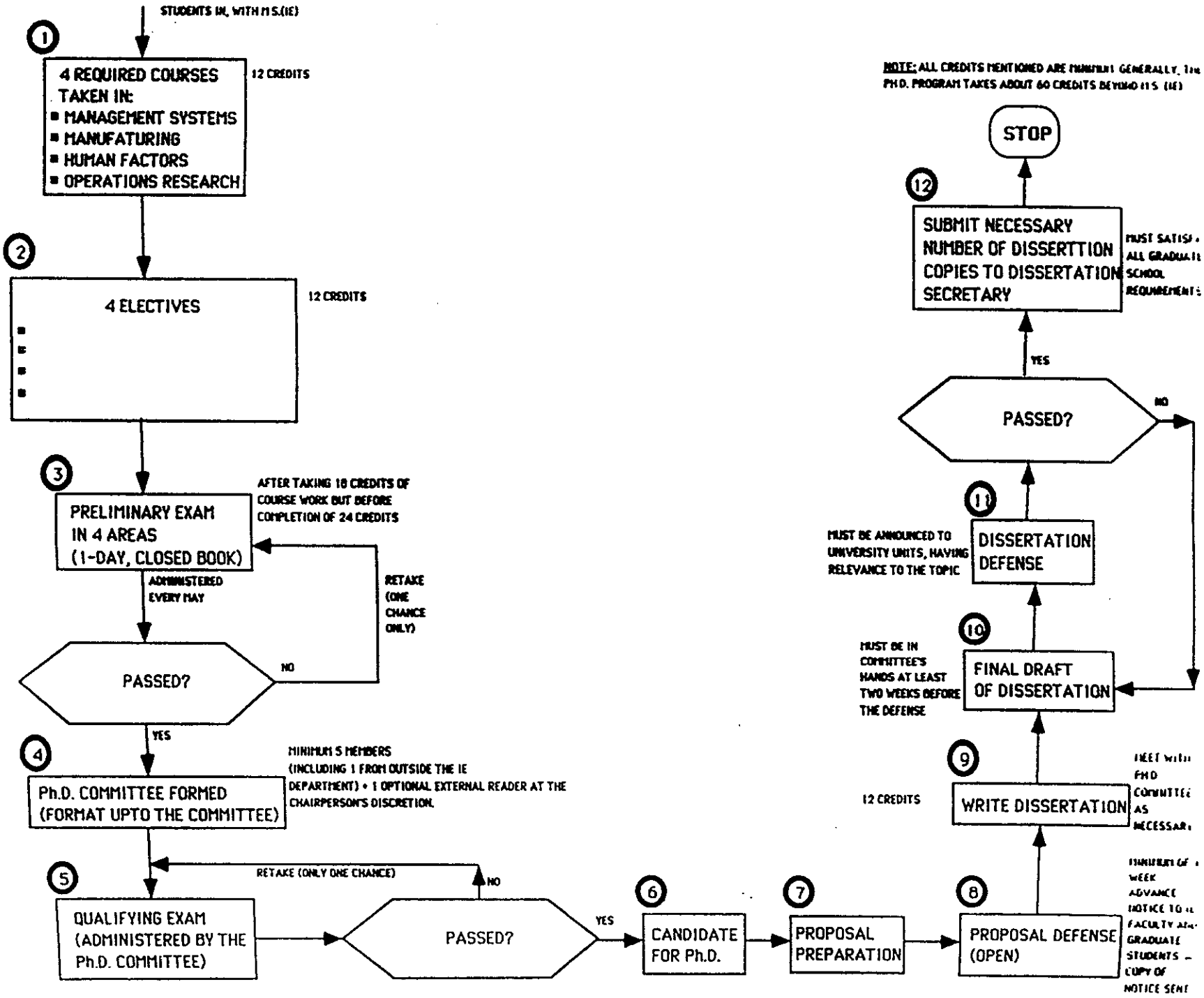
Wei, Haoli	504-21-7504	5/31/95	1996/1	South Dakota Sc	Pending					
Yao, Dongqing	801-63-7568	12/19/94	1996/1	Sozhou Universi	Pending	N/A	600			
Hidalgomonroy, Gabriel	801-64-9232	7/19/95	1996/1	Universidad La	Withdrawn	N/A	543	340	550	890
Al-Naqui, Abdul-Aziz A.	800-42-6503		1995/1	UM	Enrolled	3.3	580	400	720	1120
Eldeeb, Hesham	594-13-4861		1994/2	American University in Cairo	Enrolled	3.8	617	460	800	1260
Forbes, Lincoln	263-89-8409		1996/1	UM	Enrolled	3.4	N/R	500	710	1210
Korde, Ashutosh Laxmikant	483-19-9975		1995/2	Univ. of Baroda	Enrolled	3.3	567	410	730	1140
Swaminathan, Sarath Kumar	436-81-5718		1996/1	UM	Enrolled	3.8	643	620	770	1390

Administration. The Ph.D. program is administered by the faculty of the Department of Industrial Engineering, which is chaired by Dr. Norman G. Einspruch, through a Graduate Studies Committee composed of Dr. Shihab S. Asfour, Associate Chairman and Graduate Advisor, Dr. Sara J. Czaja and Dr. Eleftherios Iakovou. As part of the process that led to the departmental Strategic Plan adopted in December 1994, the Graduate Studies Committee prepared the procedural materials attached as Appendix A.

Budget. Supervision of doctoral students is part of the normal load assigned to members of the faculty; as such, such salary costs are covered in the departmental budget. Support for graduate students comes in the form of research and teaching assistantships, which are covered by research grants and the departmental teaching budget. Secretarial support is provided on an as-required basis.

APPENDIX A

Ph.D. PROGRAM FOR M.S.(IE) STUDENTS: The 12 Steps



UNIVERSITY OF Miami

Academic Affairs

COMMITTEE

September 29, 1992

MEETING DATE

BOARD OF TRUSTEES

SUBJECT:

Ph.D. Degree in Industrial Engineering

PRESENTED BY: Luis Glaser, Provost

BACKGROUND/CURRENT STATUS/MATTERS REQUIRING ACTION/
FINANCIAL IMPLICATIONS:

President Foote, Provost Glaser and the Faculty Senate have approved a Ph.D. Degree in Industrial Engineering and recommend Board approval.

Information on the program is attached.

BOARD RESOLUTION REQUESTED:

Recommend approval by the Executive Committee.

Ph.D. Degree in Industrial Engineering

Professor Brass, Chairman of the ad hoc committee to review the proposal for a Ph. D. in Industrial Engineering, informed the Council that the Graduate Council had approved the proposal. He introduced a draft of Class B legislation for the Senate to approve the degree. The provision for a review three years hence is a standard practice for Ph.D. degree programs. The representative from the Library raised questions about the adequacy of the library holdings, 14 items were incorrectly listed in the proposal as available in the Richter Library. He pointed out that the Library has been requested to purchase 10 journals that would support the program, but due to budget cuts, they were unable to purchase them. It was agreed to request a letter from the Library Collection Development Officer, Mr. Angus Mundy. It was *moved* and seconded to include the Class B legislation in the agenda of the next Faculty Senate meeting. *The motion carried* with one abstention.

Ph.D. Degree in Neuroscience

Professor Brass explained the need for a bylaw for interdisciplinary programs, which do not have a departmental home, in order to be able to grant degrees. He suggested that the Council recommend to the Senate to approve provisionally the program in Neuroscience while an ad hoc committee drafts a bylaw in accordance with Charter 5.7 to give the program a legal degree-granting status. Professor Warren stated that several questions were raised during the first reading: the process to elect the steering committee, the degree-granting status, and the list of graduate students submitted. This program, Professor Warren explained, was replacing the present departmentalized neurosciences program. The students now in the existing program will receive a department-associated degree, unless otherwise requested. A revised list of student names was submitted with the addition of the names of five faculty. In reference to the election of the Steering Committee, the members of the Committee will be representatives of the Program membership. The College Council of the Rosenstiel School of Marine and Atmospheric Science unanimously approved the program on April 8. The College of Arts and Sciences will discuss the proposal on April 15. Discussion followed regarding the representation on the Steering Committee. It was agreed to request that the matter of representation on the Steering Committee be reconsidered. It was agreed to forward the proposal to the Faculty Senate on April 27 with the additional information requested at the first reading on March 30. It was *moved* and seconded to agenda this item for the next Faculty Senate meeting and to request a report answering the questions raised during this reading. The *motion carried.*

UNIVERSITY OF Miami

April 7, 1992

Dr. W.J. Whelan
Chair, Faculty Senate
325 Ashe Administration Bldg.
Coral Gables, Fl 33124-4634

Dear Dr. Whelan:

Re: Ph.D. in Industrial Engineering

Enclosed please find the information that was requested in connection with the second reading of the Ph.D. in Industrial Engineering.

1. The minutes of the Graduate Council meeting of May 16, 1990 indicating that our three year report was reviewed and accepted and that the program was proceeding satisfactorily -- a copy of the minutes and the report are enclosed.

2. An update of the section on computer facilities is enclosed.

3. A list of institutions which offer a Ph.D. degree in Industrial Engineering is enclosed to be added as p. 39 a.

4. A revised section starting on page 6 with corrected typographical errors.

Thank you for your cooperation and I look forward to a positive response to the proposal during the second reading on April 27, 1992.

Sincerely,

Tarek M. Khalil, Ph.D., P.E.
Professor and Chairman

TMK/jp
Enclosures

Industrial Engineering Department
P.O. Box 248294
Coral Gables, Florida 33124-0623
FAX: 305-284-4040 • Phone: 305-284-2344 • Telex: UM 519308

Acceptance of the 3 year review report on Ph.D Program in Ergonomics

M I N U T E S

GRADUATE COUNCIL MEETING

MAY 16, 1990

1990

RECEIVED
JUN 8 1990
Graduate School

PRESENT:

Dr. Brooks Applegate, Education
Dr. Gregory Conner, Medicine
Dr. Pamela A. Ferguson, Chair
Dr. Guillermo Gonzalez, Engineering
Dr. Jo Anne K. Hecker, Graduate School
Dr. Joyce Jordan, Music
Dr. Janet L.B. Martin, Arts and Sciences
Dr. Alexander McIntire, International Studies
Dr. Donald Olson, Marine Science
Dr. Michael Pierce, Medicine
Dr. Ruth Tappen, Nursing
Dr. Paul Wilson, Music
Dr. Ralph Warburton, Architecture

GUESTS:

Dr. S. Asfour, Industrial Engineering
Dr. T. Khalil, Industrial Engineering
Dr. G. Warheit, Sociology

The meeting was opened at 3:00 p.m. by Dean Hecker.

Mathematics and Computer Science Internal Review Report

Dr. Olson, member of the internal review subcommittee, presented to Council a report prepared by the Faculty Review Committee on the Mathematics and Computer Science graduate programs. Council voted unanimously to approve this report.

Biomedical Engineering Internal Review Report

Dr. Olson presented to Council the internal report on Biomedical Engineering graduate program. Graduate Council approved this report unanimously.

Master of Arts in Liberal Studies (MALS) Report

Dean Ferguson presented the subcommittee report to Graduate Council on the proposal for a new program: Master of Arts in Liberal Studies (MALS.) Copies of the external reviewers' report, the internal review subcommittee reports and Dean Wilson's response to the external reviewers report were distributed to Council for approval. Members of the Graduate Council voted in favor of approving the MALS proposal.

Report on Ph.D. in Ergonomics

Dr. Khalil presented a 3-year report on the new Ph.D. program in Ergonomics. Council accepted his report and felt that the program was proceeding satisfactorily. A copy of the report is enclosed.

Report on Sociology

Dr. Warheit presented a 3-year report on the new Ph.D. program in Sociology. Council accepted his report and felt that the program was proceeding satisfactorily. A copy of the report is enclosed.

Graduate Faculty

The following faculty nominations were approved for membership in the Graduate Faculty:

Dr. R.A. Halberstein, Anthropology
Dr. Marvin Dawkins, Sociology

Fellowship Report .

Dean Hecker presented a report on University fellowship awards spanning the years from 1975 to 1989. A copy is attached.

Dean Ferguson gave thanks to the following Council members whose terms have expired this academic year: Dr. Eugene Provenzo, School of Education, Dr. Michael Pierce, School of Medicine, Dr. Paul Wilson, School of Music and Dr. June Dreyer, representative to the Faculty Senate. She then welcomed the following new members: Dr. Brooks Applegate, School of Education, Dr. Joyce Jordan, School of Music, Dr. Gregory Conner, School of Medicine. The new representative to the Faculty Senate will be Dr. Daniel Baden, from the Marine Campus.

The meeting was adjourned at 4:30 and members of the Council enjoyed a refreshment hour.

Respectfully submitted,

Norma E. Brito
Assistant to the Dean

Miami

M E M O R A N D U M

TO: Dr. Pamela A. Ferguson
Dean
Graduate School

FROM: Dr. Tarek M. Khalil
Chairman
Department of Industrial Engineering

DATE: April 30, 1990

SUBJECT: PH.D. PROGRAM IN ERGONOMICS

The Ph.D. program in Ergonomics was approved in 1987. Prior to its approval, five graduate students were enrolled in the interdepartmental Ph.D. program with a dissertation topic in Ergonomics. Their progress is as follows:

Name	Date Started	Graduated	Job Placement
Elaine Marshall Asfour	1982	1987	Assistant Professor, Florida Memorial College
Ashraf Genaidy	1983	1987	Assistant Professor, Western Michigan University
Elsayed Abdel-Moty	1982	1987	Research Assistant Professor, University of Miami
Subbuswamy Muthuswamy	1984	1990	Assistant Professor, Florida Atlantic University
Sherif Waly	1987	In Progress	

Industrial Engineering Department
P.O. Box 248294
Coral Gables, Florida 33124-0623
FAX: (305) 284-4040 • Phone: (305) 284-2344 • Telex: UM 519308

Since the Ph.D. program in Ergonomics officially started in 1987, the following students have been admitted:

Name	Date Started
Waddah Fatany	1987
Sherin Kamel-Ali	1987
James Koshy	1988
Mansour Tritar	1988
Soha Sadek	1990

In addition, there are four students that are currently enrolled in the M.S. program with the ultimate objective of being permitted to continue for the Ph.D.

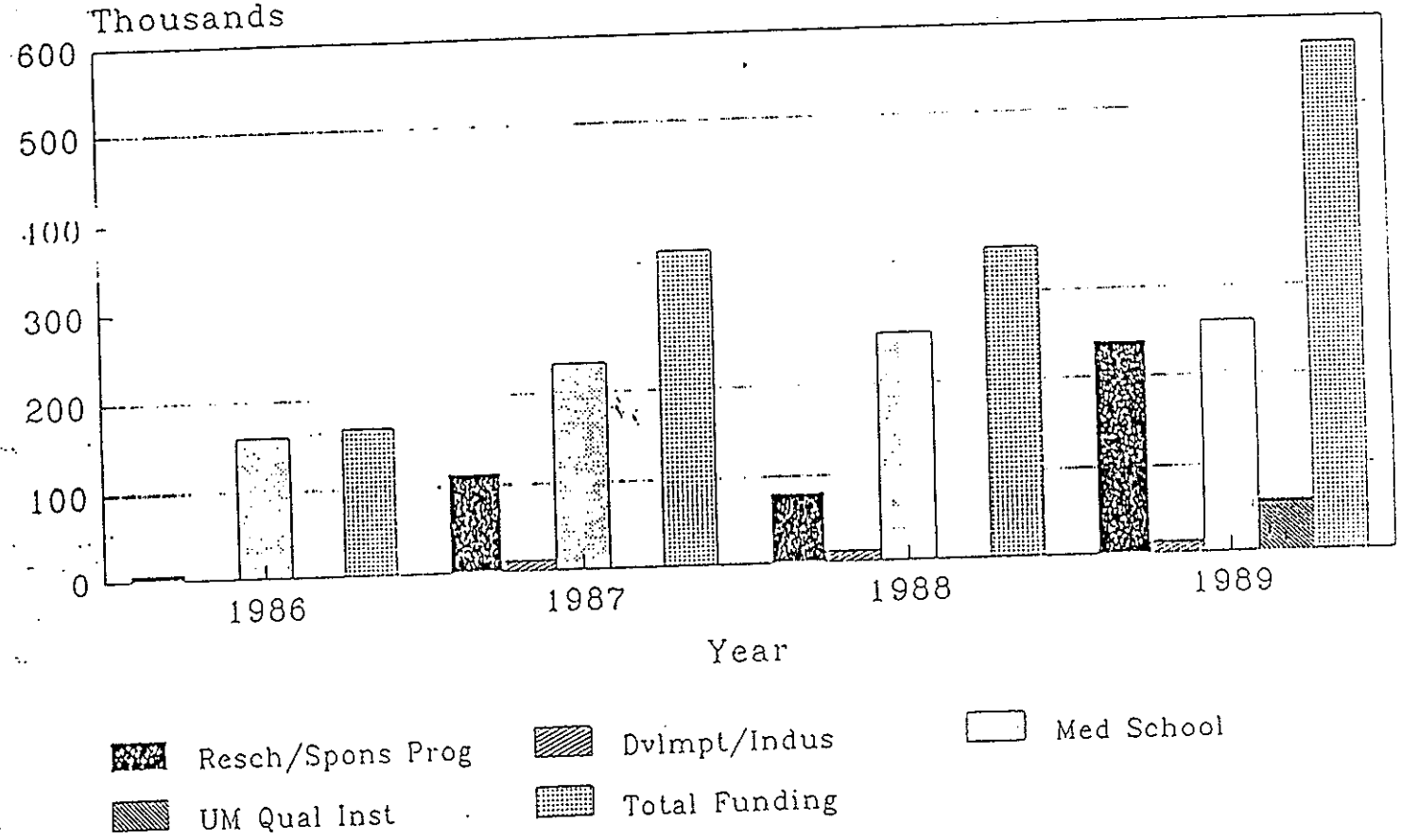
Funded research in the Ergonomics area has increased several folds since the start up of the Ph.D. program. Ten research assistantships have been fully funded and the following research faculty were added:

Dr. Sara Czaja, Research Associate Professor
Dr. Elsayed Abdel-Moty, Research Assistant Professor
Mr. Sherif Waly, M.S., Research Associate (to start August 1990)
Mr. Ahmed Zaki, M.S., Research Associate

Faculty publication has continued to be at a high rate in prestigious refereed journals, books and conference proceedings.

If you may need any additional information, please let me know.

DEPARTMENT OF INDUSTRIAL ENGINEERING
RESEARCH SUPPORT FUNDING



BY FISCAL YEAR

OTHER SOURCES OF RESEARCH SUPPORT

Uncredited Research Activities | Industrial Engineering Department | Fiscal Year 1990

Acc't #	Title	Faculty Involved	Faculty Contact	Subject of work	Amount
661511 351171 388512 776066	Research activities in the Comprehensive Pain and Rehabilitation Center's Ergonomics and Bioengineering Division	Dr. Khalil Dr. Astour Dr.Abdel-Moty Dr. Goldberg	Dr. Rosomoff	Ergonomic Evaluation and Rehabilitation In Back Injuries and Chronic Pain	$260 K estimate
779318	Research Activities with Local Companies	Dr.Khalil Dr.Astour	Frank B. Hall Burger King	Safety Engineering	11.6 K
771865 758346 771865	University of Miami Quality Institute	Dr.Swift Dr. Ip Dr. Rabie Dr. Omachonu Dr. Boubekri Dr. Sumanth Dr. Rhodes Dr. Kanô Mr. Norman	Tarek M. Khalil	Quality Improvement	$95K

Table II – Program Charts

Department of Industrial Engineering
April 30, 1990

I. Students

Registered Program Title: Ergonomics
Degree: Doctor of Philosophy

II. Applications –Admissions – Qualifications

Academic Year	Applications	Admissions Offered	New Enrollments
1984–1985	0	1	1 *
1985–1986	1	1	1 **
1986–1987	1	1	1 ***
1987–1988	3	3	2 ****
1988–1989	2	2	2 *****

Total Number of Graduate Degrees Awarded

Academic Year	Degrees Awarded
1984–1985	0
1985–1986	0
1986–1987	2 #
1987–1988	1
1988–1989	0

Started program in 1982 & 1983

Note: * denotes: 1 graduated (interdepartmental)

** denotes: 1 graduated (interdepartmental)

*** denotes: 1 progressing on full-time basis

**** denotes: 1 progressing on full-time basis
1 not currently enrolled

***** denotes: 2 progressing on full-time basis

COLLEGE OF ENGINEERING

Summary of Sponsored Awards -- 1986-1989

Department	1986 FY	1988 FY	1989 FY	Δ 1989-1986	Δ 1989-1988
BME	$ 109,670	$ 234,900	$ 321,546	193.%	36.9%
CEN	485,281	898,033	667,165	37.5	(25.7)
ECE	116,505	214,045	246,168	111.0	15.0
IEN	7,750	80,911	259,638	3250.0	221.0
MEN	460,524	419,248	573,222	24.0	36.7
Administration	65,000	25,000	25,000	(61.5)	0
COE	$1,244,730	$1,872,137	2,092,739	68.1%	11.8%

2. PHYSICAL RESOURCES

2.a. ADEQUACY OF LIBRARY HOLDINGS

The Library has an annual allocated budget for the Department of Industrial Engineering for acquiring books and periodicals. The current annual budget is $15,000 for books and $10,000 for journals and periodicals. Since subjects allocated by the Library under Industrial Engineering areas are common with several other departments in the University, the Library holdings and budget allocation by subject area become much larger. For example, the Library has significant holdings in the areas of business administration. The Gold Fund, a special endowed Library fund for the School of Business is providing added resources to the Library. Also, the Medical School Library has a very large collection of materials that are very useful for the programs in Ergonomics and Safety. The Mathematics Library contains many journals which are relevant to the quantitative areas of Industrial Engineering.The Library holdings in Industrial Engineering are considered to be strong. Additions in the area of Manufacturing Engineering have been requested and are currently being acquired. (see 7. Comparison with High-Quality Established Programs.)

A partial listing of journals and periodicals available in Industrial Engineering and related disciplines are:

Academy of Management
Academy of Management Review
Acta Orthopaedica Scandinavica
Acta Physiologica Scandinavica
Across the Board
Acta Biotheortica
Administrative Science Quarterly
American Economic Review
American Industrial Hygiene Association Journal
American Journal of Physical Anthropology
American Journal of Physiology
American Journal of Psychoanalysis
American Journal of Psychology
American Statistical Association Journal
American Statistician
Annals of Biomedical Engineering
Annals of Human Biology
Applied Ergonomics
Army Research and Development
Atmospheric Environment
Australian Journal of Psychology & Philosophy
Behavior Research Methods and Instrumentation and Computers
Bell Journal of Economics

Bell Journal of Economics and Management Science
Biological Bulletin
Biophysical Journal
Bioscience
Biotechnology and Bioengineering
Brain Journal of Neurology
British Journal of Industrial Relations
Bulletin of Mathematical Biology
Business Economics
Business Horizons
California Management Review
Columbia Human Rights Law Review
Computers and Biomedical Research
Computers and Industrial Engineering
Computers and Operations Research
Computers and People
Decision
Dissertation Abstracts
Econometrica
Economic Journal
Electroencephalography and Clinical Neurophysiology
Engineering Materials and Design
Environment
Environmental Science and Technology
Ergonomics
European Journal of Operational Research
Federal Register
Financial Executive
Geographical Analysis
Harvard Business Review
Human Biology
Human Development
Human Relations
IBM Systems Journal
I E E E Spectrum
I I E Transactions
I L O Information
I L O Publications
Industrial and Labor Relations Review
Industrial Engineering
Industrial Relations
Industrial Week
Interfaces
International Economic Review

International Journal of Engineering Science
International Journal of Environmental Studies
International Journal of Man-Machine Studies
International Journal of Production Research
International Labour Office
Journal of Acoustical Society of America
Journal of American Statistical Association
Journal of Anatomy
Journal of Analytical Psychology
Journal of Applied Behavior Analysis
Journal of Applied Psychology
Journal of Applied Physiology
Journal of Biomechanics
Journal of Biomedical Materials Research
Journal of Bone and Joint Surgery
Journal of Business
Journal of Econometrics
Journal of Economics and Business
Journal of Economic Literature
Journal of Engineering Physics
Journal of Environmental Economics and Management
Journal of Environmental Engineering. (copy 2)
Journal of Experimental Psychology
Journal of Human Evolution
Journal of Humanistic Psychology
Journal of Industrial Economics
Journal of Industrial Relations
Journal of Marketing
Journal of Marketing Research. (Cumulative Index)
Journal of Medical Engineering and Technology
Journal of Money, Credit and Banking
Journal of Occupational Psychology
Journal of Optimization Theory and Applications
Journal of Physiology
Journal of Planning and Environmental Law
Journal of Regional Science
Journal of Safety Research
Journal of Speech and Hearing Disorders
Journal of Systems Management
Journal of Theoretical Biology
Lancet
Management Accounting
Management Focus
Management Review

Management Science
Management Services
Mathematical Programming
Mathematics of Operations Research
Medical and Biological Engineering
Medical Journal of Australia
Mini-Micro Systems
Modern Materials Handling
Monthly Labor Review
National Bureau of Economic Research General Studies
National Industrial Conference Board
National Productivity Review
Nature
New Scientist
Occupational Hazards
Occupational Health and Safety
O E C D Observer
Operational Research Quarterly
Operations Research
Organizational Dynamics
Perceptual and Motor Skills
Personnel
Personnel Psychology
Physical Therapy
Physiological Reviews
Proceedings Royal Society of London
Public Administration Review
Rehabilitation Counseling Bulletin
Rehabilitation Literature
Remote Sensing of Environment
Research Management
Research Quarterly for Exercise and Sport
Review of Economics and Statistics
Review of Income and Wealth
Robotics Today
Royal Statistical Society
Sales and Marketing Management
Scandinavian Journal of Rehabilitation Medicine
Scientific American
Simulation Journal
Sloan Management Review (Cumulative Index)
Small Group Behavior
Socio-economic Planning Science
Southern Economic Journal

Supervisory Management
Transportation Science
United States Congress
U.S. Department of Health, Education and Welfare
U.S. Department of Labor, Bureau of Labor Statistics
U.S. Office of Management and Budget

2.b. LABORATORY EQUIPMENT

The Department of Industrial Engineering administers several laboratories in the McArthur Engineering Building and a laboratory at the Medical School's Comprehensive Pain and Rehabilitation Center. These laboratories serve both the undergraduate as well as graduate students in the department. Laboratories that are particularly suitable for graduate research and the type of equipment in their laboratories are given here.

2.b.1. Microcomputer Laboratory

Location of laboratory: Room 271/272, McArthur Building
Purpose of laboratory: The main purpose of the laboratory is to support courses offered by the Department of Industrial Engineering which require microcomputer work. The laboratory is also used by faculty and graduate students of the department for research purposes.
Existing equipment: The lab is equipped with fifteen (15) personal computers. Eight (8) of them were procured during the last year and are based on either the INTEL 80386DX or 80386SX microprocessors. They are equipped with hard drives with at least 60 megabytes of storage and VGA monitors. The other seven computers were acquired in earlier years and are based on either the INTEL 8088 or 80286 microprocessors. There are five 9-pin dot matrix printers and one Hewlett Packard Deskjet printer shared by the computers. In addition, students have access to the College of Engineering Computing Facilities (see 2.b.7).
Assessment of current equipment: The current equipment is adequate for general computing purposes. The newly acquired computers provide capabilities for applications with intensive numerical processing or advanced graphics such as computer-aided design.

2.b.2 Computer Integrated Manufacturing Laboratory

Location of laboratory: Room 155/156, McArthur Building
Purpose of laboratory: The objective of the Computer Integrated Manufacturing Laboratory is to provide the students with the required training on hardware and equipment, and methods of manufacturing in a CIM environment. This is accomplished by assigning laboratory projects in the various courses in the area of CIM whereby the student is trained on individual pieces of automation equipment. Integration concepts are then taught in the integrated systems section of the laboratory.
Existing equipment: The Robotics and Automation Laboratory houses state-of-the-art equipment to support the above mentioned areas of applications and research. This equipment includes 4 IBM robot systems (donated by IBM), a Motionmate 5-axis robot, a Seiko 700 5-axis robot, a MODACS V industrial controller (donated by Modcomp), 4 IBM microcomputers, 2

linear flexible conveyors, a Robotmart 3-axis CNC minimill, a spectralight CNC lathe, and a Bridgeport V2E3 3-axis CNC milling machine. In order to provide the students with state-of-the-art knowledge and experience, the Department of Industrial Engineering has recently acquired a new industrial programmable controller, and EX mill/EZ surf software. The latter software is developed specifically for the Bridgeport CNC milling machine series, which allows a complete integration of the computer aided design and computer aided manufacturing phases required to machine parts. The department has also acquired a new PUMA 562 robot system. This is a 6-axis servo controlled industrial robot equipped with Unimation's proprietary VAL II control and programming capabilities and simple user-friendly program instructions. The design of VAL II features the ability to communicate and interact with the manufacturing environment and allows users to advance from isolated cells of automation to fully integrated systems. The most recent acquisition is an Apollo work station and SILMA software. These acquisitions allow the students to work and perform research on problems involving dynamics, product and process design, graphic simulation, and manufacturing process planning.

Assessment of current equipment: The current equipment is adequate for teaching and conducting research in several areas of Computer Integrated Manufacturing, namely: Robotics, Automated Assembly, Numerical Control, Product and Process Design, and Process Planning. Recent investments in this laboratory are in excess of $700,000 acquired through donations by industry, through research support and other departmental sources.

Incremental needs: The Department of Industrial Engineering recognizes the importance of quality assurance and material handling as components of CIM. Software for these areas or is now being developed in the CIM Laboratory to support the material handling aspects. Equipment for quality assurance is progressively being acquired.

2.b.3. **Ergonomics Laboratory**

Location of laboratory: Rooms 288, McArthur Building

Purpose of laboratory: The main purpose of this laboratory is to support courses in the area of Ergonomics, Human Factors Engineering, and Biomechanics, and to conduct research projects in these fields. The equipment is used heavily by graduate students to conduct their research projects. The laboratories have state of the art equipment and software which permits students and faculty to conduct cutting edge research.

Existing equipment: Our Ergonomics Laboratories house the following equipment: bicycle ergometer, treadmill, oxygen analyzer (Beckman OM-11), carbon dioxide analyzer (capnograph), ventilation meter (Parkinson-Cowan), reaction time measurement device, depth perception device, tracking device, Sensormedics R612 8-channel recorder with all of the needed preamplifiers and amplifiers that accept different biological signals, Sensormedics carbon dioxide analyzer (LB-2), Sensormedics ventilation measurement model (VMM-2), IBM-AT microcomputer, Data Translation analog to digital converter board (DT-2801-A), Selspot 3-D motion analysis system, Faro 3-D posture analysis system, anthropometry measurement kit, strength measurement load cells and digital readout devices, and Kistler force-platform with software.

Adequacy of lab space: Ergonomics Laboratory space barely meets the existing needs for graduate study and research. As the number of graduate students increase and funded research expands, additional space will be needed.

2.b.4. The Comprehensive Pain and Rehabilitation Center Ergonomics Laboratory

Location of laboratory: South Shore Hospital, Rooms 603, 702, 704
Purpose of laboratory: The Ergonomics and Bioengineering Division of the Comprehensive Pain and Rehabilitation Center has several laboratories. The purpose of these laboratories is to conduct functional capacity assessment and to support the center's programs of treatment and rehabilitation. The laboratories also support faculty and students research projects in Ergonomics and Rehabilitation.
Existing equipment: Knee reflex reaction timer, Schaevitz digital transducer readout, pain measurement device, Chattanooge grip strength, digital timers (2), Wavetek wave generator, Lafayette reaction time device, tremor device, Okidata printer, IBM XT, Ariel performance analysis system, Kistler force platform, Panasonic VCR, Magnavox cameras (2), alphacell force readout, Bofors force readout, static strength testing station, Intellect VMS stimulation unit, Hitachi oscilloscope, Heath power supply, Hewlett-Packard function generator, scope multitester, IBM S260, Hewlett-Packard laser jet printer, IBM Proprinter X24, Hewlett Packard ScanJet, Hewlett Packard plotter, IBM S2 70-386, 3 Codetron units, PDP 11-23, back strength testing frame, Bofors force readout, Cyborg EMG unit (2), Ariel computerized exercise system multi-station, arm-leg station, AST computers (2), Samsung screens (4), Citizen printer, Fitron cycle-ergometer, and AMF quantum XL fitness computer.
Assessment of current equipment: Existing laboratory equipment and software represent state of the art in Ergonomics, Biomechanics, and Rehabilitation.
Adequacy of laboratory space: Existing space is accommodating current need. Additional space on the ninth floor of the building is being used for job simulation. Renovation of that space for future use is being contemplated.

2.b.5. Industrial Hygiene Lab

Location of laboratory: McArthur Building, Room 278.
Purpose of laboratory: To support advanced courses in Industrial Hygiene and to conduct research pertaining to occupational physical and chemical stress control equipment. **Equipment:** Laboratory is equipped with a vibration station and noise and vibration measuring equipment.

2.b.6. Productivity Research Lab

Location of laboratory: McArthur Building, Room 279.
Purpose of laboratory: To conduct advanced research in Productivity Engineering.
Equipment: Microcomputers. Funds will be drawn from revenues generated by the Third International Conference on Productivity and Quality Research.

2.b.7. College of Engineering Computing Facilities

Computer Facilities: In addition to the University-wide computer facilities, engineering faculty and students have access to college wide computer facilities as well as computer facilities in individual departments. There are three college-wide computer laboratories. The college wide computer facilities are briefly described below:

The Clarke Computational Laboratory
Location of laboratory: McArthur Building, Room 237.
Purpose of laboratory: The Clarke Computational Laboratory is equipped with twenty terminals. These terminals are hard wired to the IBM 3090 and the Vax Cluster in the University Computer Center via three multiplexers for students' use in course work computation. There are a total of twenty four lines available. Twenty modified Hazeltine terminals and one Data South printer are housed in the Clarke laboratory. The Clarke laboratory is open seven days a week for use by engineering students and other students enrolled in engineering courses. Student monitors are available for assistance.

Computer Graphics Laboratory
Location of laboratory: McArthur Building Annex, Room 201.
Purpose of laboratory: This laboratory includes twenty-eight stations with specially designed provisions that make them appropriate for teaching engineering graphics. Presently, equipment for twenty stations has been acquired and installed. Each station is equipped with an IBM PS/2 model 55SX computer.

The Computer Aided Design Laboratory
Location of laboratory: McArthur Building, Room 235.
Purpose of laboratory: The Computer Aided Design (CAD) Laboratory provides Interactive Computer Aided Design facilities for graduate/upper level undergraduate design courses and faculty research. This laboratory is built around a HARRIS 800 super-mini computer system. The 48 bit CPU machine has 1.5 MB of main memory and has thirty-two devices attached to it. The system includes a single port, 474 MB fixed disk drive and 75 IPS, 800/1600 BPI tape unit. There are eight color graphics terminals attached to the system. Other peripheral equipment include a 450 lines per minute line printer, a CALCOMP 1075 four pen color plotter, an eight pen, Hewlett Packard 7550 plotter, a laser printer and numerous alphanumeric terminals. The software library includes MOVIE.BYU, FRAME.BYU, TEMPLATE and other smaller packages, which provides the laboratory capability for sophisticated color graphics, three dimensional modeling and high level engineering analysis. This laboratory is also open seven days a week. In addition, a GOULD 6081 super-mini computer is also housed in this laboratory. the 32 bit CPU has 8 MB main memory and has 32 terminals attached to it. The system includes two 300 MB fixed minute line printer. This system uses the UNIX operating system. This system is used for both instructional purpose and research.

A college wide local area network has been installed. This network is connected to the University wide network, which in turn is connected to the global INTERNET network. The Gould system as well as a number of work stations and personal computers in different departments are connected to the network.

All users of the mainframe computer facilities must be issued a user identification number tied to specific University of Miami accounts to be charged. In course work, the faculty member obtains the access numbers for each student in the class. For research or administrative work, the appropriate principal investigator or department chairman assumes responsibility for obtaining access numbers for authorized users. Monthly usage billing are provided, by user identification number with account number. At present there is no method of limitation on

computer time used. Access numbers are authorized with a beginning date and an ending date. Should usage by a individual be excessive based upon monthly billings, the appropriate faculty member/administrator may request a change in the termination data of access numbers for specific users.

Computer usage on the main frames are measured by the monthly bills. The college wide facility does not have a billing system. The usage is measured by the number of class accounts requested by the faculty. With the proliferation of personal work stations and personal computer there has been a move away from central computers. Overall computer usage has been increasing steadily. With the variety of Computer equipment available to students and faculty members in the College of Engineering, it is believed that supporting facilities in this area should be adequate.

List of The Industrial Engineering Departments Offering PhD Programs

Arizona State University
College of Engineering and Applied Sciences
Department of Industrial and Management Systems Engineering

Auburn University
College of Engineering
Department of Industrial Engineering

Clemson University
College of Engineering
Department of Industrial Engineering

Colorado State University
College of Engineering
Department of Mechanical Engineering, Program in Industrial and Manufacturing Systems Engineering

Columbia University
School of Engineering and Applied Science
Department of Industrial Engineering and Operations Research
Program in Industrial Engineering

Cornell University
Department of Industrial Engineering and Operations Research

Georgia Institute of Technology
College of Engineering
School of Industrial and Systems Engineering

Illinois Institute of Technology
Department of Industrial Engineering and Management Science

Kansas State University
College of Engineering
Department of Industrial Engineering

Lehigh University
College of Engineering and Applied Science
Department of Industrial Engineering

Memphis State University
Herff College of Engineering
Program in Industrial and Systems Engineering

New Mexico State University
College of Engineering
Department of Industrial Engineering

North Carolina State University
College of Engineering
Department of Industrial Engineering

North Dakota State University
College of Engineering
Department of Industrial Engineering and Management

Northeastern University
Graduate School of Engineering
Department of Industrial Engineering and Information Systems

Northwestern University
Robert R. McCormick School of Engineering and Applied Science
Department of Industrial Engineering and Management Sciences

Ohio State University
College of Engineering
School of Industrial Engineering and Management

Oklahoma State University
College of Engineering
School of Industrial Engineering

Oregon State University
Graduate School, College of Engineering
Department of Industrial and Manufacturing Engineering

Pennsylvania State University, University Park Campus
College of Engineering
Department of Industrial Engineering

Polytechnic University, Brooklyn Campus
Division of Engineering
Program in Industrial Engineering

Polytechnic University, Farmingdale Campus
Division of Engineering
Program in Industrial Engineering and Operations research

Purdue University
Schools of Engineering
School of Industrial Engineering

Rensselaer Polytechnic Institute
Interdisciplinary Programs
Department of Decision Sciences and Engineering Systems

Stanford University
School of Engineering
Department of Industrial Engineering and Engineering Management

State University of New York at Buffalo
Graduate School
School of Engineering and Applied Sciences
Department of industrial Engineering

Technical University of Nova Scotia
Faculty of Engineering
Department of Industrial Engineering

Tennessee Technological University
College of Engineering
Department of Industrial Engineering

Texas A&M University
College of Engineering
Department of Industrial Engineering

Texas Tech University
Graduate School, College of Engineering
Department of Industrial Engineering

University of Alabama in Huntsville
College of Engineering
Department of Industrial and Systems Engineering
Program in Industrial Engineering

University of California at Berkeley
College of Engineering
Department of Industrial Engineering

University of Central Florida
College of Engineering
Department of Industrial Engineering

University of Cincinnati
College of Engineering
Department of Mechanical, Industrial and Nuclear Engineering

University of Florida
College of Engineering
Department of Industrial Engineering

University of Houston
Cullen College of Engineering
Department of Industrial Engineering

University of Illinois at Chicago
College of Engineering
Department of Mechanical Engineering

University of Iowa
College of Engineering
Department of Industrial Engineering

University of Louisville
Speed Scientific School
Department of Industrial Engineering

University of Massachusetts at Amherst
College of Engineering
Department of Industrial Engineering and Operations Research

University of Michigan
College of Engineering
Department of Industrial Engineering and Operations engineering

University of Missouri-Columbia
College of Engineering
Department of Industrial Engineering

University of Nebraska-Lincoln
College of Engineering and Technology
Department of Industrial and Management Systems Engineering

University of Oklahoma
College of Engineering
School of Industrial Engineering

University of Pittsburgh
School of Engineering
Department of Industrial Engineering

University of Southern California
Graduate School, School of Engineering
Department of Industrial and Systems Engineering
Program in Industrial and Systems Engineering

University of South Florida
College of Engineering
Department of Industrial and Management Systems Engineering

University of Texas at Arlington
College of Engineering
Department of Industrial Engineering

University of Toledo
College of Engineering
Department of Industrial Engineering

University of Toronto
School of Graduate Studies
Physical Sciences Division
Faculty of Applied Science and Engineering
Department of Industrial Engineering

University of Waterloo
Faculty of Engineering
Department of Management Sciences

University of Windsor
Faculty of Engineering
Department of Industrial Engineering

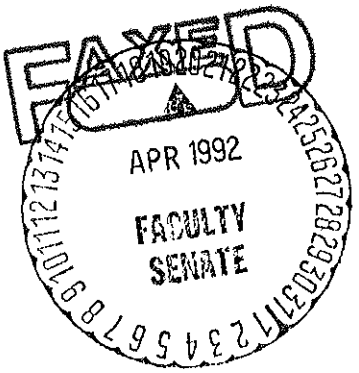
University of Wisconsin-Madison
College of Engineering
Department of Industrial Engineering

Virginia Polytechnic Institute and State University
College of Engineering
Department of Industrial and Systems Engineering

Wayne State University
College of Engineering
Department of Industrial and Manufacturing Engineering

Pendry, JE, BH

UNIVERSITY OF Miami



April 17, 1992

Dr. W.J. Whelan
Chair, Faculty Senate
325 Ashe Administration Bldg.
Coral Gables, Fl 33124-4634

Dear Dr. Whelan:

Re: Ph.D. in Industrial Engineering

Dr. Eugene Ecksein, the College of Engineering representative to the Senate Council, informed me of some of the issues discussed in the Council regarding Library holdings. I am, herewith, providing the necessary information requested.

1. A corrected list of current Library holdings as of April 16, 1992. The entire list was checked and verified by Tom Rogero of the Richter Library.

2. A letter from Angus Mundy indicating the strength of the Library holdings in Industrial Engineering and explaining the status of four requested subscriptions awaiting action, a point of concern that seems to have arisen during the Council meeting. Even though it would be desirable to add these subscriptions to the Library holdings as already planned, none of these four subscriptions would have any significant impact on the Ph.D. Program proposed.

3. The Department of Industrial Engineering library holdings and all undergraduate and graduate programs, as well as the new proposal for the Ph.D. Program in Industrial Engineering, have been reviewed in 1990 and 1991 by outside reviewers and formal reports were submitted to the Graduate School and the administration. It was clearly indicated that the Library holdings in Industrial Engineering is strong.

Industrial Engineering Department
P.O. Box 248294
Coral Gables, Florida 33124-0623
FAX: 305-284-4040 • Phone: 305-284-2344 • Telex: UM 519308

I would appreciate it if you would convey this information to the Senators expressing concern before the second reading and I look forward to a positive Senate resolution on April 27.

Thank you for your efforts and cooperation.

Sincerely,

Tarek M. Khalil, Ph.D., P.E.
Professor and Chairman

TMK/jp
Enclosures

cc: Dr. Eugene Eckstein

UNIVERSITY OF Miami

APR 17

April 16, 1992

MEMORANDUM

TO: Dr. Tarek Khalil
Chairman, Industrial Engineering Department

FROM: Angus M. Mundy
Assistant Director
for Library Collections

Subject: Industrial Engineering Collection

Richter Library's current collections in support of Industrial Engineering programs are excellent. The 1991 assessment of Library resources and facilities by the Accreditation Board for Engineering and Technology (ABET) supports this evaluation. The Industrial Engineering collections were also evaluated as "excellent" by outside reviewers of the Graduate Program in IE. They did recommend the purchase of 15 additional journal subscriptions. However, upon the Library's review of these recommendations, it was determined that subscriptions were already in place for eight of the 15, two others could not be identified, and one was a new publication which had not yet reached the market. The annual cost in 1992 of the four journals which the library could identify, but did not already own, was about $400. These four journals were <u>not</u> ordered in 1991 since the Library was in the process of canceling 450 subscriptions. However, they will be ordered early in the 1992/93 fiscal year.

Industrial Engineering programs are very much inter-disciplinary. Many of the materials purchased for support of Management Science, Computer Science, Computer Information Systems, and Electrical Engineering programs are pertinent to research and teaching in Industrial Engineering. The major resources of Calder Library at the Medical Campus are also available to faculty and students pursuing research or studies related to the bio-medical aspects of Industrial Engineering programs.

Otto G. Richter Library, P.O. Box 248214, Coral Gables, FL 33124-0320
305-284-3551 Fax 305-665-7352

Based on the Library's own assessment, the recent ABET and Graduate Program evaluations, the total Library collection available and prospective funding, the Library can adequately support a Ph.D. program in Industrial Engineering. Additional resources will have to be allocated for Industrial Engineering material, probably in the range of $2,000 - 3,000 annually. However, this is a manageable amount in the context of a total materials budget of more than $2.5 million.

AMM/jk

cc: F. Rodgers
T. Rogero
C. Christiansen

2. PHYSICAL RESOURCES

2.a. ADEQUACY OF LIBRARY HOLDINGS

The Library has an annual allocated budget for the Department of Industrial Engineering for acquiring books and periodicals. The current annual budget is $15,000 for books and $10,000 for journals and periodicals. Since subjects allocated by the Library under Industrial Engineering areas are common with several other departments in the University, the Library holdings and budget allocation by subject area become much larger. For example, the Library has significant holdings in the areas of business administration. The Gold Fund, a special endowed Library fund for the School of Business is providing added resources to the Library. Also, the Medical School Library has a very large collection of materials that are very useful for the programs in Ergonomics and Safety. The Mathematics Library contains many journals which are relevant to the quantitative areas of Industrial Engineering.The Library holdings in Industrial Engineering are considered to be strong. Additions in the area of Manufacturing Engineering have been requested and are currently being acquired. (see 7. Comparison with High-Quality Established Programs.)

A partial listing of journals and periodicals available in Industrial Engineering and related disciplines are:

Academy of Management
Academy of Management Review
Acta Orthopaedica Scandinavica
Acta Physiologica Scandinavica
Across the Board
Acta Biotheoretica
Administrative Science Quarterly
American Economic Review
American Industrial Hygiene Association Journal
American Journal of Physical Anthropology
American Journal of Physiology
American Journal of Psychoanalysis
American Journal of Psychology
American Statistical Association Journal
American Statistician
Annals of Biomedical Engineering
Annals of Human Biology
Applied Ergonomics
Army Research and Development
Atmospheric Environment
Behavior Research Methods and Instrumentation and Computers
Bell Journal of Economics
Biological Bulletin

Biophysical Journal
Biotechnology and Bioengineering
Brain Journal of Neurology
Bulletin of Mathematical Biology
Business Economics
Business Horizons
California Management Review
Columbia Human Rights Law Review
Computers and Biomedical Research
Computers and Industrial Engineering
Computers and Operations Research
Computers and People
Decision Sciences
Dissertation Abstracts
Econometrica
Economic Journal
Electroencephalography and Clinical Neurophysiology
Environment
Environmental Science and Technology
Ergonomics
European Journal of Operational Research
Federal Register
Financial Executive
Geographical Analysis
Harvard Business Review
Human Biology
Human Development
Human Relations
I E E E Spectrum
I I E Transactions
I L O Information
I L O Publications
Industrial and Labor Relations Review
Industrial Engineering
Industrial Relations
Industry Week
Interfaces
International Economic Review
International Journal of Engineering Science
International Journal of Environmental Studies
International Journal of Man-Machine Studies
International Journal of Production Research
Journal of American Statistical Association
Journal of Anatomy

Journal of Analytical Psychology
Journal of Applied Behavior Analysis
Journal of Applied Psychology
Journal of Applied Physiology
Journal of Biomechanics
Journal of Biomedical Materials Research
Journal of Bone and Joint Surgery
Journal of Business
Journal of Econometrics
Journal of Economics and Business
Journal of Economic Literature
Journal of Environmental Economics and Management
Journal of Environmental Engineering. (copy 2)
Journal of Experimental Psychology
Journal of Human Evolution
Journal of Humanistic Psychology
Journal of Industrial Economics
Journal of Industrial Relations
Journal of Marketing
Journal of Marketing Research. (Cumulative Index)
Journal of Medical Engineering and Technology
Journal of Money, Credit and Banking
Journal of Occupational and Organizational Psychology
Journal of Optimization Theory and Applications
Journal of Physiology
Journal of Planning and Environmental Law
Journal of Regional Science
Journal of Safety Research
Journal of Speech and Hearing Disorders
Journal of Systems Management
Lancet
Management Accounting
Management Review
Management Science
Mathematical Programming
Mathematics of Operations Research
Medical and Biological Engineering and Computing
Medical Journal of Australia
Monthly Labor Review
National Productivity Review
Nature
New Scientist
Occupational Hazards
Occupational Health and Safety

O E C D Observer
Operational Research Quarterly
Operations Research
Organizational Dynamics
Perceptual and Motor Skills
Personnel Journal
Personnel Psychology
Physiological Reviews
Proceedings of the Royal Society of London
Public Administration Review
Rehabilitation Counseling Bulletin
Remote Sensing of Environment
Research Quarterly for Exercise and Sport
Review of Economics and Statistics
Review of Income and Wealth
Royal Statistical Society
Sales and Marketing Management
Scandinavian Journal of Rehabilitation Medicine
Scientific American
Simulation Journal
Sloan Management Review (Cumulative Index)
Small Group Research
Socio-economic Planning Science
Southern Economic Journal
Supervisory Management
Transportation Science

2.b. LABORATORY EQUIPMENT

The Department of Industrial Engineering administers several laboratories in the McArthur Engineering Building and a laboratory at the Medical School's Comprehensive Pain and Rehabilitation Center. These laboratories serve both the undergraduate as well as graduate students in the department. Laboratories that are particularly suitable for graduate research and the type of equipment in their laboratories are given here.

2.b.1. Microcomputer Laboratory

Location of laboratory: Room 271/272, McArthur Building
Purpose of laboratory: The main purpose of the laboratory is to support courses offered by the Department of Industrial Engineering which require microcomputer work. The laboratory is also used by faculty and graduate students of the department for research purposes.
Existing equipment: The lab is equipped with fifteen (15) personal computers. Eight (8) of them were procured during the last year and are based on either the INTEL 80386DX or 80386SX microprocessors. They are equipped with hard drives with at least 60 megabytes of

storage and VGA monitors. The other seven computers were acquired in earlier years and are based on either the INTEL 8088 or 80286 microprocessors. There are five 9-pin dot matrix printers and one Hewlett Packard Deskjet printer shared by the computers. In addition, students have access to the College of Engineering Computing Facilities (see 2.b.7).

Assessment of current equipment: The current equipment is adequate for general computing purposes. The newly acquired computers provide capabilities for applications with intensive numerical processing or advanced graphics such as computer-aided design.

2.b.2 Computer Integrated Manufacturing Laboratory

Location of laboratory: Room 155/156, McArthur Building

Purpose of laboratory: The objective of the Computer Integrated Manufacturing Laboratory is to provide the students with the required training on hardware and equipment, and methods of manufacturing in a CIM environment. This is accomplished by assigning laboratory projects in the various courses in the area of CIM whereby the student is trained on individual pieces of automation equipment. Integration concepts are then taught in the integrated systems section of the laboratory.

Existing equipment: The Robotics and Automation Laboratory houses state-of-the-art equipment to support the above mentioned areas of applications and research. This equipment includes 4 IBM robot systems (donated by IBM), a Motionmate 5-axis robot, a Seiko 700 5-axis robot, a MODACS V industrial controller (donated by Modcomp), 4 IBM microcomputers, 2 linear flexible conveyors, a Robotmart 3-axis CNC minimill, a spectralight CNC lathe, and a Bridgeport V2E3 3-axis CNC milling machine. In order to provide the students with state-of-the-art knowledge and experience, the Department of Industrial Engineering has recently acquired a new industrial programmable controller, and EX mill/EZ surf software. The latter software is developed specifically for the Bridgeport CNC milling machine series, which allows a complete integration of the computer aided design and computer aided manufacturing phases required to machine parts. The department has also acquired a new PUMA 562 robot system. This is a 6-axis servo controlled industrial robot equipped with Unimation's proprietary VAL II control and programming capabilities and simple user-friendly program instructions. The design of VAL II features the ability to communicate and interact with the manufacturing environment and allows users to advance from isolated cells of automation to fully integrated systems. The most recent acquisition is an Apollo work station and SILMA software. These acquisitions allow the students to work and perform research on problems involving dynamics, product and process design, graphic simulation, and manufacturing process planning.

Assessment of current equipment: The current equipment is adequate for teaching and conducting research in several areas of Computer Integrated Manufacturing, namely: Robotics, Automated Assembly, Numerical Control, Product and Process Design, and Process Planning. Recent investments in this laboratory are in excess of $700,000 acquired through donations by industry, through research support and other departmental sources.

Incremental needs: The Department of Industrial Engineering recognizes the importance of quality assurance and material handling as components of CIM. Software for these areas or is now being developed in the CIM Laboratory to support the material handling aspects.

Equipment for quality assurance is progressively being acquired.

2.b.3. **Ergonomics Laboratory**

Location of laboratory: Rooms 288, McArthur Building
Purpose of laboratory: The main purpose of this laboratory is to support courses in the area of Ergonomics, Human Factors Engineering, and Biomechanics, and to conduct research projects in these fields. The equipment is used heavily by graduate students to conduct their research projects. The laboratories have state of the art equipment and software which permits students and faculty to conduct cutting edge research.
Existing equipment: Our Ergonomics Laboratories house the following equipment: bicycle ergometer, treadmill, oxygen analyzer (Beckman OM-11), carbon dioxide analyzer (capnograph), ventilation meter (Parkinson-Cowan), reaction time measurement device, depth perception device, tracking device, Sensormedics R612 8-channel recorder with all of the needed preamplifiers and amplifiers that accept different biological signals, Sensormedics carbon dioxide analyzer (LB-2), Sensormedics ventilation measurement model (VMM-2), IBM-AT microcomputer, Data Translation analog to digital converter board (DT-2801-A), Selspot 3-D motion analysis system, Faro 3-D posture analysis system, anthropometry measurement kit, strength measurement load cells and digital readout devices, and Kistler force-platform with software.
Adequacy of lab space: Ergonomics Laboratory space barely meets the existing needs for graduate study and research. As the number of graduate students increase and funded research expands, additional space will be needed.

2.b.4. **The Comprehensive Pain and Rehabilitation Center Ergonomics Laboratory**

Location of laboratory: South Shore Hospital, Rooms 603, 702, 704
Purpose of laboratory: The Ergonomics and Bioengineering Division of the Comprehensive Pain and Rehabilitation Center has several laboratories. The purpose of these laboratories is to conduct functional capacity assessment and to support the center's programs of treatment and rehabilitation. The laboratories also support faculty and students research projects in Ergonomics and Rehabilitation.
Existing equipment: Knee reflex reaction timer, Schaevitz digital transducer readout, pain measurement device, Chattanooge grip strength, digital timers (2), Wavetek wave generator, Lafayette reaction time device, tremor device, Okidata printer, IBM XT, Ariel performance analysis system, Kistler force platform, Panasonic VCR, Magnavox cameras (2), alphacell force readout, Bofors force readout, static strength testing station, Intellect VMS stimulation unit, Hitachi oscilloscope, Heath power supply, Hewlett-Packard function generator, scope multitester, IBM S260, Hewlett-Packard laser jet printer, IBM Proprinter X24, Hewlett Packard ScanJet, Hewlett Packard plotter, IBM S2 70-386, 3 Codetron units, PDP 11-23, back strength testing frame, Bofors force readout, Cyborg EMG unit (2), Ariel computerized exercise system multi-station, arm-leg station, AST computers (2), Samsung screens (4), Citizen printer, Fitron cycle-ergometer, and AMF quantum XL fitness computer.
Assessment of current equipment: Existing laboratory equipment and software represent state

of the art in Ergonomics, Biomechanics, and Rehabilitation.
Adequacy of laboratory space: Existing space is accommodating current need. Additional space on the ninth floor of the building is being used for job simulation. Renovation of that space for future use is being contemplated.

2.b.5. **Industrial Hygiene Lab**

Location of laboratory: McArthur Building, Room 278.
Purpose of laboratory: To support advanced courses in Industrial Hygiene and to conduct research pertaining to occupational physical and chemical stress control equipment. **Equipment:** Laboratory is equipped with a vibration station and noise and vibration measuring equipment.

2.b.6. **Productivity Research Lab**

Location of laboratory: McArthur Building, Room 279.
Purpose of laboratory: To conduct advanced research in Productivity Engineering.
Equipment: Microcomputers. Funds will be drawn from revenues generated by the Third International Conference on Productivity and Quality Research.

2.b.7. **College of Engineering Computing Facilities**

Computer Facilities: In addition to the University-wide computer facilities, engineering faculty and students have access to college wide computer facilities as well as computer facilities in individual departments. There are three college-wide computer laboratories. The college wide computer facilities are briefly described below:

The Clarke Computational Laboratory
Location of laboratory: McArthur Building, Room 237.
Purpose of laboratory: The Clarke Computational Laboratory is equipped with twenty terminals. These terminals are hard wired to the IBM 3090 and the Vax Cluster in the University Computer Center via three multiplexers for students' use in course work computation. There are a total of twenty four lines available. Twenty modified Hazeltine terminals and one Data South printer are housed in the Clarke laboratory. The Clarke laboratory is open seven days a week for use by engineering students and other students enrolled in engineering courses. Student monitors are available for assistance.

Computer Graphics Laboratory
Location of laboratory: McArthur Building Annex, Room 201.
Purpose of laboratory: This laboratory includes twenty-eight stations with specially designed provisions that make them appropriate for teaching engineering graphics. Presently, equipment for twenty stations has been acquired and installed. Each station is equipped with an IBM PS/2 model 55SX computer.

The Computer Aided Design Laboratory

Location of laboratory: McArthur Building, Room 235.
Purpose of laboratory: The Computer Aided Design (CAD) Laboratory provides Interactive Computer Aided Design facilities for graduate/upper level undergraduate design courses and faculty research. This laboratory is built around a HARRIS 800 super-mini computer system. The 48 bit CPU machine has 1.5 MB of main memory and has thirty-two devices attached to it. The system includes a single port, 474 MB fixed disk drive and 75 IPS, 800/1600 BPI tape unit. There are eight color graphics terminals attached to the system. Other peripheral equipment include a 450 lines per minute line printer, a CALCOMP 1075 four pen color plotter, an eight pen, Hewlett Packard 7550 plotter, a laser printer and numerous alphanumeric terminals. The software library includes MOVIE.BYU, FRAME.BYU, TEMPLATE and other smaller packages, which provides the laboratory capability for sophisticated color graphics, three dimensional modeling and high level engineering analysis. This laboratory is also open seven days a week. In addition, a GOULD 6081 super-mini computer is also housed in this laboratory. the 32 bit CPU has 8 MB main memory and has 32 terminals attached to it. The system includes two 300 MB fixed minute line printer. This system uses the UNIX operating system. This system is used for both instructional purpose and research.

A college wide local area network has been installed. This network is connected to the University wide network, which in turn is connected to the global INTERNET network. The Gould system as well as a number of work stations and personal computers in different departments are connected to the network.

All users of the mainframe computer facilities must be issued a user identification number tied to specific University of Miami accounts to be charged. In course work, the faculty member obtains the access numbers for each student in the class. For research or administrative work, the appropriate principal investigator or department chairman assumes responsibility for obtaining access numbers for authorized users. Monthly usage billing are provided, by user identification number with account number. At present there is no method of limitation on computer time used. Access numbers are authorized with a beginning date and an ending date. Should usage by a individual be excessive based upon monthly billings, the appropriate faculty member/administrator may request a change in the termination data of access numbers for specific users.

Computer usage on the main frames are measured by the monthly bills. The college wide facility does not have a billing system. The usage is measured by the number of class accounts requested by the faculty. With the proliferation of personal work stations and personal computer there has been a move away from central computers. Overall computer usage has been increasing steadily. With the variety of Computer equipment available to students and faculty members in the College of Engineering, it is believed that supporting facilities in this area should be adequate.

2. PHYSICAL RESOURCES

2.a. ADEQUACY OF LIBRARY HOLDINGS

The Library has an annual allocated budget for the Department of Industrial Engineering for acquiring books and periodicals. The current annual budget is $15,000 for books and $10,000 for journals and periodicals. Since subjects allocated by the Library under Industrial Engineering areas are common with several other departments in the University, the Library holdings and budget allocation by subject area become much larger. For example, the Library has significant holdings in the areas of business administration. The Gold Fund, a special endowed Library fund for the School of Business is providing added resources to the Library. Also, the Medical School Library has a very large collection of materials that are very useful for the programs in Ergonomics and Safety. The Mathematics Library contains many journals which are relevant to the quantitative areas of Industrial Engineering.The Library holdings in Industrial Engineering are considered to be strong. Additions in the area of Manufacturing Engineering have been requested and are currently being acquired. (see 7. Comparison with High-Quality Established Programs.)

A partial listing of journals and periodicals available in Industrial Engineering and related disciplines are:

Academy of Management
Academy of Management Review
Acta Orthopaedica Scandinavica
Acta Physiologica Scandinavica
Across the Board
Acta Biotheortica
Administrative Science Quarterly
American Economic Review
American Industrial Hygiene Association Journal
American Journal of Physical Anthropology
American Journal of Physiology
American Journal of Psychoanalysis
American Journal of Psychology
American Statistical Association Journal
American Statistician
Annals of Biomedical Engineering
Annals of Human Biology
Applied Ergonomics
Army Research and Development
Atmospheric Environment
Australian Journal of Psychology & Philosophy
Behavior Research Methods and Instrumentation and Computers
Bell Journal of Economics

Bell Journal of Economics and Management Science
Biological Bulletin
Biophysical Journal
Bioscience
Biotechnology and Bioengineering
Brain Journal of Neurology
British Journal of Industrial Relations
Bulletin of Mathematical Biology
Business Economics
Business Horizons
California Management Review
Columbia Human Rights Law Review
Computers and Biomedical Research
Computers and Industrial Engineering
Computers and Operations Research
Computers and People
Decision
Dissertation Abstracts
Econometrica
Economic Journal
Electroencephalography and Clinical Neurophysiology
Engineering Materials and Design
Environment
Environmental Science and Technology
Ergonomics
European Journal of Operational Research
Federal Register
Financial Executive
Geographical Analysis
Harvard Business Review
Human Biology
Human Development
Human Relations
IBM Systems Journal
I E E E Spectrum
I I E Transactions
I L O Information
I L O Publications
Industrial and Labor Relations Review
Industrial Engineering
Industrial Relations
Industrial Week
Interfaces
International Economic Review

International Journal of Engineering Science
International Journal of Environmental Studies
International Journal of Man-Machine Studies
International Journal of Production Research
International Labour Office
Journal of Acoustical Society of America
Journal of American Statistical Association
Journal of Anatomy
Journal of Analytical Psychology
Journal of Applied Behavior Analysis
Journal of Applied Psychology
Journal of Applied Physiology
Journal of Biomechanics
Journal of Biomedical Materials Research
Journal of Bone and Joint Surgery
Journal of Business
Journal of Econometrics
Journal of Economics and Business
Journal of Economic Literature
Journal of Engineering Physics
Journal of Environmental Economics and Management
Journal of Environmental Engineering. (copy 2)
Journal of Experimental Psychology
Journal of Human Evolution
Journal of Humanistic Psychology
Journal of Industrial Economics
Journal of Industrial Relations
Journal of Marketing
Journal of Marketing Research. (Cumulative Index)
Journal of Medical Engineering and Technology
Journal of Money, Credit and Banking
Journal of Occupational Psychology
Journal of Optimization Theory and Applications
Journal of Physiology
Journal of Planning and Environmental Law
Journal of Regional Science
Journal of Safety Research
Journal of Speech and Hearing Disorders
Journal of Systems Management
Journal of Theoretical Biology
Lancet
Management Accounting
Management Focus
Management Review

Management Science
Management Services
Mathematical Programming
Mathematics of Operations Research
Medical and Biological Engineering
Medical Journal of Australia
Mini-Micro Systems
Modern Materials Handling
Monthly Labor Review
National Bureau of Economic Research General Studies
National Industrial Conference Board
National Productivity Review
Nature
New Scientist
Occupational Hazards
Occupational Health and Safety
O E C D Observer
Operational Research Quarterly
Operations Research
Organizational Dynamics
Perceptual and Motor Skills
Personnel
Personnel Psychology
Physical Therapy
Physiological Reviews
Proceedings Royal Society of London
Public Administration Review
Rehabilitation Counseling Bulletin
Rehabilitation Literature
Remote Sensing of Environment
Research Management
Research Quarterly for Exercise and Sport
Review of Economics and Statistics
Review of Income and Wealth
Robotics Today
Royal Statistical Society
Sales and Marketing Management
Scandinavian Journal of Rehabilitation Medicine
Scientific American
Simulation Journal
Sloan Management Review (Cumulative Index)
Small Group Behavior
Socio-economic Planning Science
Southern Economic Journal

Supervisory Management
Transportation Science
United States Congress
U.S. Department of Health, Education and Welfare
U.S. Department of Labor, Bureau of Labor Statistics
U.S. Office of Management and Budget

2.b. LABORATORY EQUIPMENT

The Department of Industrial Engineering administers several laboratories in the McArthur Engineering Building and a laboratory at the Medical School's Comprehensive Pain and Rehabilitation Center. These laboratories serve both the undergraduate as well as graduate students in the department. Laboratories that are particularly suitable for graduate research and the type of equipment in their laboratories are given here.

2.b.1. Microcomputer Laboratory

Location of laboratory: Room 271/272, McArthur Building
Purpose of laboratory: The main purpose of the laboratory is to support courses offered by the Department of Industrial Engineering which require microcomputer work. The laboratory is also used by faculty and graduate students of the department for research purposes.
Existing equipment: The lab is equipped with fifteen (15) personal computers. Eight (8) of them were procured during the last year and are based on either the INTEL 80386DX or 80386SX microprocessors. They are equipped with hard drives with at least 60 megabytes of storage and VGA monitors. The other seven computers were acquired in earlier years and are based on either the INTEL 8088 or 80286 microprocessors. There are five 9-pin dot matrix printers and one Hewlett Packard Deskjet printer shared by the computers. In addition, students have access to the College of Engineering Computing Facilities (see 2.b.7).
Assessment of current equipment: The current equipment is adequate for general computing purposes. The newly acquired computers provide capabilities for applications with intensive numerical processing or advanced graphics such as computer-aided design.

2.b.2 Computer Integrated Manufacturing Laboratory

Location of laboratory: Room 155/156, McArthur Building
Purpose of laboratory: The objective of the Computer Integrated Manufacturing Laboratory is to provide the students with the required training on hardware and equipment, and methods of manufacturing in a CIM environment. This is accomplished by assigning laboratory projects in the various courses in the area of CIM whereby the student is trained on individual pieces of automation equipment. Integration concepts are then taught in the integrated systems section of the laboratory.
Existing equipment: The Robotics and Automation Laboratory houses state-of-the-art equipment to support the above mentioned areas of applications and research. This equipment includes 4 IBM robot systems (donated by IBM), a Motionmate 5-axis robot, a Seiko 700 5-axis robot, a MODACS V industrial controller (donated by Modcomp), 4 IBM microcomputers, 2

linear flexible conveyors, a Robotmart 3-axis CNC minimill, a spectralight CNC lathe, and a Bridgeport V2E3 3-axis CNC milling machine. In order to provide the students with state-of-the-art knowledge and experience, the Department of Industrial Engineering has recently acquired a new industrial programmable controller, and EX mill/EZ surf software. The latter software is developed specifically for the Bridgeport CNC milling machine series, which allows a complete integration of the computer aided design and computer aided manufacturing phases required to machine parts. The department has also acquired a new PUMA 562 robot system. This is a 6-axis servo controlled industrial robot equipped with Unimation's proprietary VAL II control and programming capabilities and simple user-friendly program instructions. The design of VAL II features the ability to communicate and interact with the manufacturing environment and allows users to advance from isolated cells of automation to fully integrated systems. The most recent acquisition is an Apollo work station and SILMA software. These acquisitions allow the students to work and perform research on problems involving dynamics, product and process design, graphic simulation, and manufacturing process planning.

Assessment of current equipment: The current equipment is adequate for teaching and conducting research in several areas of Computer Integrated Manufacturing, namely: Robotics, Automated Assembly, Numerical Control, Product and Process Design, and Process Planning. Recent investments in this laboratory are in excess of $700,000 acquired through donations by industry, through research support and other departmental sources.

Incremental needs: The Department of Industrial Engineering recognizes the importance of quality assurance and material handling as components of CIM. Software for these areas or is now being developed in the CIM Laboratory to support the material handling aspects. Equipment for quality assurance is progressively being acquired.

2.b.3. Ergonomics Laboratory

Location of laboratory: Rooms 288, McArthur Building

Purpose of laboratory: The main purpose of this laboratory is to support courses in the area of Ergonomics, Human Factors Engineering, and Biomechanics, and to conduct research projects in these fields. The equipment is used heavily by graduate students to conduct their research projects. The laboratories have state of the art equipment and software which permits students and faculty to conduct cutting edge research.

Existing equipment: Our Ergonomics Laboratories house the following equipment: bicycle ergometer, treadmill, oxygen analyzer (Beckman OM-11), carbon dioxide analyzer (capnograph), ventilation meter (Parkinson-Cowan), reaction time measurement device, depth perception device, tracking device, Sensormedics R612 8-channel recorder with all of the needed preamplifiers and amplifiers that accept different biological signals, Sensormedics carbon dioxide analyzer (LB-2), Sensormedics ventilation measurement model (VMM-2), IBM-AT microcomputer, Data Translation analog to digital converter board (DT-2801-A), Selspot 3-D motion analysis system, Faro 3-D posture analysis system, anthropometry measurement kit, strength measurement load cells and digital readout devices, and Kistler force-platform with software.

Adequacy of lab space: Ergonomics Laboratory space barely meets the existing needs for graduate study and research. As the number of graduate students increase and funded research expands, additional space will be needed.

2.b.4. The Comprehensive Pain and Rehabilitation Center Ergonomics Laboratory

Location of laboratory: South Shore Hospital, Rooms 603, 702, 704
Purpose of laboratory: The Ergonomics and Bioengineering Division of the Comprehensive Pain and Rehabilitation Center has several laboratories. The purpose of these laboratories is to conduct functional capacity assessment and to support the center's programs of treatment and rehabilitation. The laboratories also support faculty and students research projects in Ergonomics and Rehabilitation.
Existing equipment: Knee reflex reaction timer, Schaevitz digital transducer readout, pain measurement device, Chattanooge grip strength, digital timers (2), Wavetek wave generator, Lafayette reaction time device, tremor device, Okidata printer, IBM XT, Ariel performance analysis system, Kistler force platform, Panasonic VCR, Magnavox cameras (2), alphacell force readout, Bofors force readout, static strength testing station, Intellect VMS stimulation unit, Hitachi oscilloscope, Heath power supply, Hewlett-Packard function generator, scope multitester, IBM S260, Hewlett-Packard laser jet printer, IBM Proprinter X24, Hewlett Packard ScanJet, Hewlett Packard plotter, IBM S2 70-386, 3 Codetron units, PDP 11-23, back strength testing frame, Bofors force readout, Cyborg EMG unit (2), Ariel computerized exercise system multi-station, arm-leg station, AST computers (2), Samsung screens (4), Citizen printer, Fitron cycle-ergometer, and AMF quantum XL fitness computer.
Assessment of current equipment: Existing laboratory equipment and software represent state of the art in Ergonomics, Biomechanics, and Rehabilitation.
Adequacy of laboratory space: Existing space is accommodating current need. Additional space on the ninth floor of the building is being used for job simulation. Renovation of that space for future use is being contemplated.

2.b.5. Industrial Hygiene Lab

Location of laboratory: McArthur Building, Room 278.
Purpose of laboratory: To support advanced courses in Industrial Hygiene and to conduct research pertaining to occupational physical and chemical stress control equipment. **Equipment:** Laboratory is equipped with a vibration station and noise and vibration measuring equipment.

2.b.6. Productivity Research Lab

Location of laboratory: McArthur Building, Room 279.
Purpose of laboratory: To conduct advanced research in Productivity Engineering.
Equipment: Microcomputers. Funds will be drawn from revenues generated by the Third International Conference on Productivity and Quality Research.

2.b.7. College of Engineering Computing Facilities

Computer Facilities: In addition to the University-wide computer facilities, engineering faculty and students have access to college wide computer facilities as well as computer facilities in individual departments. There are three college-wide computer laboratories. The college wide computer facilities are briefly described below:

The Clarke Computational Laboratory
Location of laboratory: McArthur Building, Room 237.
Purpose of laboratory: The Clarke Computational Laboratory is equipped with twenty terminals. These terminals are hard wired to the IBM 3090 and the Vax Cluster in the University Computer Center via three multiplexers for students' use in course work computation. There are a total of twenty four lines available. Twenty modified Hazeltine terminals and one Data South printer are housed in the Clarke laboratory. The Clarke laboratory is open seven days a week for use by engineering students and other students enrolled in engineering courses. Student monitors are available for assistance.

Computer Graphics Laboratory
Location of laboratory: McArthur Building Annex, Room 201.
Purpose of laboratory: This laboratory includes twenty-eight stations with specially designed provisions that make them appropriate for teaching engineering graphics. Presently, equipment for twenty stations has been acquired and installed. Each station is equipped with an IBM PS/2 model 55SX computer.

The Computer Aided Design Laboratory
Location of laboratory: McArthur Building, Room 235.
Purpose of laboratory: The Computer Aided Design (CAD) Laboratory provides Interactive Computer Aided Design facilities for graduate/upper level undergraduate design courses and faculty research. This laboratory is built around a HARRIS 800 super-mini computer system. The 48 bit CPU machine has 1.5 MB of main memory and has thirty-two devices attached to it. The system includes a single port, 474 MB fixed disk drive and 75 IPS, 800/1600 BPI tape unit. There are eight color graphics terminals attached to the system. Other peripheral equipment include a 450 lines per minute line printer, a CALCOMP 1075 four pen color plotter, an eight pen, Hewlett Packard 7550 plotter, a laser printer and numerous alphanumeric terminals. The software library includes MOVIE.BYU, FRAME.BYU, TEMPLATE and other smaller packages, which provides the laboratory capability for sophisticated color graphics, three dimensional modeling and high level engineering analysis. This laboratory is also open seven days a week. In addition, a GOULD 6081 super-mini computer is also housed in this laboratory. the 32 bit CPU has 8 MB main memory and has 32 terminals attached to it. The system includes two 300 MB fixed minute line printer. This system uses the UNIX operating system. This system is used for both instructional purpose and research.

A college wide local area network has been installed. This network is connected to the University wide network, which in turn is connected to the global INTERNET network. The Gould system as well as a number of work stations and personal computers in different departments are connected to the network.

All users of the mainframe computer facilities must be issued a user identification number tied to specific University of Miami accounts to be charged. In course work, the faculty member obtains the access numbers for each student in the class. For research or administrative work, the appropriate principal investigator or department chairman assumes responsibility for obtaining access numbers for authorized users. Monthly usage billing are provided, by user identification number with account number. At present there is no method of limitation on

C, P.29 file

UNIVERSITY OF
Miami
FACULTY SENATE

April 1, 1992

Dr. Tarek M. Khalil
Chairman
Industrial Engineering
267 McArthur, 0623

Dear Dr. Khalil:

We thank you for attending the Faculty Senate meeting of March 30 to present the first reading of the proposal for the Ph.D. program in Industrial Engineering.

This is to remind you of the request that was made for additional information as follows.

1. When the Ph.D. program in Ergonomics was approved, there was an arrangement to provide a review of the status of the program at a later date. It was questioned whether this report had been submitted. You stated that a report was made. We would be glad if you would provide a copy to us.

2. It was requested that you update the section on computer facilities, which was thought to be out-of-date with respect to the present status of the facilities.

3. With reference to page 39, please provide more details of other institutions which offer the similar degree of Ph.D. in Industrial Engineering.

If you can send this material to me by the end of next week (April 10), we will be able to consider it at the April 13 Council meeting before it goes to the Senate for the second reading on April 27.

Thank you.

Yours sincerely,

W. J. Whelan
Chair, Faculty Senate

WJW/ca

325 Ashe-Admin. Bldg.
Coral Gables, Florida 33124-4634
305 284-3721

Proposal for a Ph.D. Degree in Industrial Engineering (First Reading)

Dr. Brass, chair of the ad hoc review committee, summarized the deliberations of the committee and their request for additional comparative statistics on the Ergonomics Program. They also requested a letter from the Dean and the Provost approving the budget and the expected expenditures. Such a letter was received prior to the meeting. Dr. Khalil responded to questions about the computer facilities available for the program, the definition of the scope of industrial engineering, and whether this is a new program or an extension of the existing Ph.D. degree in Ergonomics. A request was made to amplify the list of schools nationally offering similar programs, as well as correcting the list of library holdings.

Proposal for a B.S. Degree in Computer Engineering (Second Reading)

Dr. Kamal Yacoub explained that the option of Computer Engineering in Electrical Engineering has now become a program and should have a degree which reads "Bachelor of Science in Computer Engineering". Dr. Yacoub responded to questions about the curriculum and the general degree requirements. Dr. Brass, as Vice Chair and chair of the ad hoc committee to review the program, presented the proposal as a *motion* from the Senate Council, with their recommendation and that of the ad hoc review committee. The *motion carried.*

NIEHS Marine and Freshwater Biomedical Center

This item was deferred to a later meeting.

Ocean Pollution Research Center

Dr. Brass presented the proposal for the Ocean Pollution Research Center and requested approval of the name of the Center as a Sponsored Center (Bylaw VI, 6.6). It was *moved* and seconded to approve the name of the Center. The *motion carried.*

Voting Rights of Research and Educator Faculty (Second Reading)

After discussion of Senate Legislation #91003(A) - Voting Rights for Research Faculty, it was agreed to vote separately on the following six items: 1) use of "Tenured Regular Faculty" vs "Regular Faculty"; 2) through 6) are the items listed in the proposal for Legislation #91003(A). It was *moved* and seconded to amend the first paragraph by substituting "Regular" for "Tenured" faculty. The *motion to amend failed* by a vote of 8 in

UNIVERSITY OF Miami

MEMORANDUM

DATE: March 30, 1992

TO: Faculty Senate

FROM: Martin Becker, Dean, College of Engineering

RE: Ph.D. Program in Industrial Engineering

I wish to convey my enthusiastic support for the Ph.D. Program in Industrial Engineering. I consider the Ph.D. program to be essential for the intellectual and academic goals of the department and the college and for attracting and retaining outstanding faculty. Industrial Engineering, which does provide a Ph.D. program in ergonomics, is now the only department in the College of Engineering not authorized to grant a Ph.D. in the named field of the department.

We recently brought on board in mid-year 1991-92 the faculty member projected to join the faculty by next year in the proposal. This is in addition to converting to tenure track a faculty member previously on staff as a research faculty member. The College of Engineering faculty has been active in scholarship and publication in manufacturing, quality, and management of technology, along with ergonomics.

I am hopeful that we can implement this program as soon as possible.

Approved
3/30/92

MB:fc

College of Engineering
Office of the Dean
P.O. Box 248294
Coral Gables, Florida 33124-0620
305-284-2404
FAX: 305-284-4792

2nd Reading

Proposal

To recognize the Computer Engineering Option Program presently offered under the Bachelor of Science in Electrical Engineering Degree as a separate program independent from the Electrical Engineering Degree program

And

To authorize the granting to its graduates of the new degree

Bachelor of Science in Computer Engineering

Department of Electrical & Computer Engineering
University of Miami

March 30, 1992

UNDERGRADUATE Bulletin Up-Date for 1992-1993 Edition

Seq: U-264

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING
(Computer Engineering Program)—125 credits

FRESHMAN YEAR

First Semester

MTH 111 *Calculus I* 4
CHM 111 *Principles of Chemistry I* 4
ENG 105 *English Composition I* 3
EEN 101 *Orientation Seminar* 0
**Humanistic Elective 3
14

Second Semester

EEN 117 *PASCAL and Introduction to Software Engineering* 3
MTH 112 *Calculus II* 4
PHY 211 *University Physics I* 4
PHY 222 *University Physics Laboratory I* 1
ENG 107 *Writing about Science* 3
15

SOPHOMORE YEAR

First Semester

EEN 201 *Electrical Circuit Theory* 3
MTH 210 *Vectors and Matrices* 3
MTH 317 *Data Structures* 3
PHY 212 *University Physics II* 4
PHY 236 *University Physics Laboratory II* 1
**Social Science Elective 3
17

Second Semester

EEN 204 *Electrical Circuits Laboratory* 1
EEN 304 *Logic Design* 3
EEN 305 *Electronics I* 3
EEN 307 *Linear Circuits and Signals* 3
MTH 309 *Discrete Mathematics I* 3
MTH 311 *Ordinary Differential Equations* 3
16

JUNIOR YEAR

First Semester

EEN 306 *Electronics II* 3
EEN 312 *Microprocessor* 4
EEN 315 *Digital Design Laboratory* 1
EEN 324 *Systems Programming* 3
IEN 311 *Applied Probability and Statistics* 3
**Humanistic Elective 3
17

Second Semester

EEN 311 *Electronics Laboratory* 1
EEN 414 *Computer Organization and Design* 3
EEN 454 *Digital System Design* 4
IEN 380 *Engineering Economy* or Approved Electives 3
MEN 303 *Thermodynamics I* or 3
CEN 210 *Mechanics of Solids I* 3
**Social Science Electives 3
17

SENIOR YEAR

First Semester

EEN 417 *Embedded Microprocessor System Design* 2
EEN 418 *Senior Project Planning* 0
EEN 514 *Computer Architecture* 3
EEN 521 *Computer Operating Systems* 3
Computer Engineering Tech. Elective 3
**Adv. Socio-Humanistic Elective 3
14

Second Semester

EEN 419 *Computer Engineering Senior Project* 3
Computer Engineering Tech. Elective 3
Computer Engineering Tech. Elective 3
EEN 519 *Design of Computing Language* or
MTH 519 *Programming Languages* 3
**Adv. Socio-Humanistic Elective 3
15

ABSTRACT

It is proposed that the degree of Bachelor of Science in Computer Engineering be awarded to students who graduate under the existing Computer Engineering program in the department. The rationale and other relevant data are presented. This would enable us to be included in the lists of universities awarding bachelor's degree in Computer Engineering thus enhancing the visibility of our program with subsequent possible enhancement of recruitment of students seeking the degree. Since the program in Computer Engineering has been in existence for several years already, no new faculty, equipment, library books and journals, secretarial personnel or any other resources are needed to award the proposed degree.

University will award the degree of Computer Engineering in the near future, possibly next year. Inclusion of our name in the lists of universities awarding a degree in Computer Engineering will enhance our visibility and our ability to attract students interested in Computer Engineering at no extra cost. The awarding of the proposed degree will be profitable to the university from all points of view.

Center was already on its way. A letter from him to the general Faculty addressing his appointment system proposals and recommending the creation of the Teaching Faculty was being distributed.

Approval of the Minutes

The minutes of the November 25, 1991 and January 13, 1992 meetings were approved as distributed.

Voting Rights

Prof. Knoblock introduced the proposal on voting rights for Research Faculty and Educator Faculty. It was *moved* and seconded to extend voting rights for Research Faculty for a period up to five years with any extension to be renewed no later than five years. The *motion carried.* It was *moved* and seconded to apply the same language to Clinician-Educator Faculty. The *motion carried.* The proposal would be forwarded to the Senate.

Faculty Senate Retreat

The report of the Retreat on January 25 was mailed to all Senators. The Committee, chaired by Prof. Eckstein, which prepared the agenda, is now working on draft legislation.

New Academic Programs

The Chairman informed the Senate that Prof. Brass was chairing a Committee to study the proposal for a Ph. D. in Industrial Engineering. Another proposal for a Ph. D. in Neurosciences was expected. Senior Vice Provost Sugrue requested an extension for the presentation of this later program. It was *moved* and seconded that a Committee to study the proposal should be appointed and given material on the Neurosciences program in advance of external review which would take place in late February. The *motion carried with one vote against.*

It was reported that a program for a Master of Fine Arts in Creative Writing was to be discussed by the Graduate Council on February 12. A proposal from the Department of Electrical and Computer Engineering was introduced to change the name of the degree for those students graduating from the Computer Engineering program to "Bachelor of Science in Computer Engineering", while retaining the original name for those students graduating from the Electrical Engineering Program. It was *moved* and seconded to take action after verifying that the program had been sanctioned and then forward it to the Senate for approval. The *motion carried unanimously.*

UNIVERSITY OF
Miami
FACULTY SENATE

MEMORANDUM

TO: Ad Hoc Review Committee for Ph.D. in Industrial Engineering

FROM: Barbara L. Hoadley BH
Secretary of the Faculty Senate

DATE: February 3, 1992

SUBJECT: Proposal for a Ph.D. program in Industrial Engineering

Enclosed is the proposal for a Ph.D. program in Industrial Engineering. The complete proposal, including curriculum vitae, is on file in the Senate Office. Please review the material in preparation for a meeting to be called by Dr. Brass sometime late next week.

BLH/s

cc: Professor Garrett Brass, Chair
Professor George Alexandrakis
Professor Daniel Baden
Professor Michael Carlebach

Enclosure

325 Ashe-Admin. Bldg.
Coral Gables, Florida 33124-4634
305 284-3721

G Pending, WW

UNIVERSITY OF Miami

FACULTY SENATE

MEMORANDUM

TO: George Alexandrakis, Michael Carlebach and Daniel Baden

FROM: Bill Whelan
Chair, Faculty Senate

SUBJECT: Proposal for Industrial Engineering Ph.D. Program

DATE: January 6, 1992

This is to request you to constitute an ad hoc Committee to study the attached proposal concerning a Ph. D. Program in Industrial Engineering.

Hoping that you will agree to advise us, perhaps by the February 10 Council meeting, please attend to the following:

1. Ensure that the proposal meets the attached Council guidelines for graduate programs.

2. Compare the proposal with its predecessor to learn whether objections that, I understood were made, have been overcome.

3. Ensure that the budget proposals have the approval of the Provost.

4. Comment on the feasibility of the proposed schedule for implementation and, if you are in disagreement, please propose an alternative.

A copy of the complete proposal is in the Senate Office.

I would ask Dan Baden as the Graduate Council Senate Council representative to be the convenor of your group and to let me know in advance whether we can expect a report by February 10.

325 Ashe-Admin. Bldg.
Coral Gables, Florida 33124-4634
305 284-3721

IE, BM, Pending

UNIVERSITY OF Miami

M E M O R A N D U M

November 21, 1991

TO: Dr. William Whelan, Chairman
Faculty Senate and Government

FROM: Paul K. Sugrue, Senior Vice Provost
and Interim Dean of the Graduate School

SUBJECT: Proposal for Industrial Engineering
Ph.D. Program

The Graduate Council unanimously approved the proposed Ph.D. program in Industrial Engineering at the November 13, 1991 meeting.

I am enclosing a copy of the proposal and the recommendation of the Graduate Council for your action. I am also enclosing a copy of the report of the external review committee. This report should be treated confidentially and should only be shared with appropriate persons.

PKS:nb

Enclosures

Graduate School
P.O. Box 248125
Coral Gables, Florida 33124-2220
(305) 284-4154

COLLEGE OF ENGINEERING

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061-0118

DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING (703) 231-6656 FAX (703) 231-3322

OCT 1991
RECEIVED
GRADUATE
SCHOOL

CONFIDENTIAL

October 14, 1991

Dr. Paul Sugrue
Senior Vice Provost and Dean
Graduate School
University of Miami
P. O. Box 248125
Coral Gables, Florida 33124-2220

Dear Dr. Sugrue:

We have completed our evaluation of the proposal from the Department of Industrial Engineering (IE) concerning the establishment of a Ph.D. Program in IE. Our impressions, conclusions, and recommendations are totally in agreement, therefore, it was decided to submit a team report rather than individual reports.

This visit confirmed our opinion expressed in the IE graduate program review dated September 21, 1990, that serious consideration should be given to expanding the existing Ph.D. program, involving only the ergonomics specialty, to include all those areas normally associated with Industrial Engineering.

The Industrial Engineering Ph.D. program proposal was well written and comprehensive in its presentation. The IE faculty, students, and college of engineering administration were all supportive and enthusiastic advocates for its establishment. We fully support its approval and encourage the timely approval and implementation at the earliest time.

Attached you will find our opinions and recommendations. We hope you find it helpful and we wish you the best of luck in your consideration and approval process.

Please let us know if additional information is required.

Sincerely,

Robert D. Dryden, Ph.D., P.E.

Anil Mital, Ph.D., P.E, C.S.E.

RDD/pr

Attachment

CONFIDENTIAL

Industrial Engineering Ph.D. Program Review

Submitted To

The University of Miami

Graduate School

By

Robert D. Dryden

And

Anil Mital

October 14, 1991

CONTENTS

INTRODUCTION

CURRICULUM AND FACILITIES

GENERAL OBSERVATIONS
- Faculty
- Research Funding
- Financial Needs
- Graduate Students

RECOMMENDATIONS

INTRODUCTION

The on-campus visit September 12, 1991, confirmed our opinion expressed in the IE graduate program review dated September 21, 1990, that serious consideration should be given to the establishment of a Ph.D. program addressing all those areas normally associated with Industrial Engineering.

The Industrial Engineering Ph.D. program proposal was well written and comprehensive in its presentation. The IE faculty, students, and college of engineering administration were all supportive and enthusiastic advocates for its establishment. We fully support its establishment and encourage the university's timely approval and implementation at the earliest time.

CURRICULUM AND FACILITIES

Curriculum

The curriculum proposed by the IE Department presented a well rounded program of sufficient breadth and depth to address the needs of students at the Ph.D. level. The proposed required courses assured that students would be prepared in the basic knowledge and combined with the proposed elective courses in each specialty the program would represent a comprehensive offering sufficient to support Ph.D. level study. It is suggested that a course in Computer Aided Process Planning be substituted for Productivity Planning and Improvement which could then be moved to the approved elective list. A course in Inventory Control, Forecasting, Scheduling and MRP, and one in Advanced Manufacturing Processes should also be considered.

It was the opinion that the IE Department has done an excellent job of interdisciplinary program integration with other departments by cross listing appropriate courses. These courses are fully developed and are offered on a regular rotation. The faculty in the IE Department have established close working relationships with faculty teaching related courses in other departments. The rapport that has been established certainly provides a synergistic environment and extends the faculty resources for both instruction and staffing the Ph.D. research committees. We believe the IE Department has postured itself very well to rapidly implement a Ph.D. program of outstanding quality, and greater maturity than would normally be the case for a new program.

The Ph.D. program in IE would also serve as a focal point for collaboration with faculty from other engineering departments. The potential interaction might include Mechanical Engineering faculty interested in product and machine design along with Electrical Engineering faculty interested in system controls in combination with Industrial Engineering faculty interested in system integration. Such a combination provides an opportunity for faculty to interact and provide a truly interdisciplinary perspective in a synergistic manner.

Facilities

The facilities of the IE Department have been recently expanded along with considerable development and renovation of existing laboratories. The expansion of the McArthur Engineering Building has resulted in additional space being allocated to the IE Department which has made the development of a new Computer Integrated Manufacturing Laboratory possible. The space and the purchase of over $700,000 in state of the art equipment have resulted in an excellent laboratory. Computer facilities provided by the Department, the College, and the University were considered to be very adequate to meet the needs of students enrolling in an IE Ph.D. program.

The library was considered to be well equipped to handle an IE Ph.D. program and any additional requirements could be adequately met within the existing budgetary limits. It was our opinion that additional requirements would be modest at about $2,500 per year.

GENERAL OBSERVATIONS

Faculty

The faculty are very supportive and enthusiastic about the establishment of a Ph.D. program in IE and are prepared to immediately implement the program once it is approved. They have the maturity and the demonstrated scholarly activity necessary to provide the students an excellent Ph.D. level educational experience. We understand that one new faculty has been hired and that he will join the department in January, 1992.

As mentioned earlier, the IE faculty enjoys outstanding support from faculty in other departments who have demonstrated their willingness to continue their activities and assistance with the proposed Ph.D. program. Their existing activities have been directed both in instruction and in research collaboration on graduate student committees. The number of IE faculty along with those in other departments who have been active with the IE Department are believed to be sufficient to support the proposed program both instructionally as well as with research.

The IE faculty have a history of good graduate student production and have been unusually active with their students. The IE departmental faculty have a reputation of being excellent teachers. In fact, records show that many have been recognized and have received teaching awards. They have encouraged and supported the preparation and presentation of technical papers at both national and international conferences and meetings. They have comparable standing among peers at institutions which have Ph.D. IE programs in visibility and in technical quality.

Research Funding

The IE faculty have been successful in their research endeavors including funding. The research expenditures of $85,869 per faculty compare very well with other IE programs. In fact, that level of funding ranks seventh (7th) nationally in the survey published by the IE Division of the American Society for Engineering Education (ASEE).

The potential for increased funding would certainly follow the implementation of the proposed Ph.D. program. This funding would result from increasing the potential sponsors to include those whose funding is only directed at Ph.D. programs and an opportunity to interact with local industry at a higher level. Also, opportunities for faculty development grants would be increased by the approval and implementation of the proposed program.

Financial Needs

The financial needs provided in the proposal appears to be realistic and also very modest. The investment will achieve a positive net marginal revenue in the 1995-96 academic year. The investment appears to be small in comparison to many advantages.

Graduate Students

The students with whom we visited were extremely enthusiastic about the proposed program. It was also noted that several students have been awaiting the approval of such a program and would immediately seek admission. The sources of students from those just awaiting the approval of the program, those graduating from the department at the master's level, and those who will apply from other schools certainly appear to be sufficient to justify a Ph.D. program. In fact, the department will likely have the luxury of being very selective in their admissions process, a situation that would be enviable to many schools. It was our conclusion that approval of the proposed program would be a timely response to an existing demand.

RECOMMENDATIONS

It is the recommendation that the proposal for a Ph.D. program in Industrial Engineering be approved and implemented at the earliest possible time. We believe there is sufficient student demand, faculty resources, facilities, funding, and administrative support to assure its success. It could also avoid a potential plateauing of faculty development in the IE Department and enhance further the peer standing in quality and visibility of both IE faculty and students.

It is further suggested that the requirement of a B.S. in engineering be removed as a general requirement for admission (page 35). We believe this would unnecessarily limit the potential student population who could seek admission. The requirement of an engineering degree would be sufficient to assure both the quality and requisite background of candidates for admission.

UNIVERSITY OF
Miami

MEMO

To: Dr. Paul K. Sugrue, Sr. Vice Provost
and Interim Dean of Graduate School

From: Dr. Tarek M. Khalil
Chairman, Department of Industrial Engineering

Subject: Ph.D. Proposal in Industrial Engineering

Date: November 4, 1991

I received your memorandum dated October 29, 1991 together with the external reviewers' report. I am pleased with the positive findings of the report. In response to the reviewers' suggestions the following course of action will be followed:

Reviewers' Comments:	It is suggested that a course in Computer Aided Process Planning be substituted for Productivity Planning and Improvement which could then be moved to the approved elective list.
Course of Action:	A course in Computer Aided Process Planning will be developed by Professor E. Iakovou upon his arrival to campus this January. Dr. Iakovou is a graduate of Cornell University and his area of expertise fits well into this subject. The Productivity Planning and Improvement Course will be included in the list of approved electives.
Reviewers' Comments:	A course in Inventory Control, forecasting, scheduling and MRP should be considered.
Course of Action:	The contents suggested are included in the course IEN 665 which is already required in the program.
Reviewers' Comments:	Advanced Manufacturing Processes course should also be considered.
Course of Action:	Dr. Boubekri is already in the process of preparing this course for future offering. Dr. Boubekri's area of expertise is in manufacturing engineering.

Industrial Engineering Department
P.O. Box 248294
Coral Gables, Florida 33124-0623
FAX: 305-284-4040 • Phone: 305-284-2344 • Telex: UM 519308

Reviewers' Comments:	It is suggested that the requirement of a B.S. degree in engineering be removed as a general requirement for admission. (Page 35).
Course of Action:	We concur with this and the word B.S. is removed from the Proposal.

Enclosed: Updated copy of Ph.D. Proposal

UNIVERSITY OF Miami

M E M O R A N D U M

November 7, 1991

TO: Graduate Council

FROM: Subcommittee Members for Programs and Degrees:
Dr. S. Asfour, Industrial Engineering
Dr. D. Olson, Meteorology & Physical Oceanography
Dr. P. Sugrue, Chair
Dr. M. Carlebach, Faculty Senate Liaison (ex-officio)

SUBJECT: Ph.D. Proposal in Industrial Engineering

The committee strongly endorses the proposed extension of Ph.D. program in Industrial Engineering. The proposal follows the recommendations of the recent review of the graduate program in Industrial Engineering. The outside reviewers' report is very supportive. Dr. Khalil's responses to all recommendations have been timely and positive.

In summary, the committee feels this action will strengthen the College of Engineering and the University.

PKS/msb

Graduate School
P.O. Box 248125
Coral Gables, Florida 33124-2220
(305) 284-4154

Proposal for the Establishment of a Ph. D. Program in the Department of Industrial Engineering

November 4, 1991

SYNOPSIS OF PROPOSAL

It is proposed to establish a Ph.D. degree in Industrial Engineering. A proposal was submitted to establish such a degree in 1984. The University felt that more time was needed to develop the junior faculty's scholarly output. Currently, all IEN faculty have a graduate faculty status. The majority have at least five refereed journal articles within the last five years. Sponsored research has increased many folds over the past five years. A report of an independent outside consultant engaged in 1990 by the Graduate School to evaluate the graduate programs in the Industrial Engineering Department was extremely positive, and recommended the establishment of a Ph.D. program in Industrial Engineering.

1. RATIONALE

The faculty of the Department of Industrial Engineering proposes to offer a Ph.D. degree in Industrial Engineering. The faculty believes that it is in the best interest of the University, the College of Engineering, the Department, and the students that a Ph.D. degree in Industrial Engineering be established. A Ph.D. program is seen to serve student needs, support faculty scholarly and research output and enhance the image of the Department, the College of Engineering, and the University. It will also act in synergy with the existing Ph.D. program in Ergonomics, further enhancing its strength and viability. Over the past few years, the department has significantly improved its capability to offer strong graduate programs. Evidence of such progress includes

1) Curriculum

The department offers excellent graduate programs. Cooperative arrangements for scheduling and offering pertinent courses on a regular basis was established with the Department of Management Science. Joint M.S. programs with the School of Business Administration helped in identifying courses of special importance and significance to graduate studies in Industrial Engineering.

2) Faculty

Full-time departmental faculty who achieved graduate faculty status increased from three to ten. Some of the faculty on secondary appointments with the department also have achieved graduate faculty status. Faculty scholarly output has increased significantly over the past few years as evidenced by their publications record (see Curriculum Vitae). The growth of faculty scholarly output is expected to further increase with the implementation of a Ph.D. program.

3) Research

Research support increased many fold over the past few years. Currently, research support per faculty member is comparable to those of top research-supported schools (Appendix). Because of synergy between graduate education and research, this support is expected to increase when a Ph.D. program in I.E. is fully implemented.

4) Students

The department has a high quality student population in its M.S. programs. Several of these students are seeking further education towards a Ph.D. program. Numerous requests have been received from well qualified local,

national and international prospective Ph.D. students. The University of Miami is still the only viable institution that is capable of offering such a program south of Orlando/Tampa area. The student pool at the undergraduate level is a stable one, particularly because of the subsidy program in Manufacturing. This program has a high-quality incoming student population because of state subsidy requirements.

5) Facilities

The department has acquired additional space as a result of the new expansion to the McArthur Engineering Building. A new Computer-Integrated Manufacturing Laboratory has just been established. The laboratory has state of the art equipment valued at excess of $700,000. Computer facilities in the department, the college, and the university are quite adequate to meet the needs of students enrolled in Ph.D. Industrial Engineering.

6) Graduate Program Evaluation by Outside Reviewers

The graduate programs of the Industrial Engineering department have just undergone a comprehensive review by outside consultants selected independently by the University. The review was very positive. Direct quotes of comments made by the committee include:

- "The faculty and departmental administration were committed to offering a contemporary program involving an excellent curriculum and a scholarly research experience."

- "The curriculum integrated theory and applications in a manner that promoted synergism in stimulating individual investigation and research. The curriculum offered an opportunity for a well rounded education and yet provided the students with the necessary background to extend their studies into independent investigation. The curriculum also appeared to integrate very well with offerings of other departments to assure the student's preparation was comprehensive."

- "The planning for use of the new laboratories for research are [sic] excellent. We believe these facilities will provide an excellent opportunity to extend graduate education and research into areas that will promote and enhance the acquisition of external funding from additional sponsors."

- "The library was evaluated to be excellent."

- "[The faculty] are active professionally and highly regarded by their peers."

- "The faculty, in general, are well published and appear to be interested and willing to work hard at developing their respective research areas. They believe their opportunities for increased research funding and expanding the numbers of graduate students would be enhanced if a Ph.D. degree in Industrial Engineering were available."

- "[The students] were very complimentary of the department, in general, and of the faculty in particular."

- "It is recommended that consideration be given to ... [e]stablishing a Ph.D. program in Industrial Engineering which permits participation of all the options within the department."

1.a. EXACT TITLE OF DEGREE

Doctor of Philosophy in Industrial Engineering

1.b. PURPOSE AND GOALS OF DEGREE

The purpose of the degree is to prepare highly qualified candidates to serve the needs of industry, academic, research and government institutions. The Ph.D. degree in Industrial Engineering will be focused in the area of manufacturing/production systems. This is one of the classical areas of industrial engineering work which has great impact on improving industrial competitiveness. The global competition has created an unprecedented race for the optimal utilization of modern technology and human resources in manufacturing/production systems. The Ph.D. programs will better prepare students to meet the challenges and perform in such a globally competitive environment.

1.c. ASSESSMENT OF DEMAND AND JOB MARKET

The demand for students with graduate education in Industrial Engineering has been good and remains steady. Local and national employers have encouraged their employees to pursue graduate studies in Industrial Engineering as evidenced by the support these companies provide towards the tuition for their employees. Examples of such companies are IBM, FPL, and Burger King Corporation. These companies recognize the importance of optimal design of manufacturing/production systems on competitiveness.

According to the latest Council of Industrial Engineering Academic Department Heads (CIEADH) annual survey, the number of open positions at universities requiring a Ph.D. in Industrial Engineering for 1990-1991 is 62. More than fifty percent of requests are for people specializing in the manufacturing/production system concentration. Previous surveys

of the National Research Council showed that only about 1/4 of all graduating Ph.D.'s enter a career in education. The remainder is absorbed by industry and research institutions. A direct extrapolation of these figures indicate a demand of about 300 Ph.D.'s per year. The American Association of Engineering Societies published a figure of 200 Ph. D. degrees in I.E. granted in 1990. This translates into a shortage representing 1/3 of total demand. The National Science Foundation, in a recent report, has warned that there will be a severe shortage of qualified engineers to meet the technological challenges for the remainder of the century and beyond.

In the state of Florida, there are no schools that offer the Ph.D. programs in Industrial Engineering south of the Orlando/Tampa area. The only available programs exist in the University of Florida, University of Central Florida, and University of South Florida. This leaves a vacuum in the populated and growing South Florida area. The University of Miami is currently in the best position to fill this vacuum and offer a quality program in the field. Our faculty are well published in this area and our course offering is strong in the area of concentration proposed.

1.d. RELATIONSHIP TO OTHER COGNATE FIELDS

Industrial Engineering has strong relationships with a number of other fields. For example, the Department of Management Science offers many courses commonly accepted as Industrial Engineering courses. The field of Management is quite important to Industrial Engineering, and many courses in that department are highly recommended to industrial engineers. Epidemiology and Public Health, Psychology, and Biomedical Engineering are fields of great importance to the Ergonomics and Safety areas of knowledge in Industrial Engineering. Relationships between departments associated with these fields and the Industrial Engineering Department are explained in details in section 3.c. (Cooperative Work with Other Components of the University).

1.e. RELATIONSHIP TO UNDERGRADUATE AND PROFESSIONAL PROGRAMS

The department has an ongoing ABET accredited undergraduate program. The development of a Ph. D. degree in Industrial Engineering will only strengthen the department and its faculty, and will have a positive impact on undergraduate education. It should be noted that a number of talented students graduating from our undergraduate as well as our M.S. program have sought to pursue their Ph.D. degrees in other institutions because of our inability to accommodate them. Certainly it is also true that applicants from other institutions who sought admission to a Ph.D. program at the University of Miami have also not been accommodated. The lack of an overall synergistic program in Industrial Engineering has swayed some potential candidates from pursuing their Ph.D. in ergonomics at the University of Miami.

2. PHYSICAL RESOURCES

2.a. ADEQUACY OF LIBRARY HOLDINGS

The Library has an annual allocated budget for the Department of Industrial Engineering for acquiring books and periodicals. The current annual budget is $15,000 for books and $10,000 for journals and periodicals. Since subjects allocated by the Library under Industrial Engineering areas are common with several other departments in the University, the Library holdings and budget allocation by subject area become much larger. For example, the Library has significant holdings in the areas of business administration. The Gould Fund, a special endowed Library fund for the School of Business is providing added resources to the Library. Also, the Medical School Library has a very large collection of materials that are very useful for the programs in Ergonomics and Safety. The Mathematics Library contains many journals which are relevant to the quantitative areas of Industrial Engineering.The Library holdings in Industrial Engineering are considered to be strong. Additions in the area of Manufacturing Engineering have been requested and are currently being acquired. (see 7. Comparison with High-Quality Established Programs.)

A partial listing of journals and periodicals available in Industrial Engineering and related disciplines are:

Academy of Management
Academy of Management Review
Acta Orthopaedics Scandinavica
Acta Physiologica Scandinavica
Accident Society of America Journal
Across the Board
Acta Bio Theortica
Administrative Science Quarterly
American Economic Review
American Industrial Hygiene Association Journal
American Journal of Physical Anthropology
American Journal of Physiology
American Journal of Psychoanalysis
American Journal of Psychology
American Statistical Association Journal
American Statistician
Annals of Biomedical Engineering
Annals of Human Biology
Applied Ergonomics
Army Research and Development
Atmospheric Environment
Australian Journal of Physiology
Behavior Research Methods and Instrumentation and Computers

Bell Journal of Economics
Bell Journal of Economics and Management Science
Biological Bulletin
Biophysical Bioengineering and Medical Instrumentation
Biophysical Journal
Biosystems
Biotechnology and Bioengineering
Brain
British Journal of Industrial Relations
Bulletin of Mathematical Biology
Business Economics
Business Horizons
California Management Review
Columbia Human Right Review
Computers and Biomedical Research
Computers and Industrial Engineering
Computers and Operations Research
Computers and People
Decision Sciences
Disabled U.S.A.
Dissertation Abstracts
Econometrica
Economic Journal
Electroencephalography and Clinical Neurophysiology
Engineering Material and Design
Environment
Environmental Science and Technology
Ergonomics
European Journal of Operational Research
Federal Register
Financial Executive
Geographical Analysis
Harvard Business Review
Human Biology
Human Development
Human Relations
IBM Systems Journal
I E E E Spectrum
I I E Transactions
I L O Information
I L O Publications
Industrial and Labor Relations Review
Industrial and Labor Review. (Cumulative Index)
Industrial Engineering

Industrial Relations
Industrial Week
Interfaces
International Economic Review
International Journal of Engineering Science
International Journal of Environmental Studies
International Journal of Man-Machine Studies
International Journal of Mini and Microcomputers
International Journal of Production Research
International Labor Office
Journal of Acoustical Society of America
Journal of American Statistical Association
Journal of Anatomy
Journal of Analytical Psychology
Journal of Applied Behavior Analysis
Journal of Applied Psychology
Journal of Applied Physiology
Journal of Biomechanics
Journal of Biomedical Material Research
Journal of Bone and Joint Surgery
Journal of Business
Journal of Econometrics
Journal of Economics and Business
Journal of Economic Literature
Journal of Engineering Physics
Journal of Environmental Economics and Management
Journal of Environmental Engineering. (copy 2)
Journal of Experimental Psychology
Journal of Human Evolution
Journal of Humanistic Psychology
Journal of Industrial Economics
Journal of Industrial Relations
Journal of Marketing
Journal of Marketing Research. (Cumulative Index)
Journal of Medical Engineering and Technology
Journal of Money, Credit and Banking
Journal of Occupational Psychology
Journal of Optimization Theory and Applications
Journal of Physiology
Journal of Planning and Environmental Law
Journal of Regional Science
Journal of Safety Research
Journal of Speech and Hearing Disorders
Journal of Systems Management

Journal of Theoretical Biology
Lancet
Management Accounting
Management Focus
Management Review
Management Science
Management Services
Mathematical Programming
Mathematics of Operations Research
Medical and Biological Engineering
Medical Journal of Australia
Mini-Micro Systems
Modern Materials Handling
Monthly Labor Review
National Bureau of Economic Research
National Industrial Conference Board
National Productivity Review
Nature
Networks
New Scientist
Occupational Hazards
Occupational Health and Safety
O E C D Observer
Operational Research Society
Operations Research
Operations Research Society of America
Organizational Dynamics
Organization of European Community Development
Perceptual and Motor Skills
Personnel
Personnel Psychology
Physical Therapy
Physiological Reviews
Proceedings royal Society, S.B.
Public Administration Review
Rehabilitation Counseling Bulletin
Rehabilitation Literature
Remote Sensing of Environment
Research Management
Research Quarterly for Exercise and Sport
Review of Economics and Statistics
Review of Income and Wealth
Robotics Today
Royal Statistical Society

Sales and Marketing Management
Scandinavian Journal of Rehabilitation Medical
Scientific American
Simulation
Sloan Management Review (Cumulative Index)
Small Group Behavior
Society for Industrial and Applied Mathematics
Socio-economic Planning Science
Southern Economic Journal
Supervisory Management
Transportation Science
U.S. Bureau of the Budget
U.S. Congress, Joint Economic Committee
U.S. Department of Health, Education and Welfare
U.S. Department of Labor, Bureau of Labor Statistics
U.S. Office of Management and Budget

2.b. LABORATORY EQUIPMENT

The Department of Industrial Engineering administers several laboratories in the McArthur Engineering Building and a laboratory at the Medical School's Comprehensive Pain and Rehabilitation Center. These laboratories serve both the undergraduate as well as graduate students in the department. Laboratories that are particularly suitable for graduate research and the type of equipment in their laboratories are given here.

2.b.1. Microcomputer Laboratory

Location of laboratory: Room 271/272, McArthur Building
Purpose of laboratory: The main purpose of the laboratory is to support courses offered by the Department of Industrial Engineering which require microcomputer work. The laboratory is also used by faculty and graduate students of the department for research purposes.
Existing equipment: The lab currently is equipped with eleven (11) personal computers. Six of these computers are based on the INTEL 8088 microprocessor (IBM XT compatible) and are equipped with 30 megabyte hard drives and either CGA (color graphics adapter) monitors or Hercules compatible monochrome monitors. One of the six is also equipped with an 8087 math co-processor. Two other computers based on the 80286 processor and equipped with EGA (enhanced graphics adapter) color monitors are also present. Three IBM compatible computers based on the 80386 processor have recently been added to the laboratory. There are five 9-pin dot matrix printers and one Hewlett Packard Deskjet printer shared by the computers.
Assessment of current equipment: The current equipment is adequate for general computing purposes. The newly acquired computers provide capabilities for applications with intensive numerical processing or advanced graphics such as computer-aided design.

2.b.2 Computer Integrated Manufacturing Laboratory

Location of laboratory: Room 155/156, McArthur Building
Purpose of laboratory: The objective of the Computer Integrated Manufacturing Laboratory is to provide the students with the required training on hardware and equipment, and methods of manufacturing in a CIM environment. This is accomplished by assigning laboratory projects in the various courses in the area of CIM whereby the student is trained on individual pieces of automation equipment. Integration concepts are then taught in the integrated systems section of the laboratory.
Existing equipment: The Robotics and Automation Laboratory houses state-of-the-art equipment to support the above mentioned areas of applications and research. This equipment includes 4 IBM robot systems (donated by IBM), a Motionmate 5-axis robot, a Seiko 700 5-axis robot, a MODACS V industrial controller (donated by Modcomp), 4 IBM microcomputers, 2 linear flexible conveyors, a Robotmart 3-axis CNC minimill, a spectralight CNC lathe, and a Bridgeport V2E3 3-axis CNC milling machine. In order to provide the students with state-of-the-art knowledge and experience, the Department of Industrial Engineering has recently acquired a new industrial programmable controller, and EX mill/EZ surf software. The latter software is developed specifically for the Bridgeport CNC milling machine series, which allows a complete integration of the computer aided design and computer aided manufacturing phases required to machine parts. The department has also acquired a new PUMA 562 robot system. This is a 6-axis servo controlled industrial robot equipped with Unimation's proprietary VAL II control and programming capabilities and simple user-friendly program instructions. The design of VAL II features the ability to communicate and interact with the manufacturing environment and allows users to advance from isolated cells of automation to fully integrated systems. The most recent acquisition is an Apollo work station and SILMA software. These acquisitions allow the students to work and perform research on problems involving dynamics, product and process design, graphic simulation, and manufacturing process planning.
Assessment of current equipment: The current equipment is adequate for teaching and conducting research in several areas of Computer Integrated Manufacturing, namely: Robotics, Automated Assembly, Numerical Control, Product and Process Design, and Process Planning. Recent investments in this laboratory are in excess of $700,000 acquired through donations by industry, through research support and other departmental sources.
Incremental needs: The Department of Industrial Engineering recognizes the importance of quality assurance and material handling as components of CIM. Software for these areas or is now being developed in the CIM Laboratory to support the material handling aspects. Equipment for quality assurance is progressively being acquired.

2.b.3. Ergonomics Laboratory

Location of laboratory: Rooms 288, McArthur Building
Purpose of laboratory: The main purpose of this laboratory is to support courses in the area of Ergonomics, Human Factors Engineering, and Biomechanics, and to conduct research projects in these fields. The equipment is used heavily by graduate students to conduct their research projects. The laboratories have state of the art equipment and software which permits students and faculty to conduct cutting edge research.
Existing equipment: Our Ergonomics Laboratories house the following equipment: bicycle ergometer, treadmill, oxygen analyzer (Beckman OM-11), carbon dioxide analyzer

(capnograph), ventilation meter (Parkinson-Cowan), reaction time measurement device, depth perception device, tracking device, Sensormedics R612 8-channel recorder with all of the needed preamplifiers and amplifiers that accept different biological signals, Sensormedics carbon dioxide analyzer (LB-2), Sensormedics ventilation measurement model (VMM-2), IBM-AT microcomputer, Data Translation analog to digital converter board (DT-2801-A), Selspot 3-D motion analysis system, Faro 3-D posture analysis system, anthropometry measurement kit, strength measurement load cells and digital readout devices, and Kistler force-platform with software.

Adequacy of lab space: Ergonomics Laboratory space barely meets the existing needs for graduate study and research. As the number of graduate students increase and funded research expands, additional space will be needed.

2.b.4. The Comprehensive Pain and Rehabilitation Center Ergonomics Laboratory

Location of laboratory: South Shore Hospital, Rooms 603, 702, 704

Purpose of laboratory: The Ergonomics and Bioengineering Division of the Comprehensive Pain and Rehabilitation Center has several laboratories. The purpose of these laboratories is to conduct functional capacity assessment and to support the center's programs of treatment and rehabilitation. The laboratories also support faculty and students research projects in Ergonomics and Rehabilitation.

Existing equipment: Knee reflex reaction timer, Schaevitz digital transducer readout, pain measurement device, Chattanooge grip strength, digital timers (2), Wavetek wave generator, Lafayette reaction time device, tremor device, Okidata printer, IBM XT, Ariel performance analysis system, Kistler force platform, Panasonic VCR, Magnavox cameras (2), alphacell force readout, Bofors force readout, static strength testing station, Intellect VMS stimulation unit, Hitachi oscilloscope, Heath power supply, Hewlett-Packard function generator, scope multitester, IBM S260, Hewlett-Packard laser jet printer, IBM Proprinter X24, Hewlett Packard ScanJet, Hewlett Packard plotter, IBM S2 70-386, 3 Codetron units, PDP 11-23, back strength testing frame, Bofors force readout, Cyborg EMG unit (2), Ariel computerized exercise system multi-station, arm-leg station, AST computers (2), Samsung screens (4), Citizen printer, Fitron cycle-ergometer, and AMF quantum XL fitness computer.

Assessment of current equipment: Existing laboratory equipment and software represent state of the art in Ergonomics, Biomechanics, and Rehabilitation.

Adequacy of laboratory space: Existing space is accommodating current need. Additional space on the ninth floor of the building is being used for job simulation. Renovation of that space for future use is being contemplated.

2.b.5. Industrial Hygiene Lab

Location of laboratory: McArthur Building, Room 278.

Purpose of laboratory: To support advanced courses in Industrial Hygiene and to conduct research pertaining to occupational physical and chemical stress control equipment. **Equipment:** Laboratory is equipped with a vibration station and noise and vibration measuring equipment.

2.b.6. Productivity Research Lab

Location of laboratory: McArthur Building, Room 279.
Purpose of laboratory: To conduct advanced research in Productivity Engineering.
Equipment: Microcomputers. Funds will be drawn from revenues generated by the Third International Conference on Productivity and Quality Research.

CURRICULUM

3.a. Ph.D. in Industrial Engineering

The purpose of the Ph.D. degree is to permit students to conduct in-depth studies in industrial engineering and to enhance their intellectual and research skills in the field. The graduate degree work will be concentrated in the classical industrial engineering area of Manufacturing/Production Systems.

CURRICULUM STRUCTURE

The Student Graduate Advisory Committee will design a program of study with a minimum set of courses as listed below, plus a set of additional courses as deemed necessary. The committee will take into consideration the student background, objectives, and special educational needs that will better prepare the student for conducting his dissertation research. The Advisory Committee will closely monitor the student's progress to insure that all requirements have been met.

The Ph.D. requirements will follow the recommendations set by the Graduate School, which consists of a minimum of 24 credit hours of course work and up to 24 credit hours of dissertation research beyond the Master's degree.

A total of 48 course credits of graduate credit work are required for the Ph.D. including those taken for the Master Degree. These credits will be expected to include the following courses (33 credits):

IEN 612/MAS 603	Design of Experiments
IEN 614	Advanced Quality Control
IEN 642/MAS 647	Linear Programming and Extensions
IEN 643	Integer Programming and Network Flows
IEN 645/MAS 655	Stochastic Processes
IEN 647	Production Systems Modeling and Simulation
IEN 657	Ergonomics and Occupational Biomechanics
IEN 660	Productivity Measurement and Evaluation (or Advanced Management course)
IEN 662	Productivity Planning and Improvement
IEN 665	Advanced Production Systems
IEN 668	Advanced Materials Handling and Facilities Design

A list of other courses that are pertinent to the proposed concentration are given below. These courses are currently offered by the Industrial Engineering Department as well as other Departments in the University of Miami, and from which the remaining 15 credits can be taken.

IEN 505	Robotics
IEN 506	Manufacturing Processes II

IEN 509	Automated Assembly
IEN 572	Management of Technology
IEN 580	Advanced Engineering Economy
IEN 644/MAS 651	Nonlinear and Dynamic Programming
IEN 646/MAS 656	Queuing Models
IEN 649	Forecasting Systems
CIS 621	Management Information Systems
CIS 661	Introduction to Expert Systems for Management
CIS 662	Artificial Intelligence Programming for Business and Management
CIS 674	Neural Network Applications
ECE 511	Software Engineering
ECE 547	Expert Systems for Computer and Electrical Engineering
ECO 660	International Economics
ECO 691	Managerial Economics
MAS 601	Applied Regression Analysis
MAS 602	Applied Multivariate Statistics
MAS 606	Nonparametric Statistics
MEN 513	Kinematics for Robotics
MEN 517	CAD Applications Using Interactive Computer Graphics
MGT 651	Behavioral and Organizational Systems
MGT 652	Organizational Theory
MGT 658	Strategic Management
MGT 671	Management of Innovation
MTH 545	Introduction to Artificial Intelligence
MTH 645	Introduction to Expert Systems
MTH 528	Combinatorics
POL 551	Productivity in the Public and Non-Profit Sector
POL 698	Special Topics (Technology and Public Policy)
PSY 631	Advanced Psychological Statistics I
PSY 632	Multiple Regression and Multivariate Statistics
PSY 633	Multivariate Correlation Methods in Psychology

3.b. **Additional Courses**

At the present time, as we have designed this Ph.D. program, there is no need for any additional courses. However, after administering the program for some time, when there

is a perceived need to introduce any additional courses, they will be introduced according to the accepted University procedures.

3.c. Proposed Course Schedule for Next Three Years

The following is a schedule of Ph.D. core courses for the next three years. All courses are 3 credit hours each. Other courses in the department will be scheduled simultaneously as the need arises.

Term		Faculty
Fall 1991		
IEN 612*	Design of Experiments	Asfour
IEN 642/MAS 647*	Linear Programming	Aboudi
IEN 645/MAS 655*	Stochastic Processes	Ip
IEN 660	Productivity Measurement and Evaluation	Sumanth
IEN 699	Advanced Topics	Asfour
Spring 1992		
IEN 505	Robotics	Boubekri
IEN 643/MAS 649*	Integer Programming	Aboudi
IEN 644/MAS 651*	Nonlinear Programming	Ip
IEN 657	Ergonomics and Occupational Biomechanics	Asfour
IEN 665	Advanced Production Systems	Swift
IEN 668	Advanced Materials Handling and Facility Design	Omachonu
Fall 1992		
IEN 507	Computer Control in Manufacturing	Boubekri
IEN 612*	Design of Experiments	Asfour
IEN 614	Advanced Quality Control	Swift
IEN 642/MAS 647*	Linear Programming	Ip
IEN 645/MAS 655*	Stochastic Processes	Aboudi
IEN 660	Productivity Measurement and Evaluation	Sumanth
Spring 1993		
IEN 505	Robotics	Boubekri
IEN 644/MAS 651*	Nonlinear Programming	Aboudi
IEN 647	Production Systems Modeling and	Ip

	Simulation	
IEN 657	Ergonomics and Occupational Biomechanics	Asfour
IEN 665	Advanced Production Systems	Swift
IEN 668	Advanced Materials Handling and Facilities Design	Omachonu
MAS 603*	Design of Experiments	Kurucz

Fall 1993

IEN 507	Computer Control in Manufacturing	Boubekri
IEN 612*	Design of Experiments	Asfour
IEN 614	Advanced Quality Control	Swift
IEN 642/MAS 647*	Linear Programming	Ip
IEN 645/MAS 655*	Stochastic Processes	Aboudi
IEN 660	Productivity Measurement and Evaluation	Sumanth

Spring 1994

IEN 505	Robotics	Boubekri
IEN 643/MAS 649*	Integer Programming	Ip
IEN 644/MAS 651*	Nonlinear Programming	Aboudi
IEN 657	Ergonomics and Occupational Biomechanics	Asfour
IEN 665	Advanced Production Systems	Swift
IEN 668	Advanced Materials Handling and Facilities Design	Omachonu

* These courses are shared with Management Science.

3.d. COOPERATIVE INTERDISCIPLINARY WORK WITH OTHER COMPONENTS OF THE UNIVERSITY

The Department of Industrial Engineering has several strong cooperative or interdisciplinary work arrangements with other departments in the University.

3.d.1. Department of Management Science

Several faculty members with primary appointments in the Department of Management Science have secondary appointments in the Department of Industrial Engineering. Dr. Joseph Moder, Dr. Charles Kurucz, Dr. Earl Wiener and Dr. Ronny Aboudi teach regularly scheduled undergraduate and graduate courses taken by Industrial Engineering students. They participate regularly in supervisory committees of graduate students. Dr. Howard Gitlow serves as Executive Director of the University Institute for the Study of Quality in Manufacturing and Service. This Institute was formed as a joint venture between the College of Engineering, Department of Industrial Engineering and the School of Business. Many faculty members from both schools participate in the Institute's activities. Dr. Aboudi

is in charge of the M.S. program in Operations Research.

3.d.2. Department of Management

The Department of Industrial Engineering has strong ties with the Department of Management in the School of Business. The two departments collaborate under the auspices of the Graduate School in offering courses pertinent to the Management of Technology area of concentration and to Management Engineering. Dr. David Sumanth of the Department of Industrial Engineering, holds a secondary appointment in the Department of Management. Many Department of Management faculty, such as Dr. William Werther and Dr. Harold Berkman, participate in graduate student advisory committees and in conferences and seminars organized by the Department of Industrial Engineering. Several Department of Management faculty members participate in conferences organized by the Department of Industrial Engineering as speakers, session chairpersons, or in organizing committees.

3.d.3. Department of Epidemiology and Public Health

The Department of Industrial Engineering has a number of areas of interest in common with the Department of Epidemiology and Public Health. Environmental and Occupational Safety and Health, Epidemiology, and Biostatistics are but a few of those common areas of interest. This Medical School's department offers the Master's degree in Public Health. It collaborates with the Department of Industrial Engineering under the auspices of the Graduate School in the interdisciplinary Master of Science program in Environmental/Occupational Health and Safety. Under this arrangement a strong combination of academic programs are structured using shared resources of the two departments. Dr. Tarek Khalil has held a secondary appointment in the Department of Epidemiology and Public Health since 1976.

3.d.4. Department of Neurological Surgery

The Department of Industrial Engineering has very strong ties with the Department of Neurological Surgery. Dr. Khalil, Dr. Asfour, and Dr. Abdel-Moty have joint appointments in both departments. Dr. Khalil directs the Ergonomics and Bioengineering Division of the Comprehensive Pain and Rehabilitation Center, which supports several graduate students from Industrial Engineering and Psychology, and Dr. Asfour is an Assistant Chief of the Division. Dr. Hubert Rosomoff and David Fishbain participate regularly in graduate student committees and projects.

3.d.5. Other Departments in the College of Engineering

Interdepartmental collaboration between the departments of Industrial Engineering, Biomedical Engineering, Mechanical Engineering and Electrical and Computer Engineering occurs at the graduate level with students in the Ergonomics, Manufacturing or Computer related tracks. Faculty members from these departments have served on supervisory committees of graduate student projects. Students also take pertinent courses offered on

a regular basis by those departments. Offerings in Biomedical Engineering are particularly relevant to students in the Ergonomics Ph.D. program. Dr. Khalil holds a secondary appointment in the Department of Biomedical Engineering.

3.e. TEACHING

There are two major types of activities: classroom lectures and one-on-one research conferences between faculty and students. The classroom work sometimes involves presentations by students on individual library research topics. The proportion of classroom vs. individual contacts varies from student to student. Classroom contact predominates in the case of organized course work, and individual contacts become dominant during the research phase.

3.f. DISTRIBUTION OF GRADUATE STUDENTS AMONG ADVISORS

Students will be assigned to advisors according to the advisor's current research involvement and areas of publications.

3.g. CONFERENCES

The Department of Industrial Engineering has organized a series of international conferences:

- *First International Conference on Productivity Research*, Miami, Florida, February 1987
- *Annual International Industrial Ergonomics and Safety Conference*, Miami, Florida, June 1987
- *First International conference on Technology Management*, Miami, Florida, February 1988
- *Second International Conference on Productivity Research*, Miami, Florida, February 1989
- *Second International Conference on Management of Technology, Miami, Florida, February 1990*
- *American Society of Biomechanics Conference*, Miami, Florida, November 1990
- *Third International Conference on Productivity and Quality Research*, Miami, Florida, February, 1991

The Department will also be organizing, on an on-going basis, the following conferences in 1992 and 1993.

- *Third Int'l Conf. on Management of Technology*, Miami, Florida, February 1992
- *Third Int'l Conf. on Productivity Research,* Miami, Florida, February 1993

4. FACULTY

4.a. **CURRICULA VITAE**

(see Appendix A)

4.b. ESTIMATE OF ADDITIONAL FACULTY NEEDS

The existing level of resources in terms of faculty is adequate to administer the Ph.D. program. In order to strengthen it further, an additional faculty position (in manufacturing production systems) has been provided and advertised for recently. We expect to fill this position for the term beginning Fall '91.

4.c. INTERACTION WITH OTHER GRADUATE PROGRAMS

The department expects to interact heavily with other College of Engineering Departments involved in computer-integrated manufacturing. A strong interaction also exists with the Department of Management Science and the Department of Management. Faculty from all these departments will be serving on student's Ph.D. advisory committees.

4.e. **FACULTY SUMMARY (TABLE I)**

Table 1

Faculty Summary – Last Five Years

Name	Degree/Year Institution	Rank/ Appointment date	Chair Dept. Thesis (T) Disserta.(D) Committee	Member Dept. Thesis (T) Disserta.(D) Committee	Member Extradept. Thesis (T) Disserta.(D) Committee	Notable Additions	Full length Refereed (only) Publications	Extra-mural (funded) Grants & Contracts
Aboudi, R.	Ph.D./1986 Cornell	Assistant Prof./1988	2(T)	2(T) 1(D)	1(T)	5 prof. presentations 1 book chapter	6	UMQI Grant 1989 $7,500
Abdel-Moty, E.	Ph.D./1988 Univ. of Miami	Res. Asst. Professor 1989	1(T)	2(T)	1(D)	1 book chapter 10 prof. presentations	7	Fla High Tech $50,000 NIH Biomed $2,500 NIDRR $178,000
Asfour, S.	Ph.D./1980 Texas Tech.	Professor 1988	3(T) 2(D)	8(T) 1(D)	17(T) 9(D)	Edited 1 book Co-edited 1 book Co-authored 1 book 1987 Chaired and organized Annual International Industrial Ergonomics & Safety Conference 1988 College of Engineering Excellence in Teaching Award 1989 Freshman Teaching Award	26	NIOSH 1988 $92,000 1989 $96,000 FPL 1988 $50,000 1989 $75,000 1990 $116,000 1991 $129,000 Florida High Tech 1990 $20,000 CPRC 1984-present $260,000(est.)/yr.
Bayraktar, B.A.	Ph.D./1968 New York Univ.	Visiting Prof. 1986				Co-edited 2 books Co-authored 1 book chapter Co-authored I report on a workshop Co-chaired 1 conference Co-chaired 1 workshop Developed 1 new graduate course	3	NSF grant $9200 No. CDR: 8719471

(Continued on the next page)

Table 1 *(continued)*

Faculty Summary – Last Five Years

Name	Degree/Year Institution	Rank/ Appointment date	Chair Dept. Thesis (T) Disserta.(D) Committee	Member Dept. Thesis (T) Disserta.(D) Committee	Member Extradept. Thesis (T) Disserta.(D) Committee	Notable Additions	Full length Refereed (only) Publications	Extra– mural (funded) Grants & Contracts
Boubekri, N.	Ph.D./1983 Univ. of Nebraska	Assistant Professor	2(T)	1(T)	2(T)	5 paper contributions to books Technical Manual for IBM	3	UMQI 1989 $3,000 IBM 1985 $8499 UM Initiation Award (1985) $7500
Czaja, S.J.	Ph.D./1980 SUNY Buffalo, New York	Assoc. Professor	3(T) 2(D)	3(T) 3(D)	1(D)	Edited 1 book 3 book chaps. Editor, Special issue of Human Factors Office Tech. & People Chair, Technical Group on Aging – Human Factors Society	7	NIH(1988–90) $198,000 USPS(1988–89) $175,000 NIH(1988–990) $188,000 Markle Foundation (1987–90) $305,000
Ip, C.	Ph.D./1986 Cornell	Assistant Prof./1988	2(T)	4(T)		5 Prof. presentations	6	UMQI 1989 $7,500
Khalil, T.	Ph.D./1969 Texas Tech	Professor	3(D) 6(T)	2(D) 6(T)	3	Edited 2 books Many contributions to books & conferences Many presentations	16	Florida High Tech 1988 $50,000 1989 $49,000 1990 $100,000 NIDRR 1990 $178,000 NSF 1988 $9,200 InterAmerican Bank 1987 $4,300 U.S. Dept. of Labor 1985 $6,000 Burger King 1984–89 $6,000/yr.

(Continued on the next page)

Table 1 *(continued)*

Faculty Summary – Last Five Years

Name	Degree/Year Institution	Rank/ Appointment date	Chair Dept. Thesis (T) Disserta.(D) Committee	Member Dept. Thesis (T) Disserta.(D) Committee	Member Extradept. Thesis (T) Disserta.(D) Committee	Notable Additions	Full length Refereed (only) Publications	Extra-mural (funded) Grants & Contracts
Khalil, T.(contd.)								Frank B. Hall 1984–89 $5,600/yr. FRCU 1984–86 $150,000 (US Consultant) State of Florida 1984–87 $100,000/yr. 1988 $220,000 1989 $230,000 1990 $222,000 IBM 1989 (CIM donation) $200,000 Dept. of Neurological Surgery 1989 (Ariel Equip.) $100,000 CPRC 1984–present $260,000 (est.)/yr. FPL Quality Inst.(Institutional) 1988–91 $1,000,000
Kurucz, C.N.	Ph.D./1969 SUNY Buffalo, New York	Assoc. Professor 1974	2(D)	1(D) 2(T)	3(D) 1(T)	3 prof. presentations Co-author 10 additional presentations Developed 2 new grad. courses 1 book chapter		NSF, 1989–1991 $750,000 Co-Principal Investigator EPA (2) $600,000 Co-Principal investigator as sub-contractor for FIU
Moder, Joseph J.	Ph.D./1950 Northwestern	Professor		1(T) 1(D)		Revised textbook		

(Continued on the next page)

Table 1 *(continued)*

Faculty Summary – Last Five Years

Name	Degree/Year Institution	Rank/ Appointment date	Chair Dept. Thesis (T) Disserta.(D) Committee	Member Dept. Thesis (T) Disserta.(D) Committee	Member Extradept. Thesis (T) Disserta.(D) Committee	Notable Additions	Full length Refereed (only) Publications	Extra-mural (funded) Grants & Contracts
Omachonu, V.	Ph.D./1987 New York Polytechnic	Assistant Professor		4(T)		Book in press Teacher of the year award Reviewer for 3 journals Co-author of a book chapter Registered Professional Engineer 30 publications	7	UMQI grant for $7,500 Nat'l Science $5,000
Rhodes, M.	Dr. Eng./1976 Renns. Poly. Institute	Contract by semester Initial contract Fall 1985	1(T)	1(T)		Member Peer Review Editorial Board published by American Society of Safety Engineers		UMQI 1989 $1,000
Sumanth, D.J.	Ph.D./1979 IIT, Chicago	Professor/1988	9(T)	9(T)	2(T)	Editor (of refereed books) for the Chair for the 1st, 2nd and 3rd Int'l Conf. on Productivity Research Fellow Award Many professional presentations International Student ed. 1985 "Productivity Engineering Management" Spanish ed. 1990 "Productivity Engineering and Management" Indian Edition, 1990 "Productivity Engineering and Management"	10	UMTA (DOT), 1986-88 $84,725 Francisco M. 1988 $1,400 Atarraya 1988-89 $12,000 IBM 1989 $5,000 UMQI Grant 1989 $3,000 1990 $6,000 Monterey Power 1990 $1,600
Swift, J.	Ph.D./1987 Oklahoma State Univ.	Assistant Professor 1987	7(T)	1(T)		5 prof. presentations 1 book chapter Registered Professional Engineer Certified Quality Engr. Developed 2 new grad. courses	2	NSF, 1988 $10,000 UMQI,1989 $34,134 Renard Manuf., 1989 $5,000

(Continued on the next page)

Table 1 *(Continued)*

Faculty Summary – Last Five Years

Name	Degree/Year Institution	Rank/ Appointment date	Chair Dept. Thesis (T) Disserta.(D) Committee	Member Dept. Thesis (T) Disserta.(D) Committee	Member Extradept. Thesis (T) Disserta.(D) Committee	Notable Additions	Full length Refereed (only) Publications	Extra– mural (funded) Grants & Contracts
Wiener, E.	Ph.D./1961 Ohio State Univ.	Professor	1(T)	2(T) 2(D)		P.I. NASA Grant (presently 3/4 time)	5	NASA 84 1985–1989 $334,173 1988 $102,108 1989–1990 $388,062 1989–1991 $39,953

Teaching Excellence

The Department of Industrial Engineering has a tradition of emphasizing teaching excellence, and close attention and supervision of students in the programs. Faculty members who have received outstanding teaching awards over the past few years are:

•Dr. Shihab Asfour received the Alexander Orr Award, College of Engineering Excellence in Teaching Award, 1988; and the University of Miami First Freshman Teaching Award, 1989.

•Dr. Vincent Omachonu received Professor of the Year, Department of Industrial Engineering, 1990; University of Miami Freshman Teaching Award, 1990; and Award for Teaching Excellence, School of Business, University of Miami, 1991.

Faculty evaluations by students also reflect the outstanding teaching quality of the department's faculty. Those faculty who received a 100% "overall positive evaluation" rating for the 1990-1991 academic year included:

•Dr. Elsayed Abdel-Moty, IEN 311
•Dr. David Sumanth, IEN 311, IEN 570, IEN 660 (2 sections)
•Dr. Jill Swift, IEN 380, IEN 512
•Dr. Nourredine Boubekri, IEN 407
•Dr. Vincent Omachonu, IEN 465
•Dr. Shihab Asfour, IEN 501, IEN 612, IEN 657
•Dr. Bulent Bayraktar, IEN 501
•Dr. Chi Ip, IEN 641

5. STUDENTS

5.a. PROGRAM CHARTS

TABLE II - PROGRAM CHARTS

Department of Industrial Engineering
February 28, 1991

1. Students

Registered Program Title: Industrial Engineering
Degree: Master of Science

2. Applications - Admissions - Qualifications

Academic Year	Applications	Admissions Offered	New Enrollments
1984-1985	19	19	10
1985-1986	29	29	27
1986-1987	40	32	25
1987-1988	90	78	32
1988-1989	87	74	19
1989-1990	37	33	14
1990-1991	65	53	13

3. Total Number of Graduate Degrees Awarded

Academic Year	Degrees Awarded
1984-1985	5
1985-1986	10
1986-1987	20
1987-1988	13
1988-1989	11
1989-1990	23

TABLE II - PROGRAM CHARTS

Department of Industrial Engineering
February 28, 1991

1. Students

Registered Program Title: Environmental Health & Safety
Degree: Master of Science

2. Applications - Admissions - Qualifications

Academic Year	Applications	Admissions Offered	New Enrollments
1984-1985	6	6	4
1985-1986	3	3	3
1986-1987	4	2	1
1987-1988	15	13	9
1988-1989	4	3	0
1989-1990	5	3	1
1990-1991	3	2	0

3. Total Number of Graduate Degrees Awarded

Academic Year	Degrees Awarded
1984-1985	0
1985-1986	1
1986-1987	1
1987-1988	0
1988-1989	1
1989-1990	3

TABLE II - PROGRAM CHARTS

Department of Industrial Engineering
February 28, 1991

1. Students

Registered Program Title: Management of Technology
Degree: Master of Science (initiated in 1990-1991)

2. Applications - Admissions - Qualifications

Academic Year	Applications	Admissions Offered	New Enrollments
1990-1991	33	29	26

5.a. NUMBER OF STUDENTS IN PROGRAM

Students for the Ph.D. program are expected to be drawn from one or more of the following sources:

1. Current M.S. students in the IE program. A list of these students is given in Table 2. We expect to draw at least two students per year from this pool.

2. National Advertisement Campaign to inform of the establishment of the Ph.D. program at the University of Miami to attract qualified students from other parts of the country. We expect to draw at least two students per year from this pool.

3. A long waiting list of international students interested in pursuing the Ph.D. at the University of Miami. We expect that two more students per year can be drawn from this pool.

4. Alumni of the University of Miami working in local industry and desiring further graduate education. We expect to draw one student per year from this pool.

5.b. GENERAL REQUIREMENTS FOR ADMISSION

5.b.1 Doctor of Philosophy

Admission to the Ph.D. in Industrial Engineering program requires a degree in engineering. Students must show to the satisfaction of the department, strong aptitude and potential for in-depth graduate education and research.

General guidelines for the Doctor of Philosophy degree normally require a cumulative grade point average of 3.0 and a minimum combined verbal and quantitative Graduate Record Examination (GRE) score of 1000. However, at the discretion of the Graduate Studies Committee, students may be required to provide other evidence of their capabilities. Such evidence may include, but is not limited to: a) exceptional recommendations, b) experience in the engineering profession, c) high grade point average in undergraduate professional studies, and d) higher level of GRE scores.

Students who apply from foreign countries and who do not hold either an undergraduate or graduate degree from an U.S. institution are not required to submit GRE scores with their application. However, they must submit TOEFL scores of 550 or better or the student will be required to successfully complete a deficiency English language training program. In addition, these students are required to sit for the GRE prior to their admission to candidacy for the degree for which they were admitted.

5.c. PROVISIONS FOR TRAINING TA'S AND RA'S

Teaching assistants are assigned to teach laboratory classes and to assist professors with grading homework assignments. Each teaching assistant works under the direct supervision of a faculty member. Research assistants are trained in different laboratories to perform independent research. They are encouraged to publish research outcome in collaboration with their advisors. The Department has a phenomenal success rate in having its graduate students publishing their works before graduation.

6. ADMINISTRATION

6.a. ADMINISTRATION INCREMENTS IMPOSED BY THIS PROGRAM

Space is currently adequate to implement this program. Additional space may be needed as the program expands in the future.

6.a.1.

The department already has a secretary assigned to handle graduate student applications. Additional applicants for the Ph.D. is not expected to create added burden on this system.

6.a.2.

The department has recently expanded its office and laboratory facilities.

6.a.3.

Travel money is very scarce in the allocated budget. Additional resources in this category are welcome.

6.b. GOVERNANCE

An admissions committee will be responsible for the administration of the admission procedures. As a part of the admission process, the committee chairman responds to correspondence from prospective students, completes correspondence requirements of existing students, and conducts other correspondence of a general nature associated with the graduate programs. The graduate advisor performs initial contact and advising duties for all newly entering students. A supervisory committee is usually appointed when a student is formally admitted to a doctoral program. It will consist of not less than five members, namely three from the Graduate Faculty, one from outside the program or department of concentration, and the chairman, who will be a regular member of the Graduate Faculty. This committee is nominated by the department chairman. It is appropriate for the chairman to consult with the student upon the membership of the committee. The Supervisory Committee is empowered to plan the course of study for the student; to determine deficiencies, if any; to set other requirements; to request applicable transfer of credit where appropriate and to make up and administer the qualifying examination. All other issues of governance are based on existing departmental and Graduate School policies published in the University's bulletins.

7. COMPARISON WITH PRESTIGIOUS ESTABLISHED PROGRAMS

7. Comparison of Graduate Studies with Prestigious Established Programs

University	Faculty Size		Number of Ph.D. Students in Program	Number of Master of Science Students	Number of Ph.D. Degrees Granted Last Year	Research Support Per Faculty	Administrative Support (number of secretaries)
	Full Time	Secondary					
University of Southern California	6	3	25	100	2	35K	4
Clemson	9	0	10	30	3	25K	2
Lehigh	14	0	22	48	1	100K	2
Stanford	11	2	30	80	4	-	5
Penn State	20		41	<79	11	76K	-
University of Miami	10	4	5*	78	1	86K	3

* Existing Ph.D. is in Ergonomics and Interdepartmental Studies only. Current proposal is to expand to full program in Industrial Engineering.

8. BUDGET

Proposed Budget
Ph.D. Program in Industrial Engineering
Incremental Cost/Revenue Analysis

	FY 1991-92	FY 1992-93	FY 1993-94	FY 1994-95	FY 1995-96
INCREMENTAL COSTS					
Additional Faculty*	0	$50,000	$50,000	$50,000	$50,000
Additional TA's**	$33,000	$49,950	$66,600	$66,600	$66,600
Additional Lab Equipment	$5,000	$10,000	$10,000	$5,000	$5,000
Additional Library Resources	$2,500	$2,500	$2,500	$2,500	$2,500
Additional Space	0	0	0	0	0
Additional Supplies for Labs and Office	$500	$1,000	$1,500	$1,500	$1,500
Additional Travel for Presentations, Research Contracts, etc.	$1,000	$2,000	$2,000	$2,500	$3,000
Secretary (1/2 time)	0	0	0	$10,000	$10,000
Total Incremental Costs	$42,000	$115,450	$132,600	$138,100	$138,600
INCREMENTAL REVENUE					
Tuition**	$28,350 (3 students)	$56,700 (6 students)	$85,050 (9 students)	$94,500 (10 students)	$113,400 (12 students)
Expected Additional Research Revenues	$10,000	$15,000	$25,000	$40,000	$50,000
NET MARGINAL REVENUE	($3,650)	($43,750)	($22,550)	$3,600	$24,800

* Faculty member addition will be shared with other existing programs of the Department.

** Two TA's are requested for first year, increased to three for s and to 4 for third year and beyond. Tuition is calculated @ $ hour for 18 credit hours/fiscal year/per student. Figures inc tuition and stipend. Adjustment for inflation and/or cost increases is not considered.

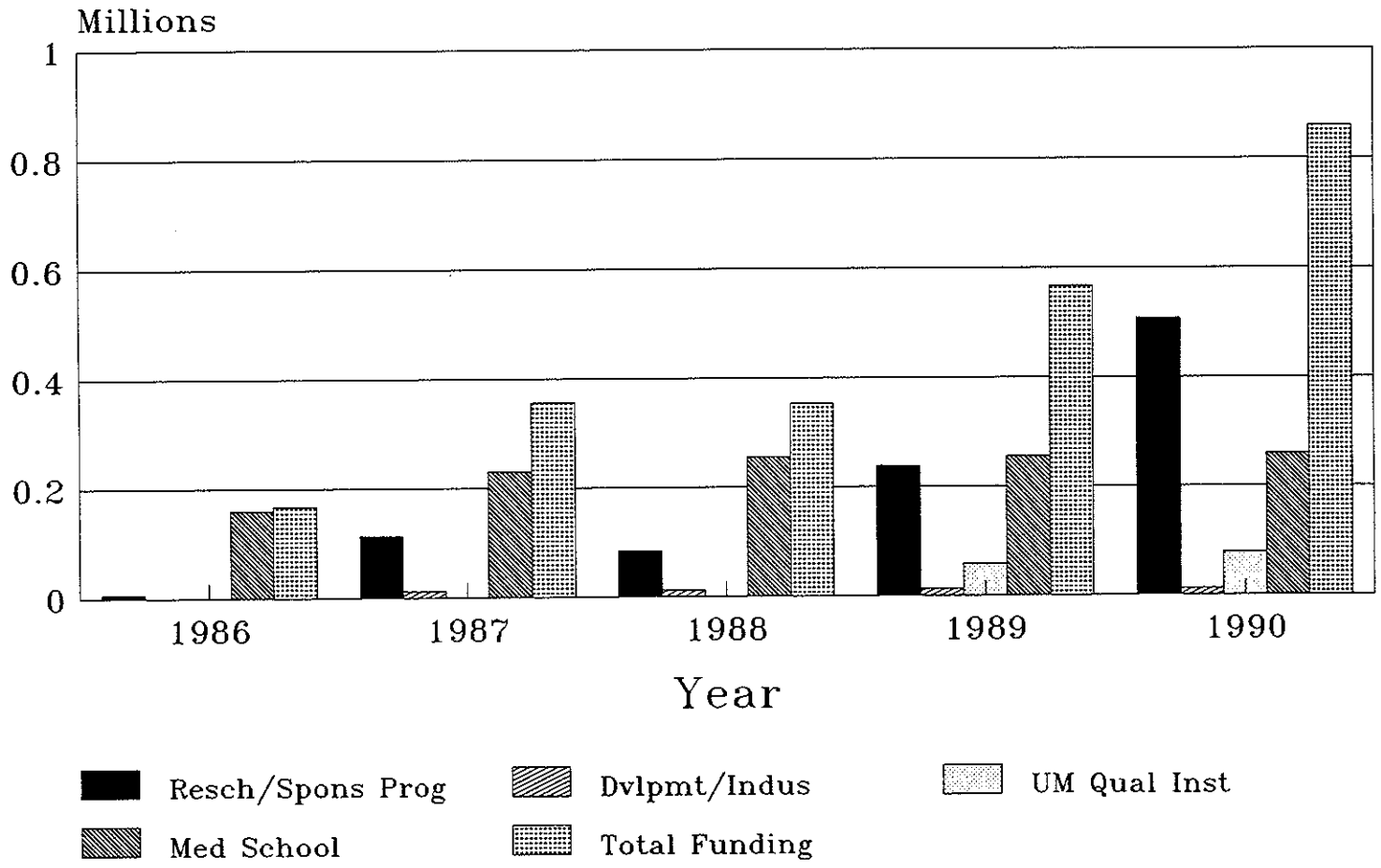
9. OTHER PERTINENT INFORMATION

9.a. COMPARISON OF TOP TEN SCHOOLS RESEARCH EXPENDITURES PER FACULTY

Rank	University	Research Dollars
1	Virginia Polytechnic Institute	$171,290
2	Texas A & M University	$112,047
3	Lehigh University	$110,171
4	University of Wisconsin, Madison	$108,729
5	University of Central Florida	$96,617
6	University of Michigan	$92,373
7	North Carolina A & T University	$80,287
8	Texas Tech University	$79,339
9	Pennsylvania State University	$76,700
10	Louisiana State University	$70,063
	University of Miami	$85,869

source: Division Newsletter, I.E. Division, American Society for Engineering Education. Editor, Hamid R. Paraei, University of Louisville, May 1990

9 b. University of Miami IE Dept.
Research Involvement by Year



9.c. - GRADUATE PROGRAM ADMISSIONS STATISTICS

Academic Year	Average Undergraduate GPA	Average GRE Verbal	Average GRE Quantitative	Average GRE Analytical
1988-1989	3.28	485.09	705.30	552.40
1989-1990	3.41	542.00	737.00	621.40

UNIVERSITY OF Miami

MEMO

To: Dr. Paul K. Sugrue, Sr. Vice Provost
and Interim Dean of Graduate School

From: Dr. Tarek M. Khalil
Chairman, Department of Industrial Engineering

Subject: Ph.D. Proposal in Industrial Engineering

Date: November 4, 1991

I received your memorandum dated October 29, 1991 together with the external reviewers' report. I am pleased with the positive findings of the report. In response to the reviewers' suggestions the following course of action will be followed:

Reviewers' Comments: It is suggested that a course in Computer Aided Process Planning be substituted for Productivity Planning and Improvement which could then be moved to the approved elective list.

Course of Action: A course in Computer Aided Process Planning will be developed by Professor E. Iakovou upon his arrival to campus this January. Dr. Iakovou is a graduate of Cornell University and his area of expertise fits well into this subject. The Productivity Planning and Improvement Course will be included in the list of approved electives.

Reviewers' Comments: A course in Inventory Control, forecasting, scheduling and MRP should be considered.

Course of Action: The contents suggested are included in the course IEN 665 which is already required in the program.

Reviewers' Comments: Advanced Manufacturing Processes course should also be considered.

Course of Action: Dr. Boubekri is already in the process of preparing this course for future offering. Dr. Boubekri's area of expertise is in manufacturing engineering.

Industrial Engineering Department
P.O. Box 248294
Coral Gables, Florida 33124-0623
FAX: 305-284-4040 • Phone: 305-284-2344 • Telex: UM 519308

Phone: (305) 284-3279
FAX: (305) 284-4571
BITNET: RGAWLEY@UMIAMI

UNIVERSITY OF
Miami
Department of Chemistry
Coral Gables, Florida 33124

Robert E. Gawley
Associate Professor

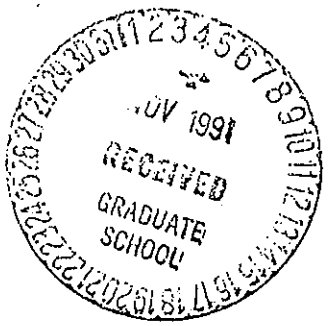
MEMORANDUM

TO: Jo Anne Hecker

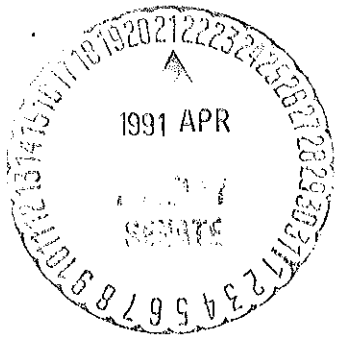
DATE: November 1, 1991

SUBJ.: IEN Ph.D.

I have received your memo of October 31 regarding the IEN PhD proposal report, and agree with their recommendation. As I told Marion over the phone, I cannot meet at 4pm on Thursday, but since I have no quarrel with the report, I don't object to the committee meeting without me.



UNIVERSITY OF Miami



M E M O R A N D U M

April 18, 1991

TO: Dr. Michael Carlebach, Director
Journalism/Photocommunication
School of Communication

FROM: Dr. Pamela A. Ferguson, Associate Provost and Dean of the Graduate School PAF

SUBJECT: Ph.D. Proposal in Industrial Engineering

We just received notice that you are the Faculty Senate ex-officio member of the Graduate School's faculty review subcommittee for the proposed Ph.D. in Industrial Engineering. A copy of the proposal is enclosed. Since we had received the proposal a month ago, the committee already met once and decided there was enough merit in the proposal to warrant bringing in external reviewers.

I'm sure I speak for the members of the subcommittee in saying that they look forward to your participation in future meetings.

PAF/msb

Enclosure

Copy to:
Dr. George Alexandrakis, Faculty Senate
Provost Luis Glaser
Professor Tarek Khalil, Industrial Engineering
Members of the Faculty Review Subcommittee

Graduate School
P.O. Box 248125
Coral Gables, Florida 33124-2220
(305) 284-4154

FILE COPY

MEMORANDUM

TO: Dr. Pamela A. Ferguson, Associate Provost and Dean of the Graduate School

FROM: Dr. George C. Alexandrakis
Chairman, Faculty Senate

DATE: April 18, 1991

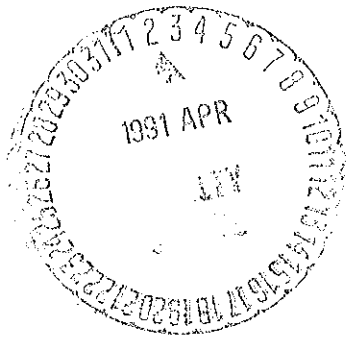
SUBJECT: Ph.D. Proposal in Industrial Engineering

Dr. Michael Carlebach, School of Communication and the new representative to the Senate from the Graduate School, has agreed to serve as the ex-officio member of the Graduate School's faculty review committee for the above-mentioned proposal.

GCA/b

cc: Provost Luis Glaser
Dean Edward Pfister
Dr. Michael Carlebach

UNIVERSITY OF Miami



M E M O R A N D U M

April 1, 1991

TO: Dr. George Alexandrakis, Chair
Faculty Senate

FROM: Dr. Pamela A. Ferguson, Associate Provost and Dean of the Graduate School

SUBJECT: Ph.D. Proposal in Industrial Engineering

We received a proposal for a Ph.D. in Industrial Engineering. Per the new procedure for streamlining the new program review, please send me the name of the Faculty Senate representative whom you wish to be an ex-officio member of the Graduate School's faculty review committee for this proposal.

Thank you for your help.

PAF/msb

Copy to: Dr. Luis Glaser, Provost

Graduate School
P.O. Box 248125
Coral Gables, Florida 33124-2220
(305) 284-4154

Proposal for the Establishment of a Ph. D. Program in the Department of Industrial Engineering

November 4, 1991

SYNOPSIS OF PROPOSAL

It is proposed to establish a Ph.D. degree in Industrial Engineering. A proposal was submitted to establish such a degree in 1984. The University felt that more time was needed to develop the junior faculty's scholarly output. Currently, all IEN faculty have a graduate faculty status. The majority have at least five refereed journal articles within the last five years. Sponsored research has increased many folds over the past five years. A report of an independent outside consultant engaged in 1990 by the Graduate School to evaluate the graduate programs in the Industrial Engineering Department was extremely positive, and recommended the establishment of a Ph.D. program in Industrial Engineering.

1. RATIONALE

The faculty of the Department of Industrial Engineering proposes to offer a Ph.D. degree in Industrial Engineering. The faculty believes that it is in the best interest of the University, the College of Engineering, the Department, and the students that a Ph.D. degree in Industrial Engineering be established. A Ph.D. program is seen to serve student needs, support faculty scholarly and research output and enhance the image of the Department, the College of Engineering, and the University. It will also act in synergy with the existing Ph.D. program in Ergonomics, further enhancing its strength and viability. Over the past few years, the department has significantly improved its capability to offer strong graduate programs. Evidence of such progress includes

1) Curriculum

The department offers excellent graduate programs. Cooperative arrangements for scheduling and offering pertinent courses on a regular basis was established with the Department of Management Science. Joint M.S. programs with the School of Business Administration helped in identifying courses of special importance and significance to graduate studies in Industrial Engineering.

2) Faculty

Full-time departmental faculty who achieved graduate faculty status increased from three to ten. Some of the faculty on secondary appointments with the department also have achieved graduate faculty status. Faculty scholarly output has increased significantly over the past few years as evidenced by their publications record (see Curriculum Vitae). The growth of faculty scholarly output is expected to further increase with the implementation of a Ph.D. program.

3) Research

Research support increased many fold over the past few years. Currently, research support per faculty member is comparable to those of top research-supported schools (Appendix). Because of synergy between graduate education and research, this support is expected to increase when a Ph.D. program in I.E. is fully implemented.

4) Students

The department has a high quality student population in its M.S. programs. Several of these students are seeking further education towards a Ph.D. program. Numerous requests have been received from well qualified local,

national and international prospective Ph.D. students. The University of Miami is still the only viable institution that is capable of offering such a program south of Orlando/Tampa area. The student pool at the undergraduate level is a stable one, particularly because of the subsidy program in Manufacturing. This program has a high-quality incoming student population because of state subsidy requirements.

5) Facilities

The department has acquired additional space as a result of the new expansion to the McArthur Engineering Building. A new Computer-Integrated Manufacturing Laboratory has just been established. The laboratory has state of the art equipment valued at excess of $700,000. Computer facilities in the department, the college, and the university are quite adequate to meet the needs of students enrolled in Ph.D. Industrial Engineering.

6) Graduate Program Evaluation by Outside Reviewers

The graduate programs of the Industrial Engineering department have just undergone a comprehensive review by outside consultants selected independently by the University. The review was very positive. Direct quotes of comments made by the committee include:

- "The faculty and departmental administration were committed to offering a contemporary program involving an excellent curriculum and a scholarly research experience."

- "The curriculum integrated theory and applications in a manner that promoted synergism in stimulating individual investigation and research. The curriculum offered an opportunity for a well rounded education and yet provided the students with the necessary background to extend their studies into independent investigation. The curriculum also appeared to integrate very well with offerings of other departments to assure the student's preparation was comprehensive."

- "The planning for use of the new laboratories for research are [sic] excellent. We believe these facilities will provide an excellent opportunity to extend graduate education and research into areas that will promote and enhance the acquisition of external funding from additional sponsors."

- "The library was evaluated to be excellent."

- "[The faculty] are active professionally and highly regarded by their peers."

- "The faculty, in general, are well published and appear to be interested and willing to work hard at developing their respective research areas. They believe their opportunities for increased research funding and expanding the numbers of graduate students would be enhanced if a Ph.D. degree in Industrial Engineering were available."

- "[The students] were very complimentary of the department, in general, and of the faculty in particular."

- "It is recommended that consideration be given to ... [e]stablishing a Ph.D. program in Industrial Engineering which permits participation of all the options within the department."

1.a. EXACT TITLE OF DEGREE

Doctor of Philosophy in Industrial Engineering

1.b. PURPOSE AND GOALS OF DEGREE

The purpose of the degree is to prepare highly qualified candidates to serve the needs of industry, academic, research and government institutions. The Ph.D. degree in Industrial Engineering will be focused in the area of manufacturing/production systems. This is one of the classical areas of industrial engineering work which has great impact on improving industrial competitiveness. The global competition has created an unprecedented race for the optimal utilization of modern technology and human resources in manufacturing/production systems. The Ph.D. programs will better prepare students to meet the challenges and perform in such a globally competitive environment.

1.c. ASSESSMENT OF DEMAND AND JOB MARKET

The demand for students with graduate education in Industrial Engineering has been good and remains steady. Local and national employers have encouraged their employees to pursue graduate studies in Industrial Engineering as evidenced by the support these companies provide towards the tuition for their employees. Examples of such companies are IBM, FPL, and Burger King Corporation. These companies recognize the importance of optimal design of manufacturing/production systems on competitiveness.

According to the latest Council of Industrial Engineering Academic Department Heads (CIEADH) annual survey, the number of open positions at universities requiring a Ph.D. in Industrial Engineering for 1990-1991 is 62. More than fifty percent of requests are for people specializing in the manufacturing/production system concentration. Previous surveys

of the National Research Council showed that only about 1/4 of all graduating Ph.D.'s enter a career in education. The remainder is absorbed by industry and research institutions. A direct extrapolation of these figures indicate a demand of about 300 Ph.D.'s per year. The American Association of Engineering Societies published a figure of 200 Ph. D. degrees in I.E. granted in 1990. This translates into a shortage representing 1/3 of total demand. The National Science Foundation, in a recent report, has warned that there will be a severe shortage of qualified engineers to meet the technological challenges for the remainder of the century and beyond.

In the state of Florida, there are no schools that offer the Ph.D. programs in Industrial Engineering south of the Orlando/Tampa area. The only available programs exist in the University of Florida, University of Central Florida, and University of South Florida. This leaves a vacuum in the populated and growing South Florida area. The University of Miami is currently in the best position to fill this vacuum and offer a quality program in the field. Our faculty are well published in this area and our course offering is strong in the area of concentration proposed.

1.d. RELATIONSHIP TO OTHER COGNATE FIELDS

Industrial Engineering has strong relationships with a number of other fields. For example, the Department of Management Science offers many courses commonly accepted as Industrial Engineering courses. The field of Management is quite important to Industrial Engineering, and many courses in that department are highly recommended to industrial engineers. Epidemiology and Public Health, Psychology, and Biomedical Engineering are fields of great importance to the Ergonomics and Safety areas of knowledge in Industrial Engineering. Relationships between departments associated with these fields and the Industrial Engineering Department are explained in details in section 3.c. (Cooperative Work with Other Components of the University).

1.e. RELATIONSHIP TO UNDERGRADUATE AND PROFESSIONAL PROGRAMS

The department has an ongoing ABET accredited undergraduate program. The development of a Ph. D. degree in Industrial Engineering will only strengthen the department and its faculty, and will have a positive impact on undergraduate education. It should be noted that a number of talented students graduating from our undergraduate as well as our M.S. program have sought to pursue their Ph.D. degrees in other institutions because of our inability to accommodate them. Certainly it is also true that applicants from other institutions who sought admission to a Ph.D. program at the University of Miami have also not been accommodated. The lack of an overall synergistic program in Industrial Engineering has swayed some potential candidates from pursuing their Ph.D. in ergonomics at the University of Miami.

2. PHYSICAL RESOURCES

2.a. ADEQUACY OF LIBRARY HOLDINGS

The Library has an annual allocated budget for the Department of Industrial Engineering for acquiring books and periodicals. The current annual budget is $15,000 for books and $10,000 for journals and periodicals. Since subjects allocated by the Library under Industrial Engineering areas are common with several other departments in the University, the Library holdings and budget allocation by subject area become much larger. For example, the Library has significant holdings in the areas of business administration. The Gould Fund, a special endowed Library fund for the School of Business is providing added resources to the Library. Also, the Medical School Library has a very large collection of materials that are very useful for the programs in Ergonomics and Safety. The Mathematics Library contains many journals which are relevant to the quantitative areas of Industrial Engineering.The Library holdings in Industrial Engineering are considered to be strong. Additions in the area of Manufacturing Engineering have been requested and are currently being acquired. (see 7. Comparison with High-Quality Established Programs.)

A partial listing of journals and periodicals available in Industrial Engineering and related disciplines are:

Academy of Management
Academy of Management Review
Acta Orthopaedics Scandinavica
Acta Physiologica Scandinavica
Accident Society of America Journal
Across the Board
Acta Bio Theortica
Administrative Science Quarterly
American Economic Review
American Industrial Hygiene Association Journal
American Journal of Physical Anthropology
American Journal of Physiology
American Journal of Psychoanalysis
American Journal of Psychology
American Statistical Association Journal
American Statistician
Annals of Biomedical Engineering
Annals of Human Biology
Applied Ergonomics
Army Research and Development
Atmospheric Environment
Australian Journal of Physiology
Behavior Research Methods and Instrumentation and Computers

Bell Journal of Economics
Bell Journal of Economics and Management Science
Biological Bulletin
Biophysical Bioengineering and Medical Instrumentation
Biophysical Journal
Biosystems
Biotechnology and Bioengineering
Brain
British Journal of Industrial Relations
Bulletin of Mathematical Biology
Business Economics
Business Horizons
California Management Review
Columbia Human Right Review
Computers and Biomedical Research
Computers and Industrial Engineering
Computers and Operations Research
Computers and People
Decision Sciences
Disabled U.S.A.
Dissertation Abstracts
Econometrica
Economic Journal
Electroencephalography and Clinical Neurophysiology
Engineering Material and Design
Environment
Environmental Science and Technology
Ergonomics
European Journal of Operational Research
Federal Register
Financial Executive
Geographical Analysis
Harvard Business Review
Human Biology
Human Development
Human Relations
IBM Systems Journal
I E E E Spectrum
I I E Transactions
I L O Information
I L O Publications
Industrial and Labor Relations Review
Industrial and Labor Review. (Cumulative Index)
Industrial Engineering

Industrial Relations
Industrial Week
Interfaces
International Economic Review
International Journal of Engineering Science
International Journal of Environmental Studies
International Journal of Man-Machine Studies
International Journal of Mini and Microcomputers
International Journal of Production Research
International Labor Office
Journal of Acoustical Society of America
Journal of American Statistical Association
Journal of Anatomy
Journal of Analytical Psychology
Journal of Applied Behavior Analysis
Journal of Applied Psychology
Journal of Applied Physiology
Journal of Biomechanics
Journal of Biomedical Material Research
Journal of Bone and Joint Surgery
Journal of Business
Journal of Econometrics
Journal of Economics and Business
Journal of Economic Literature
Journal of Engineering Physics
Journal of Environmental Economics and Management
Journal of Environmental Engineering. (copy 2)
Journal of Experimental Psychology
Journal of Human Evolution
Journal of Humanistic Psychology
Journal of Industrial Economics
Journal of Industrial Relations
Journal of Marketing
Journal of Marketing Research. (Cumulative Index)
Journal of Medical Engineering and Technology
Journal of Money, Credit and Banking
Journal of Occupational Psychology
Journal of Optimization Theory and Applications
Journal of Physiology
Journal of Planning and Environmental Law
Journal of Regional Science
Journal of Safety Research
Journal of Speech and Hearing Disorders
Journal of Systems Management

Journal of Theoretical Biology
Lancet
Management Accounting
Management Focus
Management Review
Management Science
Management Services
Mathematical Programming
Mathematics of Operations Research
Medical and Biological Engineering
Medical Journal of Australia
Mini-Micro Systems
Modern Materials Handling
Monthly Labor Review
National Bureau of Economic Research
National Industrial Conference Board
National Productivity Review
Nature
Networks
New Scientist
Occupational Hazards
Occupational Health and Safety
O E C D Observer
Operational Research Society
Operations Research
Operations Research Society of America
Organizational Dynamics
Organization of European Community Development
Perceptual and Motor Skills
Personnel
Personnel Psychology
Physical Therapy
Physiological Reviews
Proceedings royal Society, S.B.
Public Administration Review
Rehabilitation Counseling Bulletin
Rehabilitation Literature
Remote Sensing of Environment
Research Management
Research Quarterly for Exercise and Sport
Review of Economics and Statistics
Review of Income and Wealth
Robotics Today
Royal Statistical Society

Sales and Marketing Management
Scandinavian Journal of Rehabilitation Medical
Scientific American
Simulation
Sloan Management Review (Cumulative Index)
Small Group Behavior
Society for Industrial and Applied Mathematics
Socio-economic Planning Science
Southern Economic Journal
Supervisory Management
Transportation Science
U.S. Bureau of the Budget
U.S. Congress, Joint Economic Committee
U.S. Department of Health, Education and Welfare
U.S. Department of Labor, Bureau of Labor Statistics
U.S. Office of Management and Budget

2.b. LABORATORY EQUIPMENT

The Department of Industrial Engineering administers several laboratories in the McArthur Engineering Building and a laboratory at the Medical School's Comprehensive Pain and Rehabilitation Center. These laboratories serve both the undergraduate as well as graduate students in the department. Laboratories that are particularly suitable for graduate research and the type of equipment in their laboratories are given here.

2.b.1. Microcomputer Laboratory

Location of laboratory: Room 271/272, McArthur Building
Purpose of laboratory: The main purpose of the laboratory is to support courses offered by the Department of Industrial Engineering which require microcomputer work. The laboratory is also used by faculty and graduate students of the department for research purposes.
Existing equipment: The lab currently is equipped with eleven (11) personal computers. Six of these computers are based on the INTEL 8088 microprocessor (IBM XT compatible) and are equipped with 30 megabyte hard drives and either CGA (color graphics adapter) monitors or Hercules compatible monochrome monitors. One of the six is also equipped with an 8087 math co-processor. Two other computers based on the 80286 processor and equipped with EGA (enhanced graphics adapter) color monitors are also present. Three IBM compatible computers based on the 80386 processor have recently been added to the laboratory. There are five 9-pin dot matrix printers and one Hewlett Packard Deskjet printer shared by the computers.
Assessment of current equipment: The current equipment is adequate for general computing purposes. The newly acquired computers provide capabilities for applications with intensive numerical processing or advanced graphics such as computer-aided design.

2.b.2 Computer Integrated Manufacturing Laboratory

Location of laboratory: Room 155/156, McArthur Building
Purpose of laboratory: The objective of the Computer Integrated Manufacturing Laboratory is to provide the students with the required training on hardware and equipment, and methods of manufacturing in a CIM environment. This is accomplished by assigning laboratory projects in the various courses in the area of CIM whereby the student is trained on individual pieces of automation equipment. Integration concepts are then taught in the integrated systems section of the laboratory.
Existing equipment: The Robotics and Automation Laboratory houses state-of-the-art equipment to support the above mentioned areas of applications and research. This equipment includes 4 IBM robot systems (donated by IBM), a Motionmate 5-axis robot, a Seiko 700 5-axis robot, a MODACS V industrial controller (donated by Modcomp), 4 IBM microcomputers, 2 linear flexible conveyors, a Robotmart 3-axis CNC minimill, a spectralight CNC lathe, and a Bridgeport V2E3 3-axis CNC milling machine. In order to provide the students with state-of-the-art knowledge and experience, the Department of Industrial Engineering has recently acquired a new industrial programmable controller, and EX mill/EZ surf software. The latter software is developed specifically for the Bridgeport CNC milling machine series, which allows a complete integration of the computer aided design and computer aided manufacturing phases required to machine parts. The department has also acquired a new PUMA 562 robot system. This is a 6-axis servo controlled industrial robot equipped with Unimation's proprietary VAL II control and programming capabilities and simple user-friendly program instructions. The design of VAL II features the ability to communicate and interact with the manufacturing environment and allows users to advance from isolated cells of automation to fully integrated systems. The most recent acquisition is an Apollo work station and SILMA software. These acquisitions allow the students to work and perform research on problems involving dynamics, product and process design, graphic simulation, and manufacturing process planning.
Assessment of current equipment: The current equipment is adequate for teaching and conducting research in several areas of Computer Integrated Manufacturing, namely: Robotics, Automated Assembly, Numerical Control, Product and Process Design, and Process Planning. Recent investments in this laboratory are in excess of $700,000 acquired through donations by industry, through research support and other departmental sources.
Incremental needs: The Department of Industrial Engineering recognizes the importance of quality assurance and material handling as components of CIM. Software for these areas or is now being developed in the CIM Laboratory to support the material handling aspects. Equipment for quality assurance is progressively being acquired.

2.b.3. Ergonomics Laboratory

Location of laboratory: Rooms 288, McArthur Building
Purpose of laboratory: The main purpose of this laboratory is to support courses in the area of Ergonomics, Human Factors Engineering, and Biomechanics, and to conduct research projects in these fields. The equipment is used heavily by graduate students to conduct their research projects. The laboratories have state of the art equipment and software which permits students and faculty to conduct cutting edge research.
Existing equipment: Our Ergonomics Laboratories house the following equipment: bicycle ergometer, treadmill, oxygen analyzer (Beckman OM-11), carbon dioxide analyzer

(capnograph), ventilation meter (Parkinson-Cowan), reaction time measurement device, depth perception device, tracking device, Sensormedics R612 8-channel recorder with all of the needed preamplifiers and amplifiers that accept different biological signals, Sensormedics carbon dioxide analyzer (LB-2), Sensormedics ventilation measurement model (VMM-2), IBM-AT microcomputer, Data Translation analog to digital converter board (DT-2801-A), Selspot 3-D motion analysis system, Faro 3-D posture analysis system, anthropometry measurement kit, strength measurement load cells and digital readout devices, and Kistler force-platform with software.

Adequacy of lab space: Ergonomics Laboratory space barely meets the existing needs for graduate study and research. As the number of graduate students increase and funded research expands, additional space will be needed.

2.b.4. The Comprehensive Pain and Rehabilitation Center Ergonomics Laboratory

Location of laboratory: South Shore Hospital, Rooms 603, 702, 704

Purpose of laboratory: The Ergonomics and Bioengineering Division of the Comprehensive Pain and Rehabilitation Center has several laboratories. The purpose of these laboratories is to conduct functional capacity assessment and to support the center's programs of treatment and rehabilitation. The laboratories also support faculty and students research projects in Ergonomics and Rehabilitation.

Existing equipment: Knee reflex reaction timer, Schaevitz digital transducer readout, pain measurement device, Chattanooge grip strength, digital timers (2), Wavetek wave generator, Lafayette reaction time device, tremor device, Okidata printer, IBM XT, Ariel performance analysis system, Kistler force platform, Panasonic VCR, Magnavox cameras (2), alphacell force readout, Bofors force readout, static strength testing station, Intellect VMS stimulation unit, Hitachi oscilloscope, Heath power supply, Hewlett-Packard function generator, scope multitester, IBM S260, Hewlett-Packard laser jet printer, IBM Proprinter X24, Hewlett Packard ScanJet, Hewlett Packard plotter, IBM S2 70-386, 3 Codetron units, PDP 11-23, back strength testing frame, Bofors force readout, Cyborg EMG unit (2), Ariel computerized exercise system multi-station, arm-leg station, AST computers (2), Samsung screens (4), Citizen printer, Fitron cycle-ergometer, and AMF quantum XL fitness computer.

Assessment of current equipment: Existing laboratory equipment and software represent state of the art in Ergonomics, Biomechanics, and Rehabilitation.

Adequacy of laboratory space: Existing space is accommodating current need. Additional space on the ninth floor of the building is being used for job simulation. Renovation of that space for future use is being contemplated.

2.b.5. Industrial Hygiene Lab

Location of laboratory: McArthur Building, Room 278.

Purpose of laboratory: To support advanced courses in Industrial Hygiene and to conduct research pertaining to occupational physical and chemical stress control equipment. **Equipment:** Laboratory is equipped with a vibration station and noise and vibration measuring equipment.

2.b.6. Productivity Research Lab

Location of laboratory: McArthur Building, Room 279.
Purpose of laboratory: To conduct advanced research in Productivity Engineering.
Equipment: Microcomputers. Funds will be drawn from revenues generated by the Third International Conference on Productivity and Quality Research.

CURRICULUM

3.a. Ph.D. in Industrial Engineering

The purpose of the Ph.D. degree is to permit students to conduct in-depth studies in industrial engineering and to enhance their intellectual and research skills in the field. The graduate degree work will be concentrated in the classical industrial engineering area of Manufacturing/Production Systems.

CURRICULUM STRUCTURE

The Student Graduate Advisory Committee will design a program of study with a minimum set of courses as listed below, plus a set of additional courses as deemed necessary. The committee will take into consideration the student background, objectives, and special educational needs that will better prepare the student for conducting his dissertation research. The Advisory Committee will closely monitor the student's progress to insure that all requirements have been met.

The Ph.D. requirements will follow the recommendations set by the Graduate School, which consists of a minimum of 24 credit hours of course work and up to 24 credit hours of dissertation research beyond the Master's degree.

A total of 48 course credits of graduate credit work are required for the Ph.D. including those taken for the Master Degree. These credits will be expected to include the following courses (33 credits):

IEN 612/MAS 603	Design of Experiments
IEN 614	Advanced Quality Control
IEN 642/MAS 647	Linear Programming and Extensions
IEN 643	Integer Programming and Network Flows
IEN 645/MAS 655	Stochastic Processes
IEN 647	Production Systems Modeling and Simulation
IEN 657	Ergonomics and Occupational Biomechanics
IEN 660	Productivity Measurement and Evaluation (or Advanced Management course)
IEN 662	Productivity Planning and Improvement
IEN 665	Advanced Production Systems
IEN 668	Advanced Materials Handling and Facilities Design

A list of other courses that are pertinent to the proposed concentration are given below. These courses are currently offered by the Industrial Engineering Department as well as other Departments in the University of Miami, and from which the remaining 15 credits can be taken.

IEN 505	Robotics
IEN 506	Manufacturing Processes II

IEN 509	Automated Assembly
IEN 572	Management of Technology
IEN 580	Advanced Engineering Economy
IEN 644/MAS 651	Nonlinear and Dynamic Programming
IEN 646/MAS 656	Queuing Models
IEN 649	Forecasting Systems
CIS 621	Management Information Systems
CIS 661	Introduction to Expert Systems for Management
CIS 662	Artificial Intelligence Programming for Business and Management
CIS 674	Neural Network Applications
ECE 511	Software Engineering
ECE 547	Expert Systems for Computer and Electrical Engineering
ECO 660	International Economics
ECO 691	Managerial Economics
MAS 601	Applied Regression Analysis
MAS 602	Applied Multivariate Statistics
MAS 606	Nonparametric Statistics
MEN 513	Kinematics for Robotics
MEN 517	CAD Applications Using Interactive Computer Graphics
MGT 651	Behavioral and Organizational Systems
MGT 652	Organizational Theory
MGT 658	Strategic Management
MGT 671	Management of Innovation
MTH 545	Introduction to Artificial Intelligence
MTH 645	Introduction to Expert Systems
MTH 528	Combinatorics
POL 551	Productivity in the Public and Non-Profit Sector
POL 698	Special Topics (Technology and Public Policy)
PSY 631	Advanced Psychological Statistics I
PSY 632	Multiple Regression and Multivariate Statistics
PSY 633	Multivariate Correlation Methods in Psychology

3.b. **Additional Courses**

At the present time, as we have designed this Ph.D. program, there is no need for any additional courses. However, after administering the program for some time, when there

is a perceived need to introduce any additional courses, they will be introduced according to the accepted University procedures.

3.c. Proposed Course Schedule for Next Three Years

The following is a schedule of Ph.D. core courses for the next three years. All courses are 3 credit hours each. Other courses in the department will be scheduled simultaneously as the need arises.

Term		Faculty
Fall 1991		
IEN 612*	Design of Experiments	Asfour
IEN 642/MAS 647*	Linear Programming	Aboudi
IEN 645/MAS 655*	Stochastic Processes	Ip
IEN 660	Productivity Measurement and Evaluation	Sumanth
IEN 699	Advanced Topics	Asfour
Spring 1992		
IEN 505	Robotics	Boubekri
IEN 643/MAS 649*	Integer Programming	Aboudi
IEN 644/MAS 651*	Nonlinear Programming	Ip
IEN 657	Ergonomics and Occupational Biomechanics	Asfour
IEN 665	Advanced Production Systems	Swift
IEN 668	Advanced Materials Handling and Facility Design	Omachonu
Fall 1992		
IEN 507	Computer Control in Manufacturing	Boubekri
IEN 612*	Design of Experiments	Asfour
IEN 614	Advanced Quality Control	Swift
IEN 642/MAS 647*	Linear Programming	Ip
IEN 645/MAS 655*	Stochastic Processes	Aboudi
IEN 660	Productivity Measurement and Evaluation	Sumanth
Spring 1993		
IEN 505	Robotics	Boubekri
IEN 644/MAS 651*	Nonlinear Programming	Aboudi
IEN 647	Production Systems Modeling and	Ip

	Simulation	
IEN 657	Ergonomics and Occupational Biomechanics	Asfour
IEN 665	Advanced Production Systems	Swift
IEN 668	Advanced Materials Handling and Facilities Design	Omachonu
MAS 603*	Design of Experiments	Kurucz

Fall 1993

IEN 507	Computer Control in Manufacturing	Boubekri
IEN 612*	Design of Experiments	Asfour
IEN 614	Advanced Quality Control	Swift
IEN 642/MAS 647*	Linear Programming	Ip
IEN 645/MAS 655*	Stochastic Processes	Aboudi
IEN 660	Productivity Measurement and Evaluation	Sumanth

Spring 1994

IEN 505	Robotics	Boubekri
IEN 643/MAS 649*	Integer Programming	Ip
IEN 644/MAS 651*	Nonlinear Programming	Aboudi
IEN 657	Ergonomics and Occupational Biomechanics	Asfour
IEN 665	Advanced Production Systems	Swift
IEN 668	Advanced Materials Handling and Facilities Design	Omachonu

* These courses are shared with Management Science.

3.d. COOPERATIVE INTERDISCIPLINARY WORK WITH OTHER COMPONENTS OF THE UNIVERSITY

The Department of Industrial Engineering has several strong cooperative or interdisciplinary work arrangements with other departments in the University.

3.d.1. Department of Management Science

Several faculty members with primary appointments in the Department of Management Science have secondary appointments in the Department of Industrial Engineering. Dr. Joseph Moder, Dr. Charles Kurucz, Dr. Earl Wiener and Dr. Ronny Aboudi teach regularly scheduled undergraduate and graduate courses taken by Industrial Engineering students. They participate regularly in supervisory committees of graduate students. Dr. Howard Gitlow serves as Executive Director of the University Institute for the Study of Quality in Manufacturing and Service. This Institute was formed as a joint venture between the College of Engineering, Department of Industrial Engineering and the School of Business. Many faculty members from both schools participate in the Institute's activities. Dr. Aboudi

is in charge of the M.S. program in Operations Research.

3.d.2. Department of Management

The Department of Industrial Engineering has strong ties with the Department of Management in the School of Business. The two departments collaborate under the auspices of the Graduate School in offering courses pertinent to the Management of Technology area of concentration and to Management Engineering. Dr. David Sumanth of the Department of Industrial Engineering, holds a secondary appointment in the Department of Management. Many Department of Management faculty, such as Dr. William Werther and Dr. Harold Berkman, participate in graduate student advisory committees and in conferences and seminars organized by the Department of Industrial Engineering. Several Department of Management faculty members participate in conferences organized by the Department of Industrial Engineering as speakers, session chairpersons, or in organizing committees.

3.d.3. Department of Epidemiology and Public Health

The Department of Industrial Engineering has a number of areas of interest in common with the Department of Epidemiology and Public Health. Environmental and Occupational Safety and Health, Epidemiology, and Biostatistics are but a few of those common areas of interest. This Medical School's department offers the Master's degree in Public Health. It collaborates with the Department of Industrial Engineering under the auspices of the Graduate School in the interdisciplinary Master of Science program in Environmental/Occupational Health and Safety. Under this arrangement a strong combination of academic programs are structured using shared resources of the two departments. Dr. Tarek Khalil has held a secondary appointment in the Department of Epidemiology and Public Health since 1976.

3.d.4. Department of Neurological Surgery

The Department of Industrial Engineering has very strong ties with the Department of Neurological Surgery. Dr. Khalil, Dr. Asfour, and Dr. Abdel-Moty have joint appointments in both departments. Dr. Khalil directs the Ergonomics and Bioengineering Division of the Comprehensive Pain and Rehabilitation Center, which supports several graduate students from Industrial Engineering and Psychology, and Dr. Asfour is an Assistant Chief of the Division. Dr. Hubert Rosomoff and David Fishbain participate regularly in graduate student committees and projects.

3.d.5. Other Departments in the College of Engineering

Interdepartmental collaboration between the departments of Industrial Engineering, Biomedical Engineering, Mechanical Engineering and Electrical and Computer Engineering occurs at the graduate level with students in the Ergonomics, Manufacturing or Computer related tracks. Faculty members from these departments have served on supervisory committees of graduate student projects. Students also take pertinent courses offered on

a regular basis by those departments. Offerings in Biomedical Engineering are particularly relevant to students in the Ergonomics Ph.D. program. Dr. Khalil holds a secondary appointment in the Department of Biomedical Engineering.

3.e. TEACHING

There are two major types of activities: classroom lectures and one-on-one research conferences between faculty and students. The classroom work sometimes involves presentations by students on individual library research topics. The proportion of classroom vs. individual contacts varies from student to student. Classroom contact predominates in the case of organized course work, and individual contacts become dominant during the research phase.

3.f. DISTRIBUTION OF GRADUATE STUDENTS AMONG ADVISORS

Students will be assigned to advisors according to the advisor's current research involvement and areas of publications.

3.g. CONFERENCES

The Department of Industrial Engineering has organized a series of international conferences:

- *First International Conference on Productivity Research*, Miami, Florida, February 1987
- *Annual International Industrial Ergonomics and Safety Conference*, Miami, Florida, June 1987
- *First International conference on Technology Management*, Miami, Florida, February 1988
- *Second International Conference on Productivity Research*, Miami, Florida, February 1989
- *Second International Conference on Management of Technology, Miami, Florida, February 1990*
- *American Society of Biomechanics Conference*, Miami, Florida, November 1990
- *Third International Conference on Productivity and Quality Research*, Miami, Florida, February, 1991

The Department will also be organizing, on an on-going basis, the following conferences in 1992 and 1993.

- *Third Int'l Conf. on Management of Technology*, Miami, Florida, February 1992
- *Third Int'l Conf. on Productivity Research,* Miami, Florida, February 1993

4. FACULTY

4.a. CURRICULA VITAE

(see Appendix A)

4.b. ESTIMATE OF ADDITIONAL FACULTY NEEDS

The existing level of resources in terms of faculty is adequate to administer the Ph.D. program. In order to strengthen it further, an additional faculty position (in manufacturing production systems) has been provided and advertised for recently. We expect to fill this position for the term beginning Fall '91.

4.c. INTERACTION WITH OTHER GRADUATE PROGRAMS

The department expects to interact heavily with other College of Engineering Departments involved in computer-integrated manufacturing. A strong interaction also exists with the Department of Management Science and the Department of Management. Faculty from all these departments will be serving on student's Ph.D. advisory committees.

4.e. FACULTY SUMMARY (TABLE I)

Faculty Summary – Last Five Years

Name	Degree/Year Institution	Rank/ Appointment date	Chair Dept. Thesis (T) Disserta.(D) Committee	Member Dept. Thesis (T) Disserta.(D) Committee	Member Extradept. Thesis (T) Disserta.(D) Committee	Notable Additions	Full length Refereed (only) Publications	Extra-mural (funded) Grants Contracts
Aboudi, R.	Ph.D./1986 Cornell	Assistant Prof./1988	2(T)	2(T) 1(D)	1(T)	5 prof. presentations 1 book chapter	6	UMQI Grant 1989 $7,500
Abdel-Moty, E.	Ph.D./1988 Univ. of Miami	Res. Asst. Professor 1989	1(T)	2(T)	1(D)	1 book chapter 10 prof. presentations	7	Fla High Tech $50,000 NIH Biomed $2,500 NIDRR $178,000
Asfour, S.	Ph.D./1980 Texas Tech.	Professor 1988	3(T) 2(D)	8(T) 1(D)	17(T) 9(D)	Edited 1 book Co-edited 1 book Co-authored 1 book 1987 Chaired and organized Annual International Industrial Ergonomics & Safety Conference 1988 College of Engineering Excellence in Teaching Award 1989 Freshman Teaching Award	26	NIOSH 1988 $92,000 1989 $96,000 FPL 1988 $50,000 1989 $75,000 1990 $116,000 1991 $129,000 Florida High Tech 1990 $20,000 CPRC 1984-present $260,000(est.)/yr.
Bayraktar, B.A.	Ph.D./1968 New York Univ.	Visiting Prof. 1986				Co-edited 2 books Co-authored 1 book chapter Co-authored I report on a workshop Co-chaired 1 conference Co-chaired 1 workshop Developed 1 new graduate course	3	F grant $9200 No. CDR: 8719471

(Continued on the next page)

Faculty Summary - Last Five Years

Name	Degree/Year Institution	Rank/ Appointment date	Chair Dept. Thesis (T) Disserta.(D) Committee	Member Dept. Thesis (T) Disserta.(D) Committee	Member Extradept. Thesis (T) Disserta.(D) Committee	Notable Additions	Full length Refereed (only) Publications	Extra-mural (funded) Grants Contracts
Boubekri, N.	Ph.D./1983 Univ. of Nebraska	Assistant Professor	3(T)	1(T)	4(T)	5 contributions to books Technical Manual for IBM	5	UMQI 1989 $3,000 IBM 1985 $8499 UM Initiation Award (1985) $7500
Czaja, S.J.	Ph.D./1980 SUNY Buffalo, New York	Assoc. Professor	3(T) 2(D)	3(T) 3(D)	1(D)	Edited 1 book 3 book chaps. Editor, Special issue of Human Factors Office Tech. & People Chair, Technical Group on Aging - Human Factors Society	7	NIH(1988-90) $198,000 USPS(1988-89) $175,000 NIH(1988-990) $188,000 Markle Foundation (1987-90) $305,000
Ip, C.	Ph.D./1986 Cornell	Assistant Prof./1988	2(T)	4(T)		5 Prof. presentations	5	UMQI 1989 $7,500
Khalil, T.	Ph.D./1969 Texas Tech	Professor	3(D) 6(T)	2(D) 6(T)	3	Edited 2 books Many contributions to books & conferences Many presentations	16	Florida High Tech 1988 $50,000 1989 $49,000 1990 $100,00O NIDRR 1990 $178,000 NSF 1988 $9,200 InterAmerican Bank 1987 $4,300 U.S. Dept. of Labor 1985 $6,000 Burger King 1984-89 $6,000/yr.

(Continued on the next page)

Faculty Summary - Last Five Years

Name	Degree/Year Institution	Rank/ Appointment date	Chair Dept. Thesis (T) Disserta.(D) Committee	Member Dept. Thesis (T) Disserta.(D) Committee	Member Extradept. Thesis (T) Disserta.(D) Committee	Notable Additions	Full length Refereed (only) Publications	Extra-mural (funded) Grants Contracts
Khalil, T.(contd.)								Frank B. Hall 1984-89 $5,600/yr. FRCU 1984-86 $150,000 (US Consultant) State of Florida 1984-87 $100,000/yr. 1988 $220,000 1989 $230,000 1990 $222,000 IBM 1989 (CIM donation) $200,000 Dept. of Neurological Surgery 1989 (Ariel Equip.) $100,000 CPRC 1984-present $260,000 (est.)/yr. FPL Quality Inst.(Institutional) 1988-91 $1,000,000
Kurucz, C.N.	Ph.D./1969 SUNY Buffalo, New York	Assoc. Professor 1974	2(D)	1(D) 2(T)	3(D) 1(T)	3 prof. presentations Co-author 10 additional presentations Developed 2 new grad. courses 1 book chapter		NSF, 1989-1991 $750,000 Co-Principal Investigator EPA (2) $600,000 Co-Principal investigator as sub-contractor for FI
Moder, Joseph J.	Ph.D./1950 Northwestern	Professor		1(T) 1(D)		Revised textbook		

(Continued on the next page)

Faculty Summary - Last Five Years

Name	Degree/Year Institution	Rank/ Appointment date	Chair Dept. Thesis (T) Disserta.(D) Committee	Member Dept. Thesis (T) Disserta.(D) Committee	Member Extradept. Thesis (T) Disserta.(D) Committee	Notable Additions	Full length Refereed (only) Publications	Extra-mural (funded) Grants Contracts
Omachonu, V.	Ph.D./1987 New York Polytechnic	Assistant Professor		4(T)		Book in press Teacher of the year award Reviewer for 3 journals Co-author of a book chapter Registered Professional Engineer 30 publications	7	UMQI grant for $7,500 Nat'l Science $5,000
Rhodes, M.	Dr. Eng./1976 Renns. Poly. Institute	Contract by semeste Initial contract Fall 1985	1(T)	1(T)		Member Peer Review Editorial Board published by American Society of Safety Engineers		UMQI 1989 $1,000
Sumanth, D.J.	Ph.D./1979 IIT, Chicago	Professor/1988	9(T)	9(T)	2(T)	Editor (of refereed books) fo Chair for the 1st, 2nd and 3rd Int'l Conf. on Productivity Research Fellow Award Many professional presentations International Student ed. 1985 "Productivity Engineering Management" Spanish ed. 1990 "Productivity Engineering and Management Indian Edition, 1990 "Productivity Engineering and Management"	10	UMTA (DOT), 1986-88 $84,725 Francisco M. 1988 $1,400 Atarraya 1988-89 $12,000 IBM 1989 $5,000 UMQI Grant 1989 $3,000 1990 $6,000 Montenay Power 1990 $1,600
Swift, J.	Ph.D./1987 Oklahoma State Univ.	Assistant Professor 1987	7(T)	1(T)		5 prof. presentations 1 book chapter Registered Professional Engineer Certified Quality Engr. Developed 2 new grad. courses	1	NSF, 1988 $10,000 UMQI,1989 $34,134 Renard Manuf., 1989 $5,000

Faculty Summary – Last Five Years

Name	Degree/Year Institution	Rank/ Appointment date	Chair Dept. Thesis (T) Disserta.(D) Committee	Member Dept. Thesis (T) Disserta.(D) Committee	Member Extradept. Thesis (T) Disserta.(D) Committee	Notable Additions	Full length Refereed (only) Publications	Extra-mural (funded) Grants Contracts
Wiener, E.	Ph.D./1961 Ohio State Univ.	Professor	1(T)	2(T) 2(D)		P.I. NASA Grant (presently 3/4 time)	5	NASA 1985-1989 $334,173 1988 $102,108 1989-1990 $388,062 1989-1991 $39,953

Teaching Excellence

The Department of Industrial Engineering has a tradition of emphasizing teaching excellence, and close attention and supervision of students in the programs. Faculty members who have received outstanding teaching awards over the past few years are:

•Dr. Shihab Asfour received the Alexander Orr Award, College of Engineering Excellence in Teaching Award, 1988; and the University of Miami First Freshman Teaching Award, 1989.

•Dr. Vincent Omachonu received Professor of the Year, Department of Industrial Engineering, 1990; University of Miami Freshman Teaching Award, 1990; and Award for Teaching Excellence, School of Business, University of Miami, 1991.

Faculty evaluations by students also reflect the outstanding teaching quality of the department's faculty. Those faculty who received a 100% "overall positive evaluation" rating for the 1990-1991 academic year included:

•Dr. Elsayed Abdel-Moty, IEN 311
•Dr. David Sumanth, IEN 311, IEN 570, IEN 660 (2 sections)
•Dr. Jill Swift, IEN 380, IEN 512
•Dr. Nourredine Boubekri, IEN 407
•Dr. Vincent Omachonu, IEN 465
•Dr. Shihab Asfour, IEN 501, IEN 612, IEN 657
•Dr. Bulent Bayraktar, IEN 501
•Dr. Chi Ip, IEN 641

5. STUDENTS

5.a. PROGRAM CHARTS

TABLE II - PROGRAM CHARTS

Department of Industrial Engineering
February 28, 1991

1. Students

Registered Program Title: Industrial Engineering
Degree: Master of Science

2. Applications - Admissions - Qualifications

Academic Year	Applications	Admissions Offered	New Enrollments
1984-1985	19	19	10
1985-1986	29	29	27
1986-1987	40	32	25
1987-1988	90	78	32
1988-1989	87	74	19
1989-1990	37	33	14
1990-1991	65	53	13

3. Total Number of Graduate Degrees Awarded

Academic Year	Degrees Awarded
1984-1985	5
1985-1986	10
1986-1987	20
1987-1988	13
1988-1989	11
1989-1990	23

TABLE II - PROGRAM CHARTS

Department of Industrial Engineering
February 28, 1991

1. Students

Registered Program Title: Environmental Health & Safety
Degree: Master of Science

2. Applications - Admissions - Qualifications

Academic Year	Applications	Admissions Offered	New Enrollments
1984-1985	6	6	4
1985-1986	3	3	3
1986-1987	4	2	1
1987-1988	15	13	9
1988-1989	4	3	0
1989-1990	5	3	1
1990-1991	3	2	0

3. Total Number of Graduate Degrees Awarded

Academic Year	Degrees Awarded
1984-1985	0
1985-1986	1
1986-1987	1
1987-1988	0
1988-1989	1
1989-1990	3

TABLE II - PROGRAM CHARTS

Department of Industrial Engineering
February 28, 1991

1. Students

Registered Program Title: Management of Technology
Degree: Master of Science (initiated in 1990-1991)

2. Applications - Admissions - Qualifications

Academic Year	Applications	Admissions Offered	New Enrollments
1990-1991	33	29	26

5.a. NUMBER OF STUDENTS IN PROGRAM

Students for the Ph.D. program are expected to be drawn from one or more of the following sources:

1. Current M.S. students in the IE program. A list of these students is given in Table 2. We expect to draw at least two students per year from this pool.

2. National Advertisement Campaign to inform of the establishment of the Ph.D. program at the University of Miami to attract qualified students from other parts of the country. We expect to draw at least two students per year from this pool.

3. A long waiting list of international students interested in pursuing the Ph.D. at the University of Miami. We expect that two more students per year can be drawn from this pool.

4. Alumni of the University of Miami working in local industry and desiring further graduate education. We expect to draw one student per year from this pool.

5.b. GENERAL REQUIREMENTS FOR ADMISSION

5.b.1 Doctor of Philosophy

Admission to the Ph.D. in Industrial Engineering program requires a B.S. in engineering. Students must show to the satisfaction of the department, strong aptitude and potential for in-depth graduate education and research.

General guidelines for the Doctor of Philosophy degree normally require a cumulative grade point average of 3.0 and a minimum combined verbal and quantitative Graduate Record Examination (GRE) score of 1000. However, at the discretion of the Graduate Studies Committee, students may be required to provide other evidence of their capabilities. Such evidence may include, but is not limited to: a) exceptional recommendations, b) experience in the engineering profession, c) high grade point average in undergraduate professional studies, and d) higher level of GRE scores.

Students who apply from foreign countries and who do not hold either an undergraduate or graduate degree from an U.S. institution are not required to submit GRE scores with their application. However, they must submit TOEFL scores of 550 or better or the student will be required to successfully complete a deficiency English language training program. In addition, these students are required to sit for the GRE prior to their admission to candidacy for the degree for which they were admitted.

5.c. PROVISIONS FOR TRAINING TA'S AND RA'S

Teaching assistants are assigned to teach laboratory classes and to assist professors with grading homework assignments. Each teaching assistant works under the direct supervision of a faculty member. Research assistants are trained in different laboratories to perform independent research. They are encouraged to publish research outcome in collaboration with their advisors. The Department has a phenomenal success rate in having its graduate students publishing their works before graduation.

6. ADMINISTRATION

6.a. ADMINISTRATION INCREMENTS IMPOSED BY THIS PROGRAM

Space is currently adequate to implement this program. Additional space may be needed as the program expands in the future.

6.a.1.

The department already has a secretary assigned to handle graduate student applications. Additional applicants for the Ph.D. is not expected to create added burden on this system.

6.a.2.

The department has recently expanded its office and laboratory facilities.

6.a.3.

Travel money is very scare in the allocated budget. Additional resources in this category are welcome.

6.b. GOVERNANCE

An admissions committee will be responsible for the administration of the admission procedures. As a part of the admission process, the committee chairman responds to correspondence from prospective students, completes correspondence requirements of existing students, and conducts other correspondence of a general nature associated with the graduate programs. The graduate advisor performs initial contact and advising duties for all newly entering students. A supervisory committee is usually appointed when a student is formally admitted to a doctoral program. It will consist of not less than five members, namely three from the Graduate Faculty, one from outside the program or department of concentration, and the chairman, who will be a regular member of the Graduate Faculty. This committee is nominated by the department chairman. It is appropriate for the chairman to consult with the student upon the membership of the committee. The Supervisory Committee is empowered to plan the course of study for the student; to determine deficiencies, if any; to set other requirements; to request applicable transfer of credit where appropriate and to make up and administer the qualifying examination. All other issues of governance are based on existing departmental and Graduate School policies published in the University's bulletins.

7. COMPARISON WITH PRESTIGIOUS ESTABLISHED PROGRAMS

7. Comparison of Graduate Studies with Prestigious Established Programs

University	Faculty Size		Number of Ph.D. Students in Program	Number of Master of Science Students	Number of Ph.D. Degrees Granted Last Year	Research Support Per Faculty	Administrative Support (number of secretaries)
	Full Time	Secondary					
University of Southern California	6	3	25	100	2	35K	4
Clemson	9	0	10	30	3	25K	2
Lehigh	14	0	22	48	1	100K	2
Stanford	11	2	30	80	4	-	5
Penn State	20		41	<79	11	76K	-
University of Miami	10	4	5*	78	1	86K	3

* Existing Ph.D. is in Ergonomics and Interdepartmental Studies only. Current proposal is to expand to full program in Industrial Engineering.

8. BUDGET

Proposed Budget
Ph.D. Program in Industrial Engineering
Incremental Cost/Revenue Analysis

	FY 1991-92	FY 1992-93	FY 1993-94	FY 1994-95	FY 1995-96
INCREMENTAL COSTS					
Additional Faculty*	0	$50,000	$50,000	$50,000	$50,000
Additional TA's**	$33,000	$49,950	$66,600	$66,600	$66,600
Additional Lab Equipment	$5,000	$10,000	$10,000	$5,000	$5,000
Additional Library Resources	$2,500	$2,500	$2,500	$2,500	$2,500
Additional Space	0	0	0	0	0
Additional Supplies for Labs and Office	$500	$1,000	$1,500	$1,500	$1,500
Additional Travel for Presentations, Research Contracts, etc.	$1,000	$2,000	$2,000	$2,500	$3,000
Secretary (1/2 time)	0	0	0	$10,000	$10,000
Total Incremental Costs	$42,000	$115,450	$132,600	$138,100	$138,600
INCREMENTAL REVENUE					
Tuition**	$28,350 (3 students)	$56,700 (6 students)	$85,050 (9 students)	$94,500 (10 students)	$113,400 (12 students)
Expected Additional Research Revenues	$10,000	$15,000	$25,000	$40,000	$50,000
NET MARGINAL REVENUE	($3,650)	($43,750)	($22,550)	$3,600	$24,800

* Faculty member addition will be shared with other existing programs of the Department.

** Two TA's are requested for first year, increased to three for second year and to 4 for third year and beyond. Tuition is calculated @ $525/credit hour for 18 credit hours/fiscal year/per student. Figures include both tuition and stipend. Adjustment for inflation and/or cost of living increases is not considered.

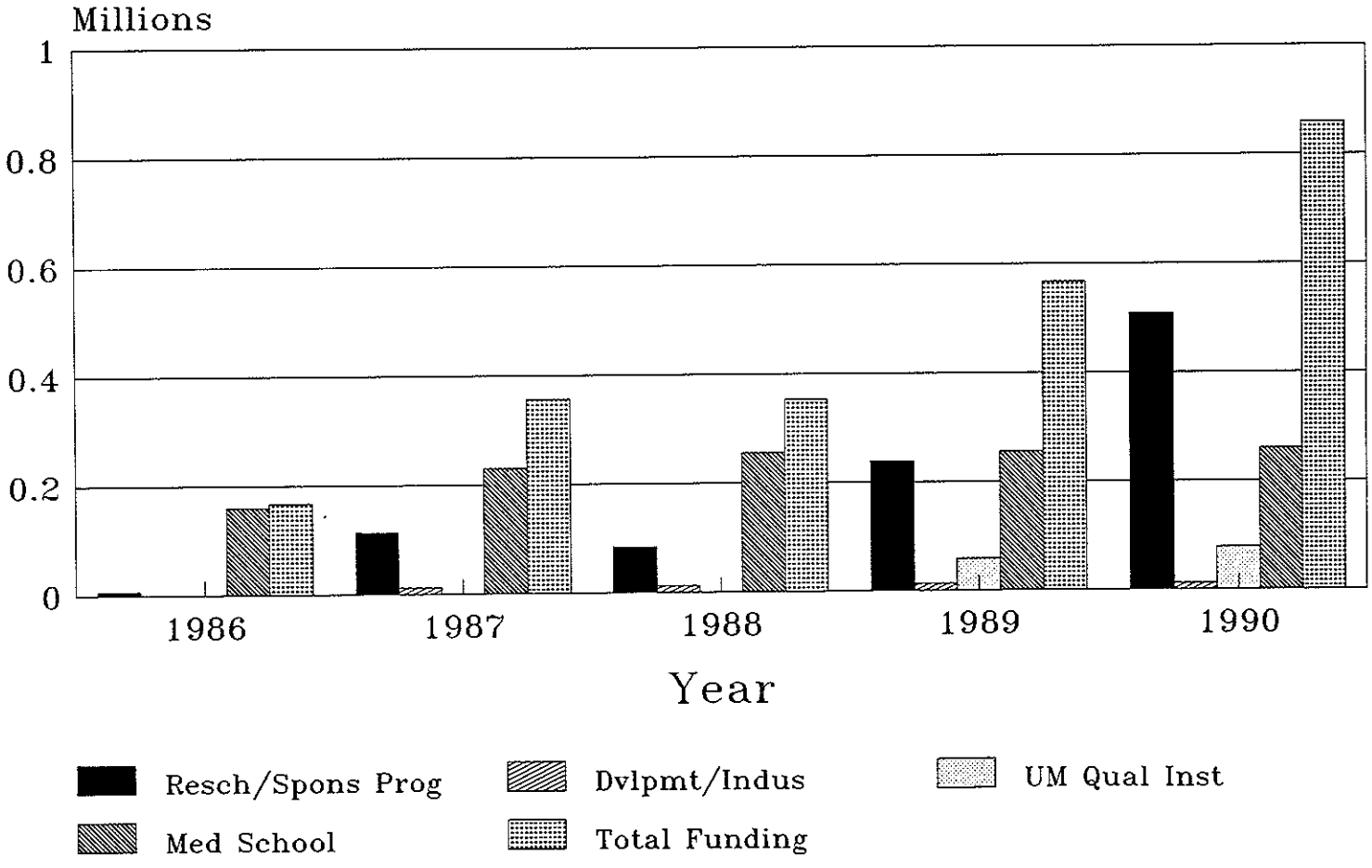
9. OTHER PERTINENT INFORMATION

9.a. COMPARISON OF TOP TEN SCHOOLS RESEARCH EXPENDITURES PER FACULTY

Rank	University	Research Dollars
1	Virginia Polytechnic Institute	$171,290
2	Texas A & M University	$112,047
3	Lehigh University	$110,171
4	University of Wisconsin, Madison	$108,729
5	University of Central Florida	$96,617
6	University of Michigan	$92,373
7	North Carolina A & T University	$80,287
8	Texas Tech University	$79,339
9	Pennsylvania State University	$76,700
10	Louisiana State University	$70,063
	University of Miami	$85,869

source: Division Newsletter, I.E. Division, American Society for Engineering Education. Editor, Hamid R. Paraei, University of Louisville, May 1990

9 b. University of Miami IE Dept. Research Involvement by Year



9.c. - GRADUATE PROGRAM ADMISSIONS STATISTICS

Academic Year	Average Undergraduate GPA	Average GRE Verbal	Average GRE Quantitative	Average GRE Analytical
1988-1989	3.28	485.09	705.30	552.40
1989-1990	3.41	542.00	737.00	621.40

APPENDIX A

UNIVERSITY OF MIAMI
CURRICULUM VITAE

1. Date: December 1, 1990

PERSONAL

2. Name: Ronny Aboudi 3a. Home Phone: (305) 361-6428

3b. Office Phone: 284-6595

4. Address: 1121 Crandon Blvd. #F1004, Key Biscayne, FL 33149

5. Employment Status: Full-time

6. Current Academic Rank: Assistant Professor

7. Department: Management Science
Industrial Engineering -- Secondary Appointment

8. Citizenship: United States

HIGHER EDUCATION

10. Cornell University, Ph.D., Operations Research, January 1986

Cornell University, M.S., Operations Research, January 1983

Florida Atlantic University, B.S., Mathematics, June 1980

11. NONE

12. NONE

EXPERIENCE

13. University of Miami, Department of Management Science, Assistant Professor, August 1988-present.

Yale University, School of Organization and Management Visiting Professor, Academic Year 87-88.

14. Chr. Michelsen Institute, Center for Petroleum Economics Scientist, October 85 - July 87.

15. NONE

PUBLICATIONS

16. NONE

17. R. Aboudi, G. Nemhauser, "Some Facets for an Assignment Problem with Side Constraints", Operations Research, to appear in March 1991.

R. Aboudi, K. Jörnsten, "Resource Constrained Assignment Problems", Discrete Applied Mathematics, 26 (1990).

R. Aboudi, Å. Hallefjord, R. Helming and K. Jörnsten, "A Note on the Pivot and Complement Heuristic For 0-1 Programming Problems", Operations Research Letters 8 (1989).

R. Aboudi, Å. Hallefjord, C. Helgesen, R. Helming, K. Jörnsten, A. Pettersen T. Raum and P. Spence, A Mathematical Programming Model for the Development of Petroleum Fields and Transportation Systems", European Journal of Operational Research, Vol 43, (1989).

R. Aboudi, K. Jörnsten and S. Bjornestad, "Sequencing Offshore Oil and Gas Fields", Investigacion Operativa, Vol 1, (1990).

R. Aboudi, Å. Hallefjord and K. Jörnsten, "A Facet Generation and Relaxation Technique Applied to an Assignment Problem with Side Constraints", to appear in European Journal of Operational Research.

R. Aboudi and K. Jörnsten, "Some Extensions to the Pivot and Complement Heuristic for 0-1 Integer Programming Problems", Discrete Applied Mathematics, under review.

R. Aboudi and D. Thon, "Second Degree Stochastic Dominance Decisions and Initial Wealth", (July 1990) submitted to Econometrica.

18. Working Paper Series:

R. Aboudi and D. Thon, "Efficient Algorithms for Stochastic Dominance Tests Based on Financial Market Data", Working Paper Number 89-04, School of Business Administration, University of Miami. (Submitted to Management Science.)

19. Publication in books:

R. Aboudi and G.L. Nemhauser, "Strong Cutting Planes and Separation," to appear in Economic Decision-Making: Games, Econometrics and Optimization, J.J. Gabszewicz, J-F Richard and L.A. Wolsey eds., North Holland, 1990.

20. NONE

21. PROFESSIONAL ORGANIZATIONS:

Operations Research Society of America (Associate Member).

22. NONE

23. NONE

24. TEACHING SPECIALIZATION:

member of the Graduate Faculty.

25. RESEARCH PERFORMED:

Summer 1989: University of Miami Summer Award in Business and the Social Sciences. Title: "Polyhedral Structure of a Relaxation of the Maximum Spanning Tree Problem with Budget Constraints". Amount: $6000.00.

UMQI (University of Miami Quality Institute). Title: "Transformer Failure Analysis". Amount: $7500.00. (Joint research with Dr. Chi Ip, Department of Industrial Engineering.)

Summer 1990: University of Miami Summer Award in Business and the Social Sciences. Title: "Stochastic Dominance and Initial Wealth". Amount: $6366.00.

26. RESEARCH ADVISING:

"A Survey of Multi-Objective Programming", By Mary Crowder, May 1990. (Research required for the M.S. Degree)

"An Algorithm for Stochastic Dominance Tests Incorporating Order Preserving Functions", By Tracey Powers, May 1990 (Research required for the M.S. Degree)

27. ADMINISTARTIVE RESPONSIBILITIES:

Advisor for the M.S. degree in Management Science.

28. COMMUNITY ACTIVITIES:

Faculty fellow at the Stanford Residential college.

29. CONFERENCES:

Mathematical Programming Conference (Boston 1985)

European Operational Research Society Meeting (Lisbon, Portugal 1986)

Combinatorial Optimization 1987 (CO 87 Southampton, Great Britain)

NATO Advanced Research Workshop (Bergen, Norway, 1987)

Operations Research Society of America (Vancouver, 1989)

Nordic Operations Research Society, "OR and Decision Support Systems" (Sweden, June 1989)

Operations Research Society of America (Las-Vegas, May 1990)

UNIVERSITY OF MIAMI
CURRICULUM VITAE

1. Date: 12/1/1990

PERSONAL:

2. Name:	Elsayed M. Abdel-Moty
3. Home Phone:	(305) 385-2762
4. Office Phone:	(305) 532-7246
5. Home Address:	14519 SW 107 Terr Miami, Florida 33186
6. Current Academic Rank:	Research Assistant Professor
7. Primary Department:	Industrial Engineering
8. Citizenship:	Egyptian
9. Visa Type:	Permanent Resident

HIGHER EDUCATION:

10. Institutional:

University of Miami, Coral Gables, Florida; Ph.D.; 1988.

Cairo University, Cairo, Egypt; M.Sc.; 1981.

Cairo University, Cairo, Egypt; B. Sc.; 1978.

11. Non-Institutional: None

12. Certification, License: None

EXPERIENCE:

13. Academic:

Cairo University, Cairo Egypt; Instructor; 1978-1981.

University of Miami, Coral Gables Florida; Teaching Assistant, 1981-1983.

University of Miami, Coral Gables Florida. Departments of Industrial Engineering and Neurological Surgery, Comprehensive Pain and Rehabilitation Center, Ergonomics Division; Research Assistant; 1982-1985.

University of Miami School of Medicine, Department of Neurological Surgery, Comprehensive Pain and Rehabilitation Center, Division of Ergonomics and Bioengineering; Research Associate; 1985-1988.

University of Miami School of Medicine, Departments of Industrial Engineering and Neurological Surgery, Comprehensive Pain and Rehabilitation Center, Ergonomics Division; Senior Research Associate; 1988-1989.

University of Miami, Departments of Industrial Engineering and Neurological Surgery and Comprehensive Pain and Rehabilitation Center, Ergonomics Division; Research Assistant Professor; 1989-present.

14. Non-Academic:

CIT ALCATEL French Telephone Co.; Electronic Exchange Technician; installing, testing, programming, and trouble-shooting computerized telephone systems in Cairo; 1979-1980.

Yom Elmostashfaita Hospital, Cairo Egypt. Biomedical Researcher, 1980.

Cairo University, Cairo Egypt. Computer Programmer, 1980.

Language Center, Coral Gables, Florida; Language Teacher; 1983-1985.

Florida International University, Miami Florida; Language Teacher; 1985-1986.

University of Miami Comprehensive Pain and Rehabilitation Center at South Shore Hospital and Medical Center; Supervisor of Ergonomics and Muscle Re-education Departments; 1990-Present.

15. Military:

Egyptian Army; Soldier; 1978-1980.

PUBLICATIONS

16. Books and Monographs Published:

1. Khalil, T.M., Asfour, S.S., Abdel-Moty, E., Rosomoff, R.S., Rosomoff, H.L., 1985. New Horizons for Ergonomics Research in Low Back Pain. In : Trends in Ergonomics / Human Factors, Eberts, R.E. and Eberts, C.G. (Eds.), Elsevier Science Publishing B.V. (North-Holland), Amsterdam, pp. 591-598.

2. Abdel-Moty, E., Khalil, T.M., 1987. Computerized Electromyography in Quantifying the Effectiveness of Functional Electrical Stimulation. In: Trends in Ergonomics/Human Factors, Asfour, S.S. (Ed.), Elsevier Science Publishing B.V. (North-Holland), Amsterdam, Vol. B, pp. 1057-1066.

3. Abdel-Moty, E., Khalil, T.M., 1987. Microcomputers in the Design and Analysis of the VDT Sitting Workplace. In: Trends in Ergonomics/Human Factors, Asfour, S.S. (Ed.), Elsevier Science Publishing B.V. (North-Holland), Amsterdam, Vol. A, pp. 113-120.

4. Abdel-Moty, E., Khalil, T.M., 1988. A Computerized Expert System for Work Simplification and Workplace Design. In: Expert Systems, N.A. Botton and T. Raz (Eds.), Industrial Engineering and Management Press, IIE, AIIE, pp. 221-226.

5. Abdel-Moty, E., Khalil, T.M., 1988. Effects of Mechanical Vibration on Peripheral Body Temperature and the Heat Emission Pattern of the Hand. In: Trends in Ergonomics / Human Factors, Afaghazedh, F. (Ed.), Elsevier Science Publishing B.V. (North-Holland), Amsterdam, Vol. IV pp. 513-519.

6. Abdel-Moty, E., Khalil, T.M., 1988. Ergonomics Considerations for the Reduction of Physical Task Demands of Low Back Pain Patients. In: Trends in Ergonomics/Human Factors, Afaghazedh, F. (Ed.), Elsevier Science Publishing B.V. (North-Holland), Amsterdam, Vol. IV, pp. 959-967.

7. Abdel-Moty, E., 1988. Effects of Functional Electric Stimulation on the Neuromuscular System. Un-Published Doctoral Dissertation, University of Miami, Coral Gables, Florida.

8. Abdel-Moty, E., Khalil, T.M., 1989. Computer-Aided Design of the Sitting Workplace for the Disabled. In: Advances in Industrial Ergonomics and Safety; Mital, A. (Ed.), Taylor and Francis, New York, pp. 863-870.

9. Abdel-Moty, E., Khalil, T.M., Asfour, S.S., Howard, M., Rosomoff, R.S., Rosomoff, H.L., 1989. Effects of Pain on Psychomotor Abilities. In: Advances in Industrial Ergonomics and Safety; Mital, A. (Ed.), Taylor and Francis, New York, pp. 465-471.

10. Abdel-Moty, E., Khalil, T., Asfour, S., Goldberg, M., Rosomoff, R., Rosomoff, H., 1990. On the Relationship Between Age and Responsiveness to Rehabilitation. In: Advances in Industrial Ergonomics and Safety II, B. Das (Ed.), Taylor & Francis Ltd., pp. 49-56.

11. Abdel-Moty, E., Khalil, T., Goldberg, M., Rosomoff, R., Rosomoff, H., 1990. Posture and Pain: Health Effects and Ergonomics Interventions. In: Advances in Industrial Ergonomics and Safety II, B. Das (Ed.), Taylor & Francis Ltd., pp. 117-124.

12. Khalil, T.M., Abdel-Moty, E., Asfour, T.M., 1990. Ergonomics in the Management of Occupational Injuries. Accepted for Publication in the "Industrial Ergonomics: Case Studies". Edited By B.M. Pulat and D.C. Alexander, Industrial Engineering and Management Press, Norcross, Georgia, pp. 41-53.

13. Asfour, S.S., Omachoun, V., Diaz, E., Abdel-Moty, E. Displays and controls. In: Workspace, Equipment and Tool Design. A. Mital and W. Karwowski (Ed.), Elsevier Science Publishers.

14. Khalil, T.M., Abdel-Moty, E., Sadek, S., Rosomoff, R.S., Rosomoff, H.L., 1991. Postural SWAY and Balance in Healthy Subjects and in Patients with Chronic Pain. Advances in Industrial Ergonomics & Safety III. W. Karwowski and J.W. Yates (Eds.), Taylor and Francis, Ltd., pp.

15. Abdel-Moty, E., Khalil, T.M., Asfour, S.S., Sadek, S., Rosomoff, R.S., Rosomoff, H.L., 1991. Workers Compensation and Non-Worker's Compensation Chronic Pain Patients Responsiveness to Rehabilitation. Advances in Industrial Ergonomics & Safety III. W. Karwowski and J.W. Yates (Eds.), Taylor and Francis, Ltd., pp.

16. Khalil, T.M., Abdel-Moty, E., Diaz, E., Rosomoff, R.S., Rosomoff, H.L., 1991. Electromyographic Symmetry Pattern in Patients with Chronic Low Back Pain and Comparison to Controls. Advances in Industrial Ergonomics & Safety III. W. Karwowski and J.W. Yates (Eds.), Taylor and Francis, Ltd., pp.

17. Abdel-Moty, E., Khalil, T.M., Fishbain, D., Rosomoff, R.S., Rosomoff, H.L., 1991. Functional Capacity Assessment of Low Back Pain Patients. Advances in Industrial Ergonomics & Safety III. W. Karwowski and J.W. Yates (Eds.), Taylor and Francis, Ltd., pp.

18. Abdel-Moty, E., Khalil, T., Goldberg, M., Asfour, S., Eckstein, E., Rosomoff, H., 1990. Functional Electric Stimulation versus Isometric Exercises for Quadriceps Muscle Strengthening: Comparison of Efficacy in the Rehabilitation of Patients with Chronic Low Back Pain. Topics in Biomedical Engineering. Pergamon Press, pp.

19. Khalil, T., Diaz, E., Abdel-Moty, E., Rosomoff, R., Rosomoff, H., 1990. Trunk Functional Abilities in Chronic Low Back Pain Patients: Relationship to Age, Body Weight, Gender, and to Effect of Rehabilitation. Topics in Biomedical Engineering. Pergamon Press, pp.

17. Juried or refereed journal articles and exhibitions:

1. Khalil, T.M., Goldberg, M.L., Asfour, S.S., Abdel-Moty, E., Rosomoff, R.S., Rosomoff, H.L., 1987. Acceptable Maximum Effort (AME): A Psychophysical Measure of Strength in low Back Pain Patients. Spine, 12:4:372-376.

2. Abdel-Moty, E., Khalil, T.M., 1987. Computerized Signal Processing Techniques for the Quantification of Muscular Activity. Computers and Industrial Engineering, 12:3:193-203.

3. Khalil, T.M., Abdel-Moty, E., Asfour, S.S., Fishbain, D.A., Rosomoff, R.S., Rosomoff, H.L., 1988. Functional Electric Stimulation in the Reversal of Conversion Disorder Paralysis. Archives of Physical Medicine and Rehabilitation, 69:7:545-547.

4. Fishbain, D.A., Goldberg, M.L., Khalil, T.M., Santana, R., Rosomoff, H.L., Abdel-Moty, E. et al., 1988. The Utility of Electromyographic Feedback in the Treatment of Conversion Paralysis. American Journal Psychiatry, 145:12:1572-1575.

5. Khalil, T.M., Asfour, S.S., Moty, E.A., Rosomoff, R.S., Rosomoff, H.L., 1987. Ergonomics Contribution to Low Back Pain Rehabilitation. Pain Management, Sep/Oct: 225-230.

6. Abdel-Moty, E., Khalil, T.M., Asfour, S.S., Rosomoff, R.S., Rosomoff, H.L., 1988. Functional Electrical Stimulation for the Restoration of Muscle Function in Low Back Pain Patients. Pain Management, Nov/Dec:258-263.

7. Abdel-Moty, E., Khalil, T.M., Goldberg, M.L., Asfour, S., Eckstein, E., Rosomoff, H.L., 1990. Functional Electrical Stimulation versus Isometric Exercises: A comparative Study of Efficacy and Its Mechanism in Chronic Low Back Pain Patients. Submitted to Archives of Physical Medicine and Rehabilitation.

8. Abdel-Moty, E., Khalil, T., Rosomoff, R.S., Rosomoff, H.L., 1990. Current Issues in Functional Capacity Assessment. Submitted to Pain Management.

18. Other works and publications:

1. Khalil, T.M., Asfour, S.S., Moty, E.A., 1985. Case Studies in Low Back Pain. Miami Engineer Magazine, Vol. 5, No. 1, pp. 16-18.

2. Moty, E.A., Khalil, T.M., Asfour, S.S., 1985. The Application of Ergonomics Research in the management of Low Back Pain. American Arab Scientific Society Newsletter No. 7, pp. 3-6.

3. Khalil, T.M., Asfour, S.S., Moty, E.A., Steele, R., Rosomoff, H.L., 1985. The Contribution of Ergonomics to Pain Programs. American Pain Society Annual Meeting, October 18-20, Dallas, Texas, pp. 69.

4. Khalil, T.M., Abdel-Moty, E., Waly, S.M., 1985. Computerized Signal Processing in the Assessment of Muscular Fatigue. Computers and Industrial Engineering, 9 Supplement 1.

5. Abdel-Moty, E., Khalil, T.M., 1986. Computerized Design of the Sitting Workplace". Computers and Industrial Engineering, Supplement 1, pp. 22-26.

6. Khalil, T.M., Asfour, S.S., Moty, E.A., Goldberg, M., Steele, R. and Rosomoff, H.L., 1986. Acceptable Muscular Effort (AME) : An Approach for Assessing Muscular Strength in Low Back Pain Patients. Abstracts of the International Society for the Study of the Lumbar Spine Annual Meeting, Dallas, May 29,30.

7. Abdel-Moty, E. and Khalil, T.M., 1986. Computer Aided Design of the Sitting Workplace. Proceedings of the 8th Annual Conference on Computers and Industrial Engineering, Orlando, Fl., pp. 22-26.

8. Abdel-Moty, E. and Khalil, T.M., 1987. A Computerized Expert System for Work Simplification and Workplace Design. Proceedings of the Annual International Meeting of IIE, Washington, D.C., May 17-21, pp. , 1987.

9. Abdel-Moty, E., 1987. Computerized Electromyography in the Evaluation of Functional Capacities. Syllabus V Conference on Innovative and Controversial Strategies in Rehabilitation: Technology and Practice, Ball Harbor, Miami Beach, Florida.

10. Abdel-Moty, E., Khalil, T.M., 1988. Computer Aided Design of the Sitting Workplace: An Expert System Approach. Proceedings of the Fourth Cairo University Mechanical Design and Production, Cairo, 27-29, Egypt, pp. 353-360.

11. Abdel-Moty, E., Khalil, T.M., Asfour, S.S., Rosomoff, R.S., Rosomoff, H.L., 1988. Correlation Analysis of the Ergonomics AME: A Method of Defining Patients Progress in a Low Back Pain Rehabilitation Program. Proceedings of the 21st Annual Meeting of the Human Factors Association of Canada /ACE, September 14-16, 1988, pp. 65-67.

12. Khalil, T.M., Waly, S.M., Abdel-Moty, E., 1988. Ergonomics Methodologies in the Reduction of Work Stresses. Proceedings of the 2nd International Congress Industrial Engineering - Competitivity of the Business Enterprise, Nancy (France), December 12-14, pp.

13. Khalil, T.M., Asfour, S.S., Abdel-Moty, E., Rosomoff, R.S., Rosomoff, H.L., 1988. Quantitative Assessment of Outcome of a Low Back Pain Rehabilitation Program. Abstracts of the International Conference on the Study of the Lumbar Spine, Miami, April 13-15.

14. Fishbain, D., Goldberg, M., Khalil, T., Asfour, S., Abdel-Moty, E., Santana, R., Steele-Rosomoff, R., Rosomoff, H., 1988. Utility of EMG Biofeedback in the Treatment of Conversion Paralysis in Chronic Pain Patients. Abstracts Canadian and American Pain Societies Joint Meeting, Toronto, Canada, Nov. 10-13.

15. Abdel-Moty, E., Fishbain, D., Goldberg, M., Khalil, T., Rosomoff, R., Rosomoff, H., 1990. Functional Electrical Stimulation (FES) Treatment of Residual Radioculopathy - Muscle Weakness in Chronic Pain Patients. Abstracts of the 8th Annual Scientific Meeting of the American Pain Society, Phoenix, Arizona, October 26-29.

16. Abdel-Moty, E., Fishbain, D., Goldberg, M., Khalil, T., Rosomoff, R., Rosomoff, H., 1990. Functional Electrical Stimulation (FES) Treatment of Residual Radioculopathy - Muscle Weakness in Chronic Pain Patients. Abstracts of the World Congress on Pain, Adelaide, Australia, April 1-6.

17. Goldberg, M., Jorge, M., Abdel-Moty, E., Khalil, T., Fishbain, D., Rosomoff, R., Rosomoff, H., 1990. Magnesium Levels in Chronic Pain Patients. Abstracts of the World Congress on Pain, Adelaide, Australia, April 1-6.

18. Abdel-Moty, E., Khalil, T., Goldberg, M., Asfour, S., Eckstein, E., Rosomoff, H., 1990. Functional Electric Stimulation (FES) versus Regular Isometric Exercises in the Rehabilitation of Chronic Low Back Pain Patients (CLBPP) with Quadriceps Muscular Weakness. Abstracts of the Annual Meeting of the International Society for the Study of the Lumbar Spine, Boston, MA, June 13-17, pp. 43.

19. Khalil, T., Abdel-Moty, E., Asfour, S., Goldberg, M., Rosomoff, R., Rosomoff, H., 1990. The Relationship Between Self-Report of Pain Level (SRPL) and Psychophysical Static Lifting Abilities in Chronic Low Back Pain (CLBP) Patients. Abstracts of the Annual Meeting of the International Society for the Study of the Lumbar Spine, Boston, MA, June 13-17, pp. 16.

20. DeVito, C., Khalil, T., Goldberg, M., Moty, E., Hilsenbeck, S., 1990. Identifying Elderly at High Risk of Fall Related Injuries. Abstract of the American Public Health Association 118th Annual Meeting, New York, New York, September 30- October 4.

21. Diaz, E., Asfour, S., Khalil, T., Abdel-Moty, E., 1990. Integrating Human Factors/Ergonomics Principles in Facilitating the Design or Analysis of Consumer Products: A Computerized Knoweldege-Base System. Proceedings of the 34th Annual Human Factors Meeting, Orlando, October 8-12.

22. Khalil, T., Asfour, S., Goldberg, M., Moty, E., Fishbain, D., Santana, R., Rosomoff, R., Rosomoff, H., 1990. Letter to the Spine, Spine, 15:4:342-343.

23. Rosomoff, H., Fishbain, D., Steele-Rosomoff, R., Goldberg, M., Jorge, M., Zaki, A., Abdel-Moty, E., 1991. Magnesium Levels in Chronic Pain Patients. Abstracts of the American Pain Society Annual Meeting, pp. 59.

24. Khalil, T., Abdel-Moty, E., Fishbain, D., 1990. Functional Capacity Assessment of Patients with Chronic Low Back Pain. Abstracts of the American Pain Society Annual Meeting, pp. 102.

25. Abdel-Moty, E., Khalil, T., Goldberg, M., Asfour, S., Eckstein, E., Rosomoff, H., 1990. Low and High Frequency Electric Stimulation versus Isometric Exercises for Muscle Strengthening: Comparison of Efficacy. Journal of Biomechanics,

26. Diaz, E., Khalil, T., Abdel-Moty, E., Rosomoff, R., Rosomoff, H., 1990. Relationship Between Human Parameters and Trunk Functional Abilities in Chronic Low Back Pain Patients. Journal of Biomechanics,

27. Khalil, T.M., Waly, S.M., Abdel-Moty, E., 1988. Ergonomics Methodologies in the Reduction of Work Stresses. Proceedings of the 2nd International Congress Industrial Engineering - Competitiveness of the Business Enterprise, Nancy (France), December 12-14, pp.

28. Abdel-Moty, E., Khalil, T., Goldberg, M., Asfour, S., Eckstein, E., Rosomoff, H., 1990. Low and High Frequency Electric Stimulation versus Isometric Exercises for Muscle Strengthening: Comparison of Efficacy. Proceedings of the 14th Annual Meeting of the American Society of Biomechanics, Miami, Florida, November 15-16, pp.

29. Diaz, E., Khalil, T., Abdel-Moty, E., Rosomoff, R., Rosomoff, H., 1990. Relationship Between Human Parameters and Trunk Functional Abilities in Chronic Low Back Pain Patients. Proceedings of the 14th Annual Meeting of the American Society of Biomechanics, Miami, Florida, November 15-16, pp.

30. Khalil, T., Abdel-Moty, E., Goldberg, M., Rosomoff, R., Rosomoff, H., 1990. Aging and Outcome of Back Pain Rehabilitation. Abstracts of the American Academy of Physical Medicine and Rehabilitation/American Congress of Rehabilitation Medicine Meeting, Phoenix, Arizona, pp. 117.

31. Abdel-Moty, E., Khalil, T., Diaz, E., Sadek, S., Rosomoff, R.S., Rosomoff, H.L., 1991. Ergonomic Job Analysis for Patients with Chronic Low Back Pain During Rehabilitation. Proceedings of the 11th Congress International Ergonomics Association, Paris, France, July 15-20.

32. Diaz, E., Khalil, T., Asfour, S., Abdel-Moty, E., 1991. Integration of Ergonomics and Product Design: A Computerized Database System. Proceedings of the 11th Congress International Ergonomics Association, Paris, France, July 15-20.

33. Khalil, T., Abdel-Moty, E., Rosomoff, R.S., Rosomoff, H.L., 1991. Age and Responsiveness to Low Back Pain Rehabilitation. Abstracts of the International Society for the Study of the Lumbar Spine Annual Meeting, May 13-16, Heidelberg, Germany, pp.

34. Abdel-Moty, E., Khalil, T., Rosomoff, R.S., Rosomoff, H.L., 1991. Maximizing Progress During Low Back Pain Rehabilitation: A Computer Model and Its Applications. Abstracts of the International Society for the Study of the Lumbar Spine Annual Meeting, May 13-16, Heidelberg, Germany, pp.

35. Field, E., Abdel-Moty, E., Khalil, T., Asfour, S., 1991. Postural Proprioception in Healthy and Back Injured Adults. Abstracts of the APTA Annual Conference, June 23-27, Boston, Massachusetts, pp.

36. Abdel-Moty, E., Field, E., Miles, N., Perez, E., 1991. Center of Pressure Reproducibility of Comfortable and Predetermined Stances in Healthy Subjects. Abstracts of the APTA Annual Conference, June 23-27, Boston, Massachusetts, pp.

19. Other works accepted for publication:

Khalil, T.M., Abdel-Moty, E., Asfour, S.S., Rosomoff, R.S., Rosomoff, H.L., 1991. Ergonomics in Back Pain: A Guide to Prevention and Rehabilitation. (In Press).

Abdel-Moty, E., Khalil, T.M., Rosomoff, R.S., Rosomoff, H.L., 1990. Ergonomics Considerations and Interventions. In: Painful Cervical Trauma: Diagnosis and Rehabilitative Treatment of Neuromusculoskeletal Injuries (C. D. Tollison and J.R. Satterthwaite, Editors). Williams & Wilkins.

PROFESSIONAL:

20. Funded Research Performed:

Abdel-Moty, E. Effects of Asymmetry on Human Display of Strength. University of Miami Research Council, 1990-1991: $2,300.00

Rosomoff, H., Khalil, T., Fishbain, D., Abdel-Moty, E. Prediction of Outcome of Low Back Pain Rehabilitation. NIDRR, 1990-1993: $178,000.

Abdel-Moty, E., Khalil, T., Rosomoff, H. Development of a Functional Abilities Computerized Testing Station. Florida High Technology and Industry Council, 1991: $50,000.00

21. Editorial responsibilities: None

22. Professional and Honorary Organizations:

Member of the Institute of Industrial Engineers since 1987.
Member of the Association of Egyptian-American Scholars since 1985.
Member of the American Arab Scientific Society since 1985.
Member of the American Heart Association since 1985.
Member of the Honor Engineering Society Tau Beta Pi since 1983.
Member of the International Society of Biomechanics since 1983.
President of the Egyptian Students Association in Miami in 1982.
Member of the Biomedical Engineering Society in Miami since 1981.
Member of the Egyptian Engineers Syndicate since 1978.
Member of the International Foundation for Industrial Ergonomics and Safety Research since 1990

23. Honors and Awards:

1982-1986 Graduate Assistantship, University of Miami.
1981-1982 Fellowship, Project HOPE, Virginia.
1974-1978 Scholarship, Cairo University.

24. Post-Doctoral Fellowship: None

25. Others Professional Activities:

Continued Education:

Completed and Introductory Course in Auto-Traction, Chattanooga Corporation, Education Division.

Completed the National Cognitive and Performance Examination for Basic Rescuer in Cardiopulmonary Resuscitation and Emergency Cardiac Care, South Shore Hospital, Miami Beach, Florida.

Eighteen Contact Hours (Approval #277-C150-18FL, Board for Rehabilitation Certification CRCC/CIRS): Innovative and Controversial Strategies in Rehabilitation V: Technology and Practice, Miami Beach, FL, Oct 23, 1987.

Sixth Annual Ariel Systems Clinic and Seminars, Orange County, Los Angles, CA, Dec. 1 to Dec 4, 1988.

University of Miami Comprehensive Pain and Rehabilitation Center, Ergonomics and Human Performance Laboratory. Responsible for the evaluation of functional performance of low back pain patients, rationalization of body mechanics education programs, electromyographic studies related to low back injury, establishing a computerized data base system for low back pain patients, thermography, work capacity evaluation, job simulation and work capacity evaluation, redesign of tools and analysis of products for safety, and on-site evaluations of workplaces.

Scientific presentations:

1. "Computer Aided Workplace Design". Computers and Industrial Engineering Conference, Orlando, FL., March 20, 1985.

2. "An Expert System for Work Simplification and Workplace Design". Annual IIE Meeting, May 18, Washington Sheraton, DC, 1987.

3. "Microcomputers in the Design and Analysis of the VDT Sitting Workplace. Annual International Industrial Ergonomics and Safety Conference, Miami, FL, June 10, 1987.

4. "Computerized Electromyography in the Quantification of the Effectiveness of Functional Electrical Stimulation. Annual International Industrial Ergonomics and Safety Conference, Miami, FL, June 10, 1987.

5. "The Effectiveness of Functional Electrical Stimulation in the Restoration of Functional Abilities. Southern Pain Society Meeting, Orlando, Florida, October 16-17, 1987.

6. "Computerized Electromyography in the Evaluation of Functional Capacities. Innovative and Controversial Strategies in Rehabilitation V: Technology and Practice. Ball Harbor, Florida, December 5, 1987.

7. "Effects of Mechanical Vibration of Peripheral Body Temperature and the Heat Emission Pattern of the Hand. Industrial Ergonomics and Safety Conference, New Orleans, June 8-10, 1988.

8. "Correlation Analysis of the Ergonomics AME: A Method of Defining Patients Progress in a Low Back Pain Rehabilitation Program. 21st Annual Meeting of the Human Factors Association of Canada /ACE, September 15, 1988.

9. "Ergonomics Contribution: Models of Preventing and Treating Chronic Pain / Standards for Chronic Pain Centers. The 3rd Annual National Disability Management Conference and Trade Show. Washington Business Group on Health - Institute for Rehabilitation and Disability Management & Thomas L. Jacobs & Associates. October 23, 1989 - Doral Resort and Country Club, Miami, Florida.

10. "Ergonomics in Rehabilitation: Role, Contributions, and Significance". The 8th Annual FARPPS (Florida Association of Rehabilitation in the Private Sector) State Conference, June 21-22, 1990 - Ft. Lauderdale, Florida.

11. "Aging and Outcome of Back Pain Rehabilitation". 67th Annual Meeting of the American Congress of Rehabilitation Medicine and American Academy of Physical Medicine and Rehabilitation, October 21-26, Phoenix, Arizona, 1990.

12. "Functional Capacity Assessment of Patients with Chronic Low Back Pain". 9th Annual Scientific Meeting of the American Pain Society, October 25-28, St. Louis, Mo., 1990.

13. "Functional Electric Stimulation versus Isometric Exercises for Quadriceps Muscle Strengthening: Comparison of Efficacy in the Rehabilitation of Patients with Chronic Low Back Pain". Ninth Southern Biomedical Engineering Conference, November 17-18, Miami, Florida.

14. "Low and High Frequency Electric Stimulation versus Isometric Exercises for Muscle Strengthening: Comparison of Efficacy. The 14th Annual Meeting of the American Society of Biomechanics, Miami, Florida, November 16, 1990.

15. "Computerized Modeling Approaches in Rehabilitation". Seminar, Department of Industrial Engineering, University of Miami, November 12, 1990.

TEACHING

26. Teaching Awards Received: None

27. Thesis and Dissertation Advising:

Member Thesis Committee: "Effects of Instruction Sets on Psychophysical Lifting Abilities". Master Thesis, Industrial Engineering by Marsie L. Howard, University of Miami, December, 1989.

Chairman Thesis Committee: "Posture and Position in Healthy and Back-Injured Subjects". Master Thesis, Physical Therapy by Edelle Field, P.T., University of Miami, 1990.

Member Thesis Committee: "Integration of Human Factors and Product Design". Master Thesis, Industrial Engineering by Eileen Diaz, University of Miami, December, 1991.

SERVICE

28. University Committee and Administrative Responsibilities:

Chairman of the Education Committee: University of Miami, Department of Neurological Surgery, Comprehensive Pain and Rehabilitation Center: Responsibilities include Pain Center's Staff Education, Continued education, Quality Assurance and In-house Inservices and Development, 1988-present.

Member of the Work Conditioning Committee: University of Miami, Department of Neurological Surgery, Comprehensive Pain and Rehabilitation Center: 1988-present.

Member of the Head / Neck Rehabilitation Program Committee: University of Miami, Department of Neurological Surgery, Comprehensive Pain and Rehabilitation Center: 1988-present.

Member of the Cruise Line Committee: University of Miami, Department of Neurological Surgery, Comprehensive Pain and Rehabilitation Center: 1988-present.

Member of the Functional Capacity Assessment Committee: University of Miami, Department of Neurological Surgery, Comprehensive Pain and Rehabilitation Center: 1989-present.

Member of the Quality Assurance Committee: University of Miami, Department of Neurological Surgery, Comprehensive Pain and Rehabilitation Center: 1990-present.

Member of the Executive Research Committee: University of Miami, Department of Neurological Surgery, Comprehensive Pain and Rehabilitation Center: 1989-present.

29. Community Activities: None

Shihab S. Asfour

Professor of Industrial Engineering
College of Engineering

Professor of Neurological Surgery
School of Medicine

University of Miami

Office Address: Department of Industrial Engineering
College of Engineering
P.O. Box 248294
University of Miami
Coral Gables, Florida 33124

Telephone: (305) 284 – 2344

Home Address: 9608 S.W. 117 Court
Miami, Florida 33186

Telephone: (305) 274 – 5326

Biographical Sketch

Dr. Shihab Asfour is a Professor of Industrial Engineering and Neurological Surgery at the University of Miami. He received his Ph.D. in Industrial Engineering from Texas Tech University, Lubbock, Texas. Dr. Asfour has served as a consultant to industrial, service and educational organizations for over 16 years.

Dr. Asfour is the recepient of the Alexander Orr excellence in teaching Award offered by the College of Engineering in 1988. Also, he received the University of Miami first Freshman Teaching Award in 1989.

Dr. Asfour has been active in the Institute of Industrial Engineers (IIE) for several years. He is a senior member of the Institute. In 1985, Dr. Asfour served as President of the IIE Miami Chapter. He has also served as Vice President of Programs and as a Director of that chapter. Besides his membership in IIE, Dr. Asfour is a member of the Ergonomics Research Society, the Human Factors Society and the Society of Manufacturing Engineers. He is also a member of Alpha Pi Mu, Sigma Xi, Omicron Delta Kappa, Phi Kappa Phi and Tau Beta Pi honor societies, and is a member of Iron Arrow Honor Society (highest honor at the University of Miami). He is also a Founding Member of the International Foundation for Industrial Ergonomics and Safety Research and currently serves as its chairman. Dr. Asfour is a member of the Editorial Board of the International Journal of Industrial Ergonomics and is an associate editor of the Institute of Industrial Engineers Transactions.

Dr. Asfour's research interests include Industrial Ergonomics, Work Physiology, Biomechanics, Rehabilitation Engineering, Safety Engineering, Work Measurement and Systems Design. Dr. Asfour's pioneering research in the application of Ergonomics to the rehabilitaion of chronic pain patients, has enabled him to establish the "Ergonomics and Bioengineering Division" as an integral part of the University of Miami Comprehensive Pain and Rehabilitation Center. Dr. Asfour has served as the Associate Director of that division since 1984.

Dr. Asfour organized and chaired the highly successful "Annual International Industrial Ergonomics and Safety Conference" that was held in Miami, Florida in June of 1987. This conference was attended by over 220 scientists, engineers and practitioners. Over 20 countries were represented in this conference.

Dr. Asfour has published over 120 articles in national and international journals, proceedings and books. He has also edited a two–volume book titled "Trends in Ergonomics/ Human Factors IV" published by Elsevier Science Publishers in 1987.

Dr. Asfour has served as the Principal or Co–Principal investigator of over 15 research grants from different funding agencies. The total research funds allocated to these grants exceed one and a half million dollars.

Curriculum Vitae

PERSONAL

2. Name:	**Shihab S. Asfour**
3a. Home Phone:	**(305)274–5326**
3b. Office Phone:	**(305)284–2344**
4. Home Address:	**9608 S.W. 117 Court** **Miami, Florida 33186**
5. Employment Status:	**Full–time**
6. Current Academic Rank:	**Professor, tenured**
7. Primary Department:	**Industrial Engineering**
8. Citizenship:	**United States**
9. Visa Type:	**None**

HIGHER EDUCATION

10. Institutional:

1980	Texas Tech University	**Ph.D.** Major: Industrial Engineering Minor: Psychology
1976	Alexandria University	**Master of Science** Major: Production Engineering
1973	Alexandria University	**Bachelor of Science** Major: Production Engineering

11. Non–Institutional:

1972	Egyptian Copper Corporation,Alexandria, Egypt. Manufacturing Engineer Trainee (Summer).
1971	Verolme Engineering, Rotterdam, Holland. Manufacturing Engineering (Summer).
1970	Sabahi Textile Corporation, Alexandria, Egypt. Maintenance Engineer Trainee (Summer).

12. Certification, Licensure:

1987	Certified Manufacturing Technologist

EXPERIENCE

13. Instructional (15 years)

1973 – 1976	**Alexandria University,** Alexandria, Egypt. Instructor in Production Engineering Department. Courses taught at Alexandria University: Manufacturing Engineering, Motion and Time Study, Statistics and Theory of Probability, Quality Control, Production Control, Factory Planning and Plant Layout, Operations Research and Industrial Hygiene and Safety.
1977 – 1978	**Texas Tech University,** Lubbock, Texas. Assisted in teaching Motion and Time Study Lab.
1978 – 1979	**Texas Tech University,** Lubbock, Texas. Teaching Assistant in the Physics Department.
1980 – 1983	**University of Miami,** Coral Gables, Florida. Assistant Professor of Industrial Engineering. Courses taught at University of Miami: Statistics, Manufacturing Engineering, Computer Programming, Motion and Time Study, Man–Machine Systems, Occupational Biomechanics, Work Physiology and Design of Experiments.
1982 – 1983	**University of Miami,** Coral Gables, Florida. Assistant Professor of Neurological Surgery.
1983 – Present	**University of Miami,** Coral Gables, Florida. Director of Graduate Studies in Industrial Engineering.
1984 – 1988	**University of Miami,** Coral Gables, Florida. Associate Professor of Industrial Engineering.
1984 – 1988	**University of Miami,** Coral Gables, Florida. Associate Professor of Neurological Surgery.
1988 – Present	**University of Miami,** Coral Gables, Florida. Professor of Industrial Engineering.
1988 – Present	**University of Miami,** Coral Gables, Florida. Professor of Neurological Surgery.

13. Instructional (cont'd):

1988 – Present	**University of Miami,** Coral Gables, Florida. Associate Chairman of Industrial Engineering Dept.

14. Professional (15 years):

1973 – Present	Consultant to industrial, service and educational organizations.
1976 – 1978	**Texas Tech University,** Lubbock, Texas. Research Assistant on "Determination and Modeling of the lifting Capacity", Funded by the Department of HEW.
1977 – 1979	**Texas Tech University,** Lubbok, Texas. Research Assistant on "Updating Military Standard 1472B", Funded by U. S. Navy.
1978 – 1979	**Texas Tech University,** Lubbock, Texas. Research Assistant on "Biomechanics of Low Coal Mining", Funded by the Bureau of Mines.
1978 – 1979	**Texas Tech University,** Lubbock, Texas. Research Assistant on "Effects of Task Variables on Lifting Capacity", Funded by the Department of HEW.
1982 – 1983	**University of Miami,** Coral Gables, Florida. Assistant Professor of Neurological Surgery.
1982 – Present	**University of Miami Comprehensive Pain and Rehabilitation Center,** Miami Beach, Florida. Associate Director of the Ergonomics and Bioengineering Division.
1984 – 1988	**University of Miami,** Coral Gables, Florida. Associate Professor of Neurological Surgery.
1988 – Present	**University of Miami,** Coral Gables, Florida. Professor of Neurological Surgery.
1988 – Present	**University of Miami,** Coral Gables, Florida. Associate Chairman of Industrial Engineering Dept.

15. Military:

None

PUBLICATIONS

16. Books, Contribution To Books And Monographs Published:

16a. Books:

1. Asfour, S.S. (editor), Trends in Ergonomics/Human Factors IV–A, Elsevier Science Publishers, Amsterdam, 574 pages, 1987.

2. Asfour, S.S. (editor), Trends in Ergonomics/Human Factors IV–B, Elsevier Science Publishers, Amsterdam, 562 pages, 1987.

3. Khalil, T.M., Abdel–Moty, S. and Asfour, S.S., Ergonomics in Back Pain: A Practical Guide to Prevention and Rehabilitation, Taylor & Francis Ltd., London (expected release 1990).

16b. Contributions To Books:

1. Asfour, S.S., Genaidy, A.M., Khalil, T.M. and Greco, E.C., "A Combined Approach for the Determination of Lifting Capacity", in Trends in Ergonomics/Human Factors I, Eberts, R. and Eberts, C.G. (editors), Elsevier Science Publishers, Amsterdam, pp. 617–623, 1985.

2. Asfour, S.S., Genaidy, A.M., Khalil, T.M. and Greco, E.C., "Lifting Capacity Norms Based on Strength and Endurance of Workers", in Trends in Ergonomics/Human Factors II, Eberts, R. and Eberts, C.G. (editors), Elsevier Science Publishers, Amsterdam, pp. 609–615, 1985.

3. Vinciguerra, T., Asfour, S.S. and Genaidy, A.M., "Nutrition As An Ergonomic Component in the Workplace", in Trends in Ergonomics/Human Factors II, Eberts, R. and Eberts, C.G. (editors), Elsevier Science Publishers, Amsterdam, pp. 161–167, 1985.

4. Genaidy, A.M., Asfour, S.S., Vinciguerra, T. and Abdel–Salam, A.M., "A Suggested Submaximal Test for Job Design and Pre–Employment Screening Tests", in Trends in Ergonomics/Human Factors II, Eberts, R. and Eberts, C.G. (editors), Elsevier Science Publishers, Amsterdam, pp. 403–407, 1985.

5. Genaidy, A.M., Asfour,S.S., Khalil, T.M. and Waly, S.M., "Physiologic Issues in Manual Materials Handling", in Trends in Ergonomics/Human Factors II, Eberts, R. and Eberts, C.G. (editors), Elsevier Science Publishers, Amsterdam, pp. 571–576, 1985.

6. Khalil, T.M., Asfour, S.S., Moty, E.A., Steel, R. and Rosomoff, H.L., "New Horizons for Ergonomic Research in Low Back Pain ", in Trends in Ergonomics/Human Factors II, Eberts, R. and Eberts, C.G. (editors), Elsevier Science Publishers, Amsterdam, pp. 591–598, 1985.

16b. Contributions To Books: (cont'd)

7. Genaidy, A.M., Asfour, S.S., Ayoub, M.M. and Khalil, T.M., "A Data Base of the Mechanical Efficiency of the Human Machine During Lifting and Lowering Tasks", in Ergonomics International 85, Brown, I.D., Goldsmith, R., Coombes, K. and Sinclair, M.A. (editors), Taylor and Francis, London and Philadelphia, pp. 214–216, 1985.

8. Khalil, T.M., Asfour, S.S., Steele, R. and Rosomoff, H.L., "Ergonomics Contributions to the Rehabilitation of Low Back Pain", in Ergonomics International 85, Brown, I.D., Goldsmith, R., Coombes, K. and Sinclair, M.A. (editors),Taylor and Francis, London and Philadelphia, pp. 466–468, 1985.

9. Asfour, S.S., Genaidy, A.M. and Khalil, T.M., "The Relationship Between Frequency of Lift and Lifting Capacity", in Ergonomics International 85, Brown, I.D., Goldsmith, R., Coombes, K. and Sinclair, M.A. (editors), Taylor and Francis, London and Philadelphia, pp. 865–867, 1985.

10. Genaidy, A.M., Asfour, S.S. and Khalil, T.M., "Modeling of the Human Kinetics During Repetitive Lifting", in Ergonomics International 85, Brown, I.D., Goldsmith, R., Coombes, K. and Sinclair, M.A. (editors), Taylor and Francis, London and Philadelphia, pp. 868–870, 1985.

11. Waly, S.M., Khalil, T.M. and Asfour, S.S., "Physiological Basis of Muscular Fatigue: An Electromyographic Study", in Trends in Ergonomics/Human Factors III Part B, Karwowski, W. (editor), Elsevier Science Publishers, Amsterdam, pp. 751–758, 1986.

12. Asfour,S.S., Ayoub, M.M., Genaidy, A.M. and Khalil, T.M.,"A Data Base of Physiological Responses to Manual Lifting", in Trends in Ergonomics/Human Factors III Part B, Karwowski, W. (editor), Elsevier Science Publishers, Amsterdam, pp. 801–810, 1986.

13. Asfour, S.S., Ayoub, M.M. and Genaidy, A.M., "A Data Base of Physiological Responses to Manual Lowering", in Trends in Ergonomics/Human Factors III Part B, Karwowski, W. (editor), Elsevier Science Publishers, Amsterdam, pp. 811–818, 1986.

14. Muthuswamy, S., Asfour, S.S., Vinciguerra, T. and Genaidy, A.M., "The Design of Work/Rest Schedules as an Ergonomic Component in Manual Materials Handling", in Trends in Ergonomics/HumanFactors III Part B, Karwowski, W. (editor), Elsevier Science Publishers, Amsterdam, pp. 871–878, 1986.

15. Genaidy, A.M., Asfour, S.S. and Kabuka, M., "An Expert System for The Design of Manual Materials Handling Tasks", in Trends in Ergonomics/Human Factors IV Part A, Asfour, S.S. (editor), Elsevier Science Publishers, Amsterdam, pp. 559–566, 1987.

16b. Contributions To Books: (cont'd)

16. Khalil, T.M., Asfour, S.S., Marchette, B. and Omachonu, V., "Lower Back Injuries In Nursing: A Biomechanical Analysis and Intervention Strategy", in Trends in Ergonomics/Human Factors IV Part B, Asfour, S.S. (editor), Elsevier Science Publishers, Amsterdam, pp. 811–821, 1987.

17. Alvarez, E., Carrillo, M., Asfour, S.S. and Kang, K., "The Occupational Biomechanics Trainer: A Computerized Educational Tool", in Trends in Ergonomics/Human Factors IV Part B, Asfour, S.S. (editor), Elsevier Science Publishers, Amsterdam, pp. 893–900, 1987.

18. Mital, A., Asfour, S.S. and Aghazadeh, F., "Limitations of MTM in Accurate Determination of Workstandards for Physically Demanding Jobs", in Trends in Ergonomics/Human Factors IV Part B, Asfour, S.S. (editor), Elsevier Science Publishers, Amsterdam, pp. 979–985, 1987.

19. Khalil, T.M., Asfour, S.S., Waly, S.M., Rosomoff, R.S. and Rosomoff, H.L., "Isometric Exercise And Biofeedback in Strength Training", in Trends in Ergonomics/Human Factors IV Part B, Asfour, S.S. (editor), Elsevier Science Publishers, Amsterdam, pp. 1095–1101, 1987.

20. Abdel–Moty, E., Khalil, T.M., Asfour, S.S., Rosomoff, R.S. and Rosomoff, H.L., "Ergonomics Considerations for the Reduction of Physical Task Demands of Low Back Pain Patients", in Trends in Ergonomics/Human Factors V Part B, Aghazadeh, F., (editor), Elsevier Science Publishers, Amsterdam, pp. 959–967, 1988.

21. Khalil, T.M., Asfour, S.S., Waly, S.M., Rosomoff, R.S. and Rosomoff, H.L., "Effectiveness of Aggressive Treatment of Back Pain", in Trends in Ergonomics/Human Factors V Part B, Aghazadeh, F., (editor), Elsevier Science Publishers, Amsterdam, pp. 977–983, 1988.

22. Abdel–Moty, E., Khalil, T.M., Asfour, S.S., Howard, M., Rosomoff, H., "Effects of Low Back Pain on Psychomotor Skills", in Advances in Industrial Ergonomics and Safety I, Mital, A. (Editor), Taylor & Francis, London, 1989.

23. Kamel, M.S., Muthuswamy, S. and Asfour S.S., "Analogy of Physiologic Responses to Electric circuit Responses During a Scheduled Manual Lifting Task", in Advances in Industrial Ergonomics and Safety I, Mital, A. (editor), Taylor & Francis, London, pp. 97–103, 1989.

24. Degani, A., Kamel, M.S. and Asfour, S.S., "Effect of Task Duration on Perceived Exertion", in Advances in Industrial Ergonomics and Safety I, Mital, A. (editor), Taylor & Francis, London, pp. 899–905, 1989.

25. Asfour, s.S., Genaidy, A.M., Fahmy, M.W., Younis, A. and Waly, S.M., "Endurance and Physiological Responses for High Frequency Lifting Tasks: A Preliminary Report" in Advances in Industrial Ergonomics and Safety II, Das, B. (editor), Taylor & Francis, London, 1990.

17. Juried Or Refereed Articles:

17a. Refereed Articles In Journals:

1. Ayoub, M.M., Mital, A. and Asfour, S.S., "Review, Evaluation, and Comparison of Models for Predicting Lifting Capacity". Human Factors, 22, 3, pp. 257–269, 1980.

2. Ayoub, M.M., Mital, A., Bakken, G. and Asfour, S.S., "Development of Strength and Capacity Norms for Manual Materials Handling Activities: The State of the Art". Human Factors, 22, 3, pp. 271–283, 1980.

3. Garg, A., Mital, A. and Asfour, S.S., "A Comparison of Isometric Strength and Dynamic Lifting Capability". Ergonomics, 23, 1, pp.13–27, 1980.

4. Mital, A., Asfour, S.S. and Ayoub, M.M., "Physiological Approach in Manual Lifting: Work Rate Recommendations and A Comparison with the Psychophysical Approach". Journal of Human Ergology, 11, 2, pp. 143–156, 1982.

5. Mital, A. and Asfour, S.S., "Material Handling Capacity of Workers", Material Flow, 1, 2, pp. 89–100, 1983.

6. Asfour, S.S., Ayoub, M.M., Mital, A. and Bethea, N.J., "Perceived Exertion of Physical Effort for Various Manual Handling Tasks". American Industrial Hygiene Association Journal, 44, 3, pp. 223–228, 1983.

7. Mital, A. and Asfour, S.S., "Maximum Frequencies Acceptable to Males for One Handed Horizontal–Lifting in the Sagittal Plane". Human Factors, 25, 5, pp. 563–571, 1983.

8. Asfour, S.S., Ayoub, M.M. and Mital, A., "Effects of An Endurance and Strength Training Programme on Lifting Capability of Males". Ergonomics, 27, 4, pp. 435–442, 1984.

9. Asfour, S.S., Ayoub, M.M. and Genaidy, A.M., "A Psychophysical Study of the Effect of Task Variables on Lifting and Lowering Tasks". Journal of Human Ergology, 13, 1, pp. 3–14, 1984.

10. Khalil, T.M., Genaidy, A.M., Asfour, S.S. and Vinciguerra, T., "Physiological Limits in Lifting". American Industrial Hygiene Association Journal, 46, 4, pp. 220–224, 1985.

11. Khalil, T.M., Asfour, S.S., Waly, S.M., Melean, L. and Rosomoff, H.L., "Effects of Low Back Pain Rehabilitation Program on Muscle Functional Abilities". Journal of Biomechanics, 19, 6, pp. 467, 1986.

12. Asfour, S.S., Genaidy, A.M., Khalil, T.M. and Muthuswamy, S., "Physiologic Responses to Static, Dynamic and Combined Work". American Industrial Hygiene Association Journal, 47, 12, pp. 798–802, 1986.

17a. Refereed Articles In Journals: (cont'd)

13. Khalil, T.M., Goldberg, M.L., Asfour, S.S., Moty, E., Rosomoff, R.S. and Rosomoff, H.L., "Acceptable Maximum Effort (AME): A Psychophysical Measure of Strength in Back Pain Patients". Spine, 12, 4, pp. 372–376, 1987.

14. Asfour, S.S., Genaidy, A.M. and Khalil, T.M., "An On–Line Microcomputer–Based Metabolic Monitoring System". International Journal of Industrial Ergonomics, 1, 3, pp. 169–177, 1987.

15. Genaidy, A.M., Asfour, S.S. and Khalil, T.M., "An On–Line Microcomputer–Based Cardiac Monitoring System". International Journal of Industrial Ergonomics, 1, 4, pp. 273–283, 1987.

16. Genaidy, A.M. and Asfour, S.S., "Review and Evaluation of Physiological Cost Prediction Models For Manual Materials Handling", Human Factors, 29, 4, pp. 465–476, 1987.

17. Khalil, T.M., Waly, S.M., Genaidy, A.M. and Asfour, S.S., "Determination of Lifting Abilities: A Comparative Study of Four Techniques". American Industrial Hygiene Association Journal, 48, 12, pp. 951 – 956, 1987.

18. Kabuka, M., Genaidy, A.M. and Asfour, S.S., "A Knowledge–Based System For The Design of Manual Material Handling". Applied Ergonomics, 19, 2, pp. 147–155, 1988.

19. Khalil, T.M., Abdel–Moty, E., Asfour, S.S., Fishbain, D.A., Rosomoff, R.S. and Rosomoff, H.L., "Functional Electric Stimulation in the Reversal of Conversion Disorder Paralysis". Archives of Physical Medicine and Rehabilitation, 69, 7, pp. 545 – 547, 1988.

20. Asfour, S.S., Genaidy, A.M. and Mital, A., "Physiological Guidelines for the Design of Manual Lifting and Lowering Tasks: The State of the Art". American Industrial Hygiene Association Journal, 49, 4, pp. 150–160, 1988.

21. Genaidy, A.M., Asfour, S.S., Mital, A. and Tritar, M., "Psychophysical Capacity Modeling in Frequent Manual Material Handling Activities". Human Factors, 30, 3, pp. 319–337, 1988.

22. Asfour, S.S., Waly, S.M., Genaidy, A.M. and Gonzalez, R.M. " Physiological Stresses Associated with Television Camera Operators Tasks". Applied Ergonomics, 19, 4, pp. 275–280, 1988.

23. Khalil, T.M., Asfour, S.S.,Abdel–Moty, E., Rosomoff, R.N. and Rosomoff, H., "Ergonomic Contributions to low Back Pain Rehabilitation". Pain Management, pp. 225–230, 1988.

24. Abdel–Moty, E., Khalil, T.M., Asfour, S.S., Rosomoff, R.S. and Rosomoff, H.L., "Functional Electrical Stimulation for the Restoration of Muscle Function in Low Back Pain Patients". Pain Management, pp. 258–263, 1988.

17a. Refereed Articles In Journals: (cont'd)

25. Genaidy, A.M., and Asfour, S.S., "Effects of Frequency and Load of lift on endurance time". Ergonomics, 32, 1, pp. 51–57, 1989.

26. Asfour, S.S., Khalil, T.M., Waly, S.M., Goldberg, M.L., Rosomoff, R.S., and Rosomoff, H.L., "Biofeedback in Back Muscle Strengthening". Spine, accepted for publication and will appear in 1990.

27. Genaidy, A.M., Khalil, T.M., Asfour, S.S., and Duncan, R.C., "Human Physiological Capabilities for Prolonged Manuel Lifting Tasks". IIE Transations, accepted for publication and will appear in 1990.

17b. Refereed Articles In Books:

1. Asfour, S.S., Genaidy, A.M., Khalil, T.M. and Greco, E.C., "Physiological and Psychophysical Determination of Lifting Capacity for Low Frequency Lifting Tasks", in Trends in Ergonomics/Human Factors I, Mital, A. (editor), Elsevier Science Publishers, Amsterdam, pp. 149–153, 1984.

2. Asfour, S.S., Dutta, S.P. and Taboun, S.M., "The Effects of Training on Static Strength and Carrying Capacity of College Males", in Trends in Ergonomics/Human Factors I, Mital, A. (editor), Elsevier Science Publishers, Amsterdam, pp. 161–166, 1984.

3. Asfour, S.S., Khalil, T.M., Genaidy, A.M. and Waly, S.M., "Evaluation of Lifting Capacity Determination Methodologies: A Fuzzy Set Approach", in Applications of Fuzzy Set Theory in Human Factors, Karwowski, W. and Mital, A. (editors), Elsevier Science Publishers, Amsterdam, pp.339–347, 1986.

4. Khalil, T.M., Asfour, S.S., Waly, S.M., Rosomoff, R.S. and Rosomoff, H.L., "Effects of Feedback Information on Isometric Training", in Biomechanics X–A, Jonsson, B. (editor), Human Kinetics Publishers, Champaign, Illinois, pp.491–494, 1987.

5. Khalil, T.M., Waly, S.M. and Asfour, S.S., "Electromyographic Methodologies in Rehabilitation", in Ergonomics in Rehabilitation, Mital, A. and Karwowski, W. (editors), Taylor And Francis, London, England, accepted for publication.

6. Khalil, T.M., Abdel–Moty, E., Asfour, S.S., Steele– Rosomoff, R. and Rosomoff, H.L., "Ergonomics in the Management of Occupational Injuries", in Industrial Ergonomics: A Practitioner's Guide, Pulat, M. and Alexander G. (editors), Institute of Industrial Engineers Press, Atlanta, Georgia, 1990.

17c. Articles Submitted To Refereed Journals:

1. Asfour, S.S. and Genaidy, A.M., "Effects of Working Time on Physiological Responses for High Frequency Lifting Tasks". Submitted to International Journal of Industrial Ergonomics.

2. Asfour, S.S., Tritar, M. and Genaidy, A.M., "Endurance time and Physiological Responses to Prolonged Arm Lifting Tasks." Submitted to Ergonomics Journal.

3. Abdel–Moty, E., Khalil, T.M., Goldberg, M.L., Asfour, S.S., Eckstein, E.C. and Rosomoff, H.L., "Functional Electric Stimulation versus Isometric Exercises: A Comparative Study of Efficacy and its Mechanism in Chronic Low Back Pain Patients with Quadriceps Muscle Weakness". Submitted to The Archives of Physical Medicine of Rehabilitation.

4. Khalil, T.M., Asfour, S.S., Martinez L.M., Waly, S.M., Rosomoff, R.S. and Rosomoff, H.L., "Stretching in the Rehabilitation of Low Back Pain Patients". Submitted to Spine.

5. Genaidy, A.M., Houshyar A., and Asfour, S.S., "Physiologic and Psychophysical Responses to Static, Combined, and Dynamic Tasks". Submitted to Applied Ergonomics.

6. Genaidy, A.H., Asfour, S.S., Mital, A. and Waly S.M., "Psychophysical Models for Frequent Manual Lifting Tasks". Submitted to Applied Ergonomics.

18. Other Publications:

18a. Thesis and Dissertation:

1. Asfour, S.S., "Investigation of Factors Affecting Human Performance in Dynamic Visual Inspection Tasks". Unpublished Master's Thesis, Alexandria University, Alexandria, Egypt, 1976.

2. Asfour, S.S., "Energy Cost Prediction Models for Manual Lifting and Lowering Tasks". Ph.D. Dissertation, Texas Tech University, Lubbock, Texas, 1980.

18b. Grant Reports:

1. Ayoub, M.M., Bethea, N.J., Deivanayagam, S., Asfour, S.S., Martz, H., Bakken, G., Liles, D., Mital, A. and Sherif, M., "Determination and Modeling of Lifting Capacity". Final Report, HEW (NIOSH) Grant No. 5R010H00545–02, Cincinnati, OH: NIOSH, 1978.

2. Asfour, S.S., "Determination of Climatological Conditions in a Dry Food Warehouse". Final Report, American Can Company, 1982.

18b. Grant Reports: (cont'd)

3. Ayoub, M.M., Liles, D., Asfour, S.S., Bakken, G.M., Mital, A., Selan, J.L., Mahajan, P. and Bethea, N., "Effects of Task Variables on Lifting Capacity". Final Report, HEW (NIOSH) Grant No. 5R01H00798–04, Cincinnati, OH: NIOSH, 1983.

4. Asfour, S.S., "An 18–month Study of the Climatological Conditions in a South Florida Warehouse". Final Report, American Can Company, 1986.

5. Asfour, S.S., "An 18–month Study of the Climatological Conditions in a South Florida Warehouse – Phase II". American Can Company, 1987.

6. Asfour, S.S., "A Comprehensive Program For The Reduction of Musculoskeletal Injuries In A Large Utility Company". Florida Power and Light Company, Phase I Report, June, 1988.

7. Asfour, S.S., "A Comprehensive Program for the Reduction of Musculoskeletal Injuries In A Large Utility Company". Florida Power and Light Company, Phase II Report, January 1989.

8. Asfour, S.S., "A Comprehensive Program for the Reduction of Musculoskeletal Injuries In A Large Utility Company". Florida Power and Light Company, Phase III Report, October 1989.

9. Asfour, S.S., "A Comprehensive Program or the Reduction of Musculoskeletal Injuries In A Large Utility Company". Florida Power and Light Company, Phase IV Report, December 1989.

18c. Articles In Conference Proceedings:

1. Mital, A. Ayoub, M.M., Asfour, S.S. and Bethea, N.J., "Relationship Between Lifting Capacity and Injury in Occupations Requiring Lifting". Proceedings of the Human Factors Society 22nd Annual Meeting, Detroit, Michigan, 1978.

2. Asfour, S.S., Ayoub, M.M., Mital, A. and Bethea, N.J., "Reach Profiles for Males and Females Under Restrained and Unrestrained Conditions". Proceedings for the Human Factors Society – 22nd Annual Meeting, Detroit, Michigan, 1978.

3. Mital, A., Asfour, S.S. and Burford, C., "Effect of Mental Stress and Performance on Physiological Responses". Proceedings of the AIHA Annual Conference, Chicago, Illinois, 1979.

4. Asfour, S.S. and Ayoub, M.M., "Effects of Training on Manual Lifting". Proceedings of the AIHA Annual Conference, Houston, Texas, 1980.

18c. Articles In Conference Proceedings: (cont'd)

5. Asfour, S.S. and Ayoub, M.M., "Perceived Exertion of Physical Stresses for Various Manual Lifting and Lowering Tasks". Proceedings of the AIHA Annual Conference, Portland, Oregon, 1981.

6. Elwany, M., Badawi, M. and Asfour, S.S., "Conveyor Based Visual Inspection Efficiency Over Short and Extended Work Periods". Proceedings of the 8th Congress of the International Ergonomics Association, Tokyo, Japan, 1982.

7. Khalil, T.M. and Asfour, S.S., "Productivity: The Key to Progress". Proceedings of the 5th Conference of Egypt the year 2000. On the Role of Science and Technology in Development, Cairo, Egypt, 1982.

8. Mital, A., Asfour, S.S. and Ayoub, M.M., "Recommended Work Rates and Container Configuration for Manual Lifting and Lowering Activities". Proceedings of the 8th Congress of the International Ergonomics Association, Tokyo, Japan, 1982.

9. Khalil, T.M., Asfour, S.S., Moty, E.A., Rosomoff,H.L. and Steele, R., "The Management of Low Back Pain: A Comprehensive Approach". Proceedings of Institute of Industrial Engineers Annual Conference, Louisville, Kentucky, 1983.

10. Asfour, S.S., Khalil, T.M., Moty, E.A., Steele, R. and Rosomoff,H.L., "Back Pain: A Challenge to Productivity". Proceedings of 7th International Conference on Production Research, Windsor, Canada, 1983.

11. Asfour, S.S., Dutta, S.P. and Taboun, S.M., "The Effects of Training on Static Strength and Carrying Capacity of College Males". Proceedings of the lst Mid–Central Ergonomics/Human Factors Conference, Cincinnati, Ohio, 1984.

12. Asfour, S.S., Genaidy, A., Khalil, T.M. and Greco, E. G., "Physiological and Psychophysical Determination of Lifting Capacity for Low Frequency Lifting Tasks". Proceedings of the lst Mid–Central Ergonomics/Human Factors Conference, Cincinnati, Ohio, 1984.

13. Hurst, R.E. and Asfour, S.S., "Determining Comfort Health Index Values for Workers in Uncontrolled South Florida Work Environments". Proceedings of the lst Mid–Central Ergonomics/Human Factors Conference, Cincinnati, Ohio, 1984.

14. Khalil, T.M., Asfour, S.S., Waly, S.M. and Genaidy, A.M., "A Comparative Study of Static and Dynamic Lifting Tasks". Proceedings of the Human Factors Society – 28th Annual Meeting, San Antonio, Texas, 1984.

18c. Articles In Conference Proceedings: (cont'd)

15. Genaidy, A.M., Asfour, S.S., Khalil, T.M. and Waly, S.M., "The Maximum Efficiency of the Human Machine During Lifting". Proceedings of the Human Factors Society – 28th Annual Meeting, San Antonio, Texas, 1984.

16. Khalil, T.M., Asfour, S.S. and Moty, E.A., "Case Studies in Low Back Pain". Proceedings of the Human Factors Society – 28th Annual Meeting, San Antonio, Texas, 1984.

17. Mital, A., Shell, R.L. and Asfour, S.S., "Future Application of Ergonomics". Proceedings of the Society of Automotive Engineers, Detroit, Michigan, 1984.

18. Genaidy, A.M., Asfour, S.S., Khalil, T.M. and Muthuswamy, S., "A Microcomputer Based Cardiac Monitor for Manual Materials Handling". Computers and Industrial Engineering Journal, 9, Supplement 1, 1985.

19. Asfour, S.S., Ayoub, M.M. and Genaidy, A.M., "Computer Models for Energy Cost Prediction of Manual Lifting and Lowering Tasks". Computers and Industrial Engineering Journal, 9, Supplement 1, 1985.

20. Genaidy, A.M., Asfour, S.S., Khalil, T.M. and Vinciguerra, T., "Physiologic Responses to Lifting with Special Reference to Static and Dynamic Tasks". Proceedings of AIHA Annual Conference, Las Vegas, Nevada, 1985.

21. Khalil, T.M., Asfour, S.S., Waly, S.M. and Genaidy, A.M., "Maximum Acceptable Static Effort (MASE) As A Measure of Lifting Capacity". Proceedings of AIHA Annual Conference, Las Vegas, Nevada, 1985.

22. Khalil, T.M., Asfour, S.S., Waly, S.M., Steele, R. and Rosomoff, H.L., "Effect of Feedback Information on Isometric Training". Proceedings of the 10th Congress of International Society of Biomechanics, Umea, Sweden, 1985.

23. Goodrow, M., El Maghraby, A.S. and Asfour, S.S., "An Interactive Graphic Simulator for the Study of Human Motion". Proceedings of the Society for Computer Simulation MultiConference, San Diego, California, 1985.

24. Khalil, T.M., Asfour, S.S., Moty, E.A., Steele, R. and Rosomoff, H.L., "The Contributions of Ergonomics to Pain Programs". American Pain Society 5th Annual General Meeting, Dallas, Texas, 1985.

25. Khalil, T.M., Asfour, S.S., Waly, S.M., Melean, L. and Rosomoff, H.L., "Effect of Low Back Pain Rehabilitation Program on Muscle Functional Abilities". Proceedings of the 9th Annual Meeting of the American Society of Biomechanics, Ann Arbor, Michigan, 1985.

26. Waly, S.M., Asfour, E.P., Khalil, T.M. and Asfour, S.S., "Human Considerations in Systems Design". Proceedings of the 3rd Conference on Mechanical Design and Production, Cairo, Egypt, 1985.

18c. Articles In Conference Proceedings: (cont'd)

27. Asfour, S.S., Genaidy, A.M., Khalil, T.M. and Asfour, E.P., "Design of Manual Materials Handling Tasks". Proceedings of the 3rd Conference on Mechanical Design and Production, Cairo, Egypt, 1985.

28. Genaidy, A.M., Asfour, S.S. and Muthuswamy, S., "Modeling of Physiologic Responses to Manual Work: A Systems Approach". Proceedings of the 1985 IEEE International Conference on Systems, Man, and Cybernetics, Tuscon, Arizona, 1985.

29. Asfour, S.S., Ayoub, M.M. and Genaidy, A.M., "Computer Models for the Prediction of Lifting and Lowering Capacity of Individuals". Proceedings of the 1985 IEEE International Conference on Systems, Man, and Cybernetics, Tuscon, Arizona, 1985.

30. Asfour, S.S., Genaidy, A.M., Khalil, T.M. and Muthuswamy, S., "An On–Line Microcomputer–Based Respiratory Monitor for Manual Materials Handling". Computers and Industrial Engineering Journal, 11, 1–4, 1986.

31. Bienkowski, T.L., Asfour, S.S., Waly, S.M. and Genaidy, A.M., "A Comprehensive Data Base for Manual Materials Handling". Computers and Industrial Engineering Journal, 11, 1–4, 1986.

32. Asfour, S.S., Khalil, T.M., Sipes, A.J., Fishbain, D.A., Bon, E., Rosomoff R.S. and Rosomoff, H.L., "Quantitative Measurements of Pain: A new Design of a Pressure Algometer". American Pain Society 6th Annual Meeting, Washington, D.C., 1986.

33. Khalil, T.M., Asfour, S.S., Moty, E., Goldberg, M., Steele R. and Rosomoff, H.L., "Acceptable Maximum Effort (AME): An Approach for Assessing Strength in Low Back Pain Patients". The International Society for the Study of Lumbar Spine Meeting, Dallas, Texas, 1986.

34. Waly, S.M., Ozdamar, O., Kline, J., Asfour, S.S. and Khalil, T.M., "The Role of Feedback Information In Isometric Muscle Training". Proceedings of the 39th Annual Conference of Engineering in Medicine and Biology, Baltimore, Maryland, 1986.

35. Khalil, T.M., Asfour, S.S., Steele R. and Rosomoff, H.L., "The Contributions Of Ergonomics to the Rehabilitation of Low Back Pain Patients". Proceedings of 3rd Colloquium on Ergonomics and the Handicapped, Paris, France, 1986.

36. Asfour, S.S. and Genaidy. A.M., "A Knowledge–Based System for Assessment of Human Physiological Abilities in Manual Lifting Tasks". Computers and Industrial Engineering Journal, 13, 1–4, 1987.

18c. Articles In Conference Proceedings: (cont'd)

37. Genaidy, A.M., Duyos, J.R. and Asfour, S.S., "Physiological Stresses Associated with Manual Handling of Containers of Varied Sizes and Weights: A Case Study". Proceedings of the Human Factors Society – 31st Annual Meeting, New York, New York, 1987.

38. Genaidy, A.M., Bafna, K.M. and Asfour, S.S., "Ergonomic Job Design in Manual Material Handling". Proceedings of International Industrial Engineering Conference, Orlando, Florida, 1988.

39. Genaidy, A.M., Bafna, K.M., Khalil, T.M., Asfour, S.S. and Zandin, K., "Ergonomic Consideration of Predetermined Motion Time Systems". Proceedings of International Industrial Engineering Conference, Orlando, Florida, 1988.

40. Waly, S.M., Asfour, S.S., Khalil, T.M., Goldberg, M.L., Rosomoff, R.S. and Rosomoff, H.L. "Functional Back Strengths in Chronic Low Back Patients". Proceedings of the Annual Conference of the Human Factors Association of Canada. Edmonton, Alberta, Canada, 1988.

41. Abdel–Moty, E., Khalil, T.M., Asfour, S.S., Rosomoff, R.S. and Rosomoff, H., "Correlation Analysis of the Ergonomics AME: A Method of Defining Patients Progress in Low Back Pain Rehabilitation Program". Proceedings of the Annual Conference of the Human Factors Association of Canada, Edmonton, Canada, 1988.

42. Goldberg, M., Fishbain, D., Coya, M., Arrleana, J., Asfour, S.S. Khalil, T.M., Steele–Rosomoff, R. and Rosomoff, H., "Use of Electromyographic Biofeedback in the Rehabilitation of Low Back Pain Patients: Body Mechanics Instruction". Proceedings of the Annual Conference of the Human Factors Association of Canada, Edmonton, Canada, 1988.

43. Khalil, T.M., Asfour, S.S., Waly, S.M., Rosomoff, R.S. and Rosomoff, H.L. "Muscle Reconditioning in the Management of Chronic Back Pain". Proceedings of the Canadian and American Pain Societies Joint Meeting, Toronto, Canada, 1988.

44. Fishbain, D., Goldberg, M., Khalil, T.M., Asfour, S.S. Abdel–Moty, E., Santana, R., Steele–Rosomoff, R. and Rosomoff, H. "Utility of EMG Biofeedback in the Treatment of Conversion Paralysis in Chronic Pain Patients". Proceedings of the Canadian and American Pain Societies Joint Meeting, Toronto, Canada, 1988.

45. Khalil, T.M., Asfour, S.S., Waly, S.M., Rosomoff, H.L. and Rosomoff, H.L. "Biofeedback and Muscle Strengthening in the Management of Back Pain". The International Society for the Study of the Lumbar Spine Meeting, Miami Beach, Florida, 1988.

18c. Articles In Conference Proceedings: (cont'd)

46. Genaidy, A.M., Asfour, S.S. and Khalil, T.M. "Physiological Fatigue Limits For Manual Lifting". Proceedings of the 10th Congress of the International Ergonomics Association, Sydney, Australia, 1988.

47. Genaidy, A.M. and Asfour, S.S. "The Effect of Body Weight on Physiological Responses in Manual Lifting Tasks". Proceedings of the 10th Congress of the International Ergonomics Association, Sydney, Australia, 1988.

48. Khalil, T.M., Asfour, S.S., Steel, R. and Rosomoff, H.L. "L'Apport de l'Ergonomie dans la Reeducation des Patients Atteints de Douleurs Lombaires". Ergonomie et Handicaps Moteurs III Colloque, Vanves, France, 1988.

49. Genaidy, A.M., Asfour, S.S. and Khalil, T.M., "Preliminary Physiological Guidelines for Continuous Lifting Tasks". Proceedings of the Human Factors Society – 32nd Annual Meeting, Anaheim, California, 1988.

50. Goldberg, M., Fishbain, D., Coya–Orozo, M. Asfour, S.S., Khalil, T.M. and Rosomoff, R. "Electromyographic (EMG) Biofeedback and Body Mechanics Instruction for Chronic Pain Patients A Controlled Study". American Pain Society: Abstracts, Eighth Annual Scientific Meeting, Phoenix, Arizona, 1989.

18d. Additional Publications:

1. Asfour, S.S. and Mital, A. "Some Factors in Manual Materials Handling – A Review". Institute of Biotechnology Report, Texas Tech. University, 1977.

2. Elwany, M., Badawi, M. and Asfour, S.S. "An Investigation into Conveyor Paced Visual Inspection". Faculty of Engineering Bulletin, Alexandria University, Alexandria, Egypt, 1981.

3. Rosomoff, H.L., Khalil, T.M., Steele, R. and Asfour, S.S. "The Facts and Myths of the Low Back Pain Problem". Workshop at the AIHA Annual Conference, Detroit, Michigan, 1984.

4. Khalil, T.M., Asfour, S.S. and Moty, E.A. "Case Studies in Low Back Pain". The Miami Engineer Magazine, 5, 1, 1985.

5. Asfour, S.S., Waly, S.M. and Genaidy, A.M. "A Comparative Study of Three Aerobic Conditioning Regimens". Annual International Industrial Ergonomics and Safety Conference, Louisville, Kentucky, 1986.

6. Omachonu, O., Asfour, S.S., Waly, S.M. and Quinless, F. "Job Stress in Nursing: Implications for Job Redesign". Annual International Industrial Ergonomics and Safety Conference, Miami, Florida, 1987.

18d. Additional Publications: (cont'd)

7. Khalil, T.M., Asfour, S.S., Melean, L., Rosomoff, R.S. and Rosomoff, H.L. "Effects of Muscle Stretching on Low Back Pain". The International Society for the Study of Lumbar Spine – Poster Session, Rome, Italy, 1987.

8. Waly, S.M., Asfour, S.S., Khalil, T.M., Rosomoff, R.S. and Rosomoff, H.L. "A Multidisciplinary Approach for the Treatment of Back Pain". The Miami Engineer Magazine, 6, 1, 1988.

19. Other Works Accepted For Publication:

None

20. Editorial Responsibilities:

- Refereed papers for the following Journals:
  1. Human Factors.
  2. Computers and Industrial Engineering.
  3. Ergonomics.
  4. International Journal of Industrial Ergonomics.

- Member of the Editorial Board of the International Journal of Industrial Ergonomics.

- Edited the book titled "Trends in Ergonomics/Human Factors IV" published by Elsevier Science Publishers, Amsterdam, Holland, 1987.

18d. Additional Publications: (cont'd)

7. Khalil, T.M., Asfour, S.S., Melean, L., Rosomoff, R.S. and Rosomoff, H.L. "Effects of Muscle Stretching on Low Back Pain". The International Society for the Study of Lumbar Spine – Poster Session, Rome, Italy, 1987.

8. Waly, S.M., Asfour, S.S., Khalil, T.M., Rosomoff, R.S. and Rosomoff, H.L. "A Multidisciplinary Approach for the Treatment of Back Pain". The Miami Engineer Magazine, 6, 1, 1988.

19. Other Works Accepted For Publication:

None

20. Editorial Responsibilities:

- Refereed papers for the following Journals:
  1. Human Factors.
  2. Computers and Industrial Engineering.
  3. Ergonomics.
  4. International Journal of Industrial Ergonomics.

- Member of the Editorial Board of the International Journal of Industrial Ergonomics.

- Edited the book titled "Trends in Ergonomics/Human Factors IV" published by Elsevier Science Publishers, Amsterdam, Holland, 1987.

21. Professional And Honorary Organizations:

21a. Memberships:

- The Ergonomics Research Society – Member
- The Human Factors Society – Member
- International Foundation for Industrial Ergonomics and Safety Research – Founding Member
- Institute of Industrial Engineers (IIE) – Senior Member.
- Society of Manufacturing Engineers – Member
- The Honor Society of Phi Kappa Phi – Member
- Industrial Engineering Honor Society (Alpha Pi Mu) – Member.
- National Leadership and Scholarship Honor Society (Omicron Delta Kappa) – Member.
- The Engineering Honor Society (Tau Beta Pi) – Member
- The Scientific Research Society of North America (Sigma Xi) – Associate Member.
- Registered Engineer, Egyptian Syndicate of Professional Engineers.
- Iron Arrow Honor Society (Highest Leadership Honor Society at the University of Miami) – Member.

21b. Positions Held:

- Chairman of "One–Day Seminars" Committee of the Institute of Industrial Engineers (IIE), Miami Chapter, 1982.
- Faculty Advisor of the Industrial Engineering Honor Society (Alpha Pi Mu) at the University of Miami, 1983.
- Vice President of Programs of the Institute of Industrial Engineers, Miami Chapter, 1984.
- President of the Institute of Industrial Engineers, Miami Chapter, 1985.

21b. Positions Held: (cont'd)

- Director of the Institute of Industrial Engineers, Miami Chapter, 1986.
- Faculty Advisor of the Institute of Industrial Engineers, University of Miami Student Chapter, 1987.
- Program Chairperson of the Work Measurement & Methods Engineering Division for the International Industrial Engineering Conference, 1988.

22. Honors And Awards:

- Alexandria University, Undergraduate Fellowship, 1969.
- Alexandria University, Undergraduate Fellowship, 1971.
- Texas Tech. University, Department of Industrial Engineering, Research Assistantship, 1976–1979.
- Texas Tech. University, Physics Department, Teaching Assistantship, 1978–1979.
- Outstanding Industrial Engineer of the year, Institute of Industrial Engineers, Miami Chapter, 1986.
- Award of Excellence presented to the Miami Chapter of the Institute of Industrial Engineers – Shihab S. Asfour, President. Presented at the Institute's National Meeting in Dallas, Texas, 1986.
- Award for Community Affairs Competition presented to the Miami Chapter of the Institute of Industrial Engineers as region IV winner – Shihab S. Asfour, President. Presented at the Institute's National Meeting in Dallas, Texas, 1986.
- Alexander Orr Award, College of Engineering Excellence in Teaching Award, 1988.
- University of Miami First Freshman Teaching Award, 1989.

23. Post–Doctoral Fellowships:

None

24. Teaching Specialization:

- o Developed and taught the following courses:

  IEN 494 Senior Project
  IEN 501 Manufacturing Analysis and Design I
  IEN 502 Manufacturing Analysis and Design II
  IEN 659 Work Physiology

- o Revised, expanded and taught the following courses:

  IEN 557 Man–Machine System
  IEN 612 Design of Experiments
  IEN 657 Ergonomics and Occupational Biomechanics

- o Joint Appointment with the Department of Neurological Surgery.

- o Member of the Graduate Faculty of the University of Miami.

25. Research Performed:

1. "Determination of Safe Work Loads for Low Frequency Tasks". Funded by NIH Biomedical Support Grant Award, 1981, **Principal Investigator, $3,996**

2. "Determination of Climatological Conditions in a Dry Food Warehouse". Funded by American Can Company, Neenah, Wisconsin, 1982, **Principal Investigator, $3,625**

3. "Ergonomic Evaluation and Rehabilitation of Back Injuries and Chronic Pain, Phase I". Funded by Department of Neurological Surgery, University of Miami, School of Medicine, 1982–1983, **Co–Principal Investigator, $50,000**

4. "Ergonomic Evaluation and Rehabilitation of Back Injuries and Chronic Pain, Phase II". Funded by Department of Neurological Surgery, University of Miami, School of Medicine 1983–1984, **Co–Principal Investigator, $80,000**

5. "Ergonomic Evaluation and Rehabilitation of Back Injuries and Chronic Pain, Phase III". Funded by Department of Neurological Surgery, University of Miami, School of Medicine, 1984–1985, **Co–Principal Investigator, $100,000**

6. "An 18–Month Study of the Climatological Conditions in a South Florida Warehouse". Funded by American Can Company, Neenah, Wisconsin, 1985, **Principal Investigator, $9,494**

7. "Ergonomic Evaluation and Rehabilitation of Back Injuries and Chronic Pain, Phase IV". Funded by Department of Neurological Surgery, University of Miami, School of Medicine 1985–1986, **Co–Principal Investigator, $160,000**

25. Research Performed: (cont'd)

8. "A Microcomputer Based Cardiorespiratory Physiologic Monitoring System for Stress Testing". Funded by the General Research Support, Award of the University of Miami, 1985, **Principal Investigator, $8,800** (includes $4,400 matching funds from the Department of Industrial Engineering)

9. "Ergonomic Evaluation and Rehabilitation of Back Injuries and Chronic Pain, Phase V". Funded by Department of Neurological Surgery, University of Miami, School of Medicine, 1986–1987, **Co–Principal Investigator, $231,000**

10. "An 18–Month Study of the Climatological Conditions in a South Florida Warehouse, Phase II". Funded by American Can Company, Neenah, Wisconsin, 1987, **Principal Investigator, $6,969**

11. "Motion Analysis System". College of Engineering Research Equipment Award Competition, 1987, **Principal Investigator, $43,000** (includes $21,500 matching funds from the Department of Industrial Engineering)

12. "Ergonomic Evaluation and Rehabilitation of Back Injuries and Chronic Pain, Phase VI". Funded by Department of Neurological Surgery, University of Miami, School of Medicine 1987–1988, **Co–Principal Investigator, $256,000**

13. "A Comprehensive Program for the Reduction of Musculoskeletal Injuries in A Large Utility Company". Funded by Florida Power and Light (FPL), 1988–1989, **Principal Investigator, $125,000**

14. "Ergonomic Evaluation and Rehabilitation of Back Injuries and Chronic Pain, Phase VII". Funded by Department of Neurological Surgery, University of Miami, School of Medicine 1988–1989, **Co–Principal Investigator, $256,000**

15. "Ergonomic Injury Control in High Frequency Lifting Tasks". Funded by the Department of Health and Human Services, 1988 – 1990, **Principal Investigator, $187,318**

16. "Gait Analysis of Patients with CAT/CAM Prostheses". Funded by CAT/CAM Foundation, 1988, **Principal Investigator, $5,000**

17. "Ergonomic Evaluation and Rehabilitation of Back Injuries and Chronic Pain, Phase VIII". Funded by Department of Neurological Surgery, University of Miami, School of Medicine. 1989–1990, **Co–Principal Investigator, $256,000**

18. "An Occupational Biomechanics Program for the Reduction of Musculoskeletal Injuries in a Large Utility Company". Funded by Florida Power and Light (FPL), 1990–1991. **Principal Investigator, $245,544**

19. "Force Plate System". College of Engineering Research Equipment Award Competition, 1990. **Principal Investigator, $25,000** (includes $6,000 matching funds from the Department of Industrial Engineering)

25. Research Performed: (cont'd)

20. "Creation and Funding of Center for Health Technologies for Research, Development, Design, Management and Training". Florida High Tech, 1990. **Principal Investigator, $20,000**

26. Thesis And Dissertation Advising:

26a. Master's Theses Supervised (Chairman):

1. A.M. Genaidy, "Physiological and Psychophysical Determination of Lifting Capacity for Low Frequency Lifting Tasks". Department of Biomedical Engineering, University of Miami, May, 1983.

2. A. Sipes, "Evaluation and Measurement of Pain". Department of Industrial Engineering, University of Miami, June, 1987.

3. M. Tritar, "Physiological Models and Guidelines for the Design of Prolonged Arm Lifting Tasks". Department of Industrial Engineering, University of Miami. August, 1988.

4. E. Diaz, "A Microcomputer Based System for the Ergonomic Design of Displays and Controls". Department of Industrial Engineering, University of Miami. In progress.

5. T. Bienkowski, Department of Industrial Engineering, University of Miami. In progress.

6. V. Missar, Department of Industrial Engineering, University of Miami. In progress.

7. I. Jomoah, Department of Industrial Engineering, University of Miami. In progress.

8. Rajakanan, Department of Industrial Engineering, University of Miami. In progress.

9. M.W. Fahmy, Department of Industrial Engineering, University of Miami. In progress.

10. M. Akcin, Department of Industrial Engineering, University of Miami. In progress.

26b. Master's Theses Supervised (Member):

1. M.M. Soliman, "Application of Motion and Time Study Techniques for Guest Rooms Cleaning Operation in the Lodging Industry". Florida International University, May, 1983.

2. K. Tota, "The Microcomputer : A Powerful Tool In Soils Laboratory Data Collection And Reduction". Department of Civil Engineering, University of Miami, December, 1984.

3. R. Nelson, "Determining Three–Dimensional Object Shape and Orientation from a Single Perspective View". Department of Electrical and Computer Engineering, University of Miami, May, 1986.

4. S.M. Waly, "The Role of Feedback Information in Isometric Strength Training". Department of Biomedical Engineering, University of Miami, May, 1986.

5. L. Melean, "Effects of Stretching on Low Back Reconditioning". Department of Industrial Engineering, University of Miami, May, 1986.

6. J. Guarin, "CCD Architecture for Logarithmic Polar Conformal Mapping". Department of Electrical and Computer Engineering, University of Miami, May,1986.

7. M. Carrillo, "Evaluation of Policy Rules Performance in Scheduling Carousel Conveyors". Department of Industrial Engineering, University of Miami, June, 1986.

8. I. Padron, "Effect of Synthetic Fibers on Volume Stability and Cracking of Portland Cement Concrete and Mortar". Department of Civil Engineering, University of Miami, December, 1986.

9. M.A. Shahrour, "Properties of Compaction Concrete for Pavement Applications". Department of Civil Engineering, University of Miami, December 1986.

10. M. Almeer, "Theory and Design of Digital Filters Using Optimum Basis Transform". Department of Electrical and Computer Engineering, University of Miami, June, 1987.

11. H. Hernandez, "Linear Camera Caliberation Approach for Binocular Stereo Vision Applications". Department of Electrical and Computer Engineering, University of Miami, August, 1987.

12. K. Fok, "Automatic Navigation System for Vision Guided Vehicles Using Heuristic and Finite State Machine". Department of Electrical and Computer Engineering, University of Miami, August, 1987.

26b. Master's Theses Supervised (Member): (cont'd)

13. Y. Hachem, "Flexural Fatigue as a Performance Measure of Steel Fiber Reinforced Concrete". Department of Civil Engineering, University of Miami, December, 1987.

14. M. Beruvides, "A Computer Interface for Direct Numerical Control in CIM". Department of Industrial Engineering, University of Miami, May, 1988.

15. S. Troxler, "Expert System Applications in Concrete Engineering". Department of Civil Engineering, University of Miami, August, 1988.

16. M. Georgiou, "Determination of Bioelectric Sources in a Volume Conductor from External Measurements of the Electric Potenial". Department of Biomedical Engineering, University of Miami, December, 1988.

17. E.J. Alvarez, "Policy Rules Affecting AS/RS Throughput: An Evaluation Using Computer Simulation." Department of Industrial Engineering, University of Miami, December, 1988.

18. H. Kamarudin, "Integrated Preliminary Design System for Wooden Roof Trusses". Department of Civil Engineering, University of Miami, December, 1988.

19. H. Peyrarian, "Data Link Reliability and Synchronization Procedures". Department of Electrical Engineering, University of Miami, May, 1989.

20. A.P. Pons, "Comparative Analysis of Algorithms for the Minimization of Multivalued Logic Functions". Department of Electrical and Computer Engineering, University of Miami, August, 1989.

21. J.T.Flynn, "Methodology for Just–In–Time Implementation". Department of Industrial Engineering, University of Miami, August, 1989.

22. A. Degani, "Human Factors of Flight Deck Checklists: The Normal Checklist". Department of Industrial Engineering, University of Miami, August, 1989.

23. M.G. Mueller, "Development of A Generic Methodology for Selecting New Technology". Department of Industrial Engineering, University of Miami, December 1989.

24. J. Alvrus, "Automated Analysis of Auditory Evoked Potentials and Sleep Electroencephalograms". Department of Biomedical Engineering, University of Miami, May, 1990.
25. H.M. Barhouse, "Knowledge Based Expert System Prototype Bridge Rating". Department of Civil Engineering, University of Miami, May, 1990.

26. G. Ramanujam, "Modeling Robot Grasping Strategies for Rotational Parts in Automatic assembly". Department of Industrial Engineering, University of Miami, May, 1990.

26b. Master's Theses Supervised (Member): (cont'd)

27. B. Sheridan, "A Survey of American Quality Circles Programs in 1986". Department of Industrial Engineering, University of Miami. In progress.

28. R. Gonzalez, Department of Industrial Engineering, University of Miami. In progress.

29. M. Deodoglu, Department of Industrial Engineering, University of Miami. In progress.

30. T. Flynn, Department of Industrial Engineering, University of Miami. In progress.

26c. Ph.D. Dissertations Supervised (Chairman):

1. A.M. Genaidy, "Physiological Models and Guidelines for the Design of Prolonged Leg Lifting Tasks". Interdepartmental Ph.D., University of Miami, August, 1987.

2. S. Muthuswamy, "Work–Rest Scheduling for Manual Lifting Tasks". Interdepartmental Ph.D., University of Miami. May, 1990.

3. S.M. Waly, Interdepartmental Ph.D., University of Miami. In progress.

4. M. Tritar, Ph.D. in Ergonomics, University of Miami. In progress.

5. J. Koshy, Ph.D. in Ergonomics, University of Miami. In progress.

26d. Ph.D. Dissertations Supervised (Member):

1. N. Ghafoori, "Phosphogypsum–Based Concrete Engineering Characteristics and Road Construction Application". Department of Civil Engineering, University of Miami, August, 1986.

2. S. Taboun, "Models of Individual and Combined Manual Materials Handling Tasks". Department of Industrial Engineering, University of Windsor, Canada, August, 1986.

3. M. Shahrour, "Roller Compaction Concrete for Pavement Applications". D.A. Thesis, Department of Civil Engineering, University of Miami, December, 1986.

4. H. Aboalsamh, "Architectural Approaches to the Design of LISP Oriented Reduced Instruction Set Machines". Interdepartmental Ph.D., University of Miami, December, 1987.

26d. Ph.D. Dissertations Supervised (Member): (cont'd)

5. A. Boujarwah, "System Software for Enhancement of Computational Accuracy Through User–Selected Number Representation". Department of Electrical and Computer Engineering, University of Miami, December, 1987.

6. E.A. Moty, "Effects of Functional Electric Stimulation on the Neuromuscular System". Interdepartmental Ph.D., University of Miami, May, 1988.

7. A. Naqi, "GIS in Municipal, Public and Private Agencies". D.A. Thesis, Department of Civil Engineering, University of Miami, June, 1988.

8. G. Spicker, "Modeling, Simulation and Analysis of Fault–Tolerant Multiprocessor Architectures". Department of Electrical and Computer Engineering, University of Miami, May, 1989.

9. M. Baran, "Separation Properties in Toplogical Category". Department of Mathematics, University of Miami, May, 1990.

10. Y.H. Hackhem, "Bridge Inspection Strategies". Department of Civil Engineering, University of Miami, May, 1990.

27. University Committee And Administrative Responsibilities:

27a. University Committees Served on:

- Member of the University of Miami Ethics Committee, 1980–1982.
- Member of the University of Miami Library Committee, 1983.
- Elected Industrial Engineering Department Representative to the College of Engineering Council, 1983– present.
- Member of the Search Committee for Industrial Engineering Department Chairman, 1984.
- Elected College of Engineering Representative to University of Miami Academic Planning Committee, 1985 – 1987.
- Member of the Search Committee for Biomedical Engineering Department Chairman, 1986.
- Member of the College of Engineering Research Council, 1986–1989.
- Member of the University of Miami Coral Gables Campus Safety Committee, 1986–present.

27a. University Committees Served on: (cont'd)

- Representative of the Industrial Engineering Department to the College of Engineering Scholarship Committee, 1986–present.
- Member of the Distinguished Alumnus Award Committee, 1986 – Present.
- Elected Representative of the Industrial Engineering Department to the College of Engineering Tenure and Promotion Review Board, 1987–1993.
- Elected Representative of the Collage of Engineering to the University of Miami Academic Personnel Board, 1988 – 1989.
- Member of the University of Miami Graduate Council's Subcommittee on Graduate Faculty, 1987 & 1988.
- Member of the College of Engineering Consultative Committee for the search for College of Engineering Dean, 1989–1990.
- Member of the University Search Committee for Dean of the College of Engineering, 1989–1990.
- Elected as the College of Engineering Senator to the Faculty Senate 1989–1991.

27b. Administrative Resposibilities:

- Co–editor of PIE (A quarterly publication of the productivity Center, Inc.), 1981.
- Chairman of "One–Day Seminars/Workshops". Committee of the Institute of Industrial Engineers, Miami Chapter, 1982.
- Acting Chairman for the Department of Industrial Engineering on several occasions.
- Academic Advisor of Industrial Engineering Juniors, 1980– 1983.
- Director of Graduate Studies at the Department of Industrial Engineering, 1983 – present.

27b. Administrative Resposibilities: (cont'd)

- Associate Director of the Ergonomics and Bioengineering Division, University of Miami Comprehensive Pain and Rehabilitation Center at South Shore Hospital, Miami Beach, Florida, 1984 – present.

- President of Institute of Industrial Engineers, Miami Chapter, 1985.

- Director of Institute of Industrial Engineers, Miami Chapter, 1986.

- Chaired and Organized the Annual International Industrial Ergonomics and Safety Conference held in Miami, June 9–12, 1987.

- Associate Chairman of the Department of Industrial Engineering, University of Miami, Coral Gables, Florida, 1988 – Present.

28. Community Activities:

- Organization of Arab Students: Faculty Advisor, 1981– present.

- Jewish Vocational Services: Helped increase productivity for different jobs through class projects, 1981–1985.

- Muslim Center of the University of Miami: Member of the Board of Trustees, 1981–present.

- MTM Association Certification: With the Cooperation of Barnes Management Services helped some students and Industrial Engineers at the Miami area become certified in MTM, 1981–present.

- The Industrial Engineering Honor Society (Alpha Pi Mu): Faculty Advisor, 1982–1984.

- Muslim center of the University of Miami: Vice – President, 1983–1984.

- Goodwill Industry: Helped increase productivity for different jobs through class projects, 1983–1985.

- Member of the Advisory Board to Industrial Contract Department Committee of Goodwill Industries of South Florida, Inc., 1982–1984.

- President of Institute of Industrial Engineers, Miami Chapter, 1985.

28. Community Activities: (cont'd)

- Director of Institute of Industrial Engineers, Miami Chapter, 1986.
- The Institute of Industrial Engineers University of Miami Student Chapter: Faculty Advisor, 1987.
- The Institute of Industrial Engineers University of Miami Student Chapter: Faculty Advisor, 1988.
- The Institute of Industrial Engineers University of Miami Student Chapter: Faculty Advisor, 1989.

29. Other Professional Information:

29a. Technical Presentations:

1. "Relationship Between Lifting Capacity and Injury in Occupations Requiring Lifting". Paper presented at the Human Factors 22nd conference, Detroit, Michigan, October, 1978.

2. "Reach Profiles for Males and Females Under Restrained and Unrestrained Conditions". Paper presented at the Human Factors 22nd Conference, Detroit, Michigan, October 1978.

3. "Effect of Mental Stress, and Performance on Physiological Responses". Paper presented at the AIHA Annual Conference, Chicago, Illinois, May 1979.

4. "Perceived Exertion of Physical Stresses for Various Manual Lifting and Lowering Tasks". Paper presented at the AIHA Annual Conference, Portland, Oregon, May, 1981.

5. "Application of Human Factors to Manual Material Handling". Graduate Seminar, University of Miami, Coral Gables, Miami, February, 1983.

6. "The Management of Low Back Pain: A Comprehensive Approach". Paper presented at IIE Annual Conference, Louisville, Kentucky, May, 1983.

7. "A Comparative Study of Static and Dynamic Lifting Tasks". Paper presented at the Human Factors Society – 28th Annual Meeting, San Antonio, Texas, October, 1984.

8. "The Maximum Efficiency of the Human Machine During Lifting". Paper presented at the Human Factors Society – 28th Annual Meeting, San Antonio, Texas, October, 1984.

9. "Case Studies in Low Back Pain". Paper presented at The Human Factors Society – 28th Annual Meeting, San Antonio, Texas, October, 1984.

10. "Computer Models for Energy Cost Prediction of Manual Lifting and Lowering Tasks". Paper presented at the 7th Annual Conference on Computers and Industrial Engineering, Orlando, Florida, March, 1985.

11. "A Microcomputer Based Cardiac Monitor for Manual Materials Handling". Paper presented at the 7th Annual Conference on Computers and Industrial Engineering, Orlando, Florida, March, 1985.

12. "A Combined Approach for Determination of Lifting Capacity". Paper presented at the 2nd Annual Mid – Central Ergonomics/Human Factors Conference, West Lafayette, Indiana, June, 1985.

29a. Technical Presentations: (cont'd)

13. "Lifting Capacity Norms Based on Strength and Endurance of Workers". Paper presented at the 2nd Annual Mid – Central Ergonomics/Human Factors Conference, West Lafayette, Indiana, June, 1985.

14. "Physiologic Issues in Manual Materials Handling". Paper presented at the 2nd Annual Mid – Central Ergonomics/Human Factors Conference, West Lafayette, Indiana, June, 1985.

15. "A Suggested Submaximal Test for Job Design and Pre – Employment Screening Tests". Paper presented at the 2nd Annual Mid – Central Ergonomics/Human Factors Conference, West Lafayette, Indiana, June, 1985.

16. "Nutrition as an Ergonomic Component in the Workplace". Paper presented at the 2nd Annual Mid–Central Ergonomics/Human Factors Conference, West Lafayette, Indiana, June, 1985.

17. "New Horizons for Ergonomic Research in Low Back Pain". Paper presented at the 2nd Annual Mid–Central Ergonomics/ Human Factors Conference, West Lafayette, Indiana, June, 1985.

18. "Modeling of the Human Kinetics During Repetitive Lifting". Paper presented at the 9th Congress of the International Ergonomics Association Conference, Bournemouth, England, September, 1985.

19. "A Data Base of the Mechanical Efficiency of the Human Machine During Lifting and Lowering Tasks". Paper presented at the 9th Congress of the International Ergonomics Association Conference, Bournemouth, England, September, 1985.

20. "The Relationship Between Frequency of Lift and Lifting Capacity". Paper presented at the 9th Congress of the International Ergonomics Association Conference, Bourenmouth, England, September, 1985.

21. "Ergonomics Contribution to the Rehabilitation of Low Back Pain". Paper presented at the 9th Congress of the International Ergonomics Association Conference, Bourenmouth, England, September, 1985.

22. "Human Considerations in System Design". Paper presented at the 3rd Conference on Mechanical Design and Production, Cairo, Egypt, December, 1985.

23. "Design of Manual Materials Handling Tasks". Paper presented at the 3rd Conference on Mechanical Design and Production, Cairo, Egypt, December, 1985.

29a. Technical Presentations: (cont'd)

24. "An On–Line Microcomputer–Based Respiratory Monitor for Manual Materials Handling". Paper presented at the 8th Annual Conference on Computers and Industrial Engineering, Orlando, Florida, March, 1986.

25. "A Comprehensive Data Base for Manual Materials Handling". Paper presented at the 8th Annual Conference on Computers and Industrial Engineering, Orlando, Florida, March, 1986.

26. "A Data Base of Physiological Responses to Manual Lifting". Paper presented at the Annual International Industrial Ergonomics and Safety Conference, Louisville, Kentucky, June, 1986.

27. "A Data Base of Physiological Responses to Manual Lowering". Paper presented at the Annual International Industrial Ergonomics and Safety Conference, Louisville, Kentucky, June, 1986.

28. "Physiological Basis of Muscular Fatigue: An Electromyographic Study". Paper presented at the Annual International Industrial Ergonomics and Safety Conference, Louisville, Kentucky, June, 1986.

29. "The Design of Work/Rest Schedules as an Ergonomic Component in Manual Materials Handling". Paper presented at the Annual International Industrial Ergonomics and Safety Conference, Louisville, Kentucky, June, 1986.

30. "A Comparative Study of Three Aerobic Conditioning Regimens". Paper presented at the Annual International Industrial Ergonomics and Safety Conference, Louisville, Kentucky, June, 1986.

31. "Ergonomics and the Injured Worker". Invited presentation at the Miami Occupational Therapy Forum, Miami, Florida, March, 1987.

32. "Musculoskeletal Injury Reduction: An Ergonomic Approach". Invited presentation at Florida Power and Light Company (FPL), Fort Lauderale, Florida, April, 1987.

33. "Work Capacity Evaluation of Workers Engaged in Physically Demanding Jobs". Invited presentation at Florida Power and Light Company (FPL), Miami, Florida, August, 1987.

34. "Ergonomics in Rehabilitation". Women in Transportation South East Conference, FT. Lauderdale, Florida, September, 1987.

35. "Effects of Low Back Pain on Psychomotor Skills". Paper presented at the International Industrial Ergonomics and Safety Conference held in Cincinnati, Ohio, June 1989.

29a. Technical Presentations: (cont'd)

36. "Analogy of Physiologic Responses to Electric Circuit Responses During a Scheduled Manual Lifting Task". Paper presented at the International Industrial Ergonomics and Safety Conference held in Cincinnati, Ohio, June 1989.

37. "Effect of Task Direction on Perceived Exertion". Paper presented at the International Industrial Ergonomics and Safety Conference held in Cincinnati, Ohio, June 1989.

29b. Professional and Development Activities:

1. Developed and established a "State of the Art" Work Physiology Laboratory, 1981–present.

2. Established the Ergonomics and Bioengineering Division of the University of Miami Comprehensive Pain and Rehabilitation Center, 1984.

3. Editorial Board Member, International Journal of Industrial Ergonomics, Elsevier Science Publishers, 1985–present.

4. Founding Member, International Foundation for Industrial Ergonomics and Safety Research, 1986–present.

5. Special Session Organizer and Chairman, "Manual Handling Databases", Annual International Industrial Ergonomics and Safety Conference '86, Louisville, Kentucky, 1986.

6. Member of International Program Advisory Committee, Annual International Industrial Ergonomics and Safety Conference '86, Louisville, Kentucky, 1986.

7. Editor, Trends in Ergonomics/Human Factors IV, two volumes, Elsevier Science Publishers, Amsterdam, 1987.

8. Conference Chairman, Annual International Industrial Ergonomics and Safety Conference '87, Miami, Florida, June 9–12, 1987.

9. Served as referee for the International Conference on Productivity Research '87, Miami, Florida, 1987.

10. Session Chairman, International Conference on Productivity Research '87, Miami, Florida, 1987.

11. Appeared on Mr. Ron King's show, for 30 minutes, which was aired on WLYF FM radio station. The show revolved around the field of Ergonomics and the University of Miami Industrial Engineering Department, August, 1987.

29b. Professional and Development Activities: (cont'd)

12. Session Chairman, International Conference on Technology Management, Miami, Florida, Feb. 17–19, 1988.

13. Special Session Organizer and Chairman, "Ergonomics in Rehabilitation", 21st Annual Meeting of the Human Factors Association of Canada, Edmonton, Alberta, Canada, September, 1988.

29c. Master's Comprehensive Examinations:

1. M. Valasquez, Industrial Engineering, 1981

2. T. Bhatty, Industrial Engineering, 1981

3. S. Taboun, Industrial Engineering, 1981

4. R. Booy, Electrical Engineering, 1981

5. R. Abulgasem, Industrial Engineering, 1981

6. D. Feder, Industrial Engineering, 1982

7. A. Fern andez Environmental Health and Safety, 1982

8. B. Ahmadi, Civil Engineering, 1982

9. A. Chanouha, Civil Engineering, 1983

10. W. El gammal, Civil Engineering, 1983

11. A. Khan, Civil Engineering, 1983

12. M. Shahrour, Civil Engineering, 1983

13. T. Vinciguerra, Environmental Health and Safety, 1984

14. R. Uzcategui, Environmental Health and Safety, 1984

15. I.Genie, Industrial Engineering, 1984

16. O.Ben'nakhi, Industrial Engineering, 1985

17. I. Takieddine, Civil Engineering, 1985

29c. Master's Comprehensive Examinations: (cont'd)

18. A. Naqi, Civil Engineering, 1985
19. B. Marchette, Enviromental Health and Safety, 1985
20. M. Cevenini, Industrial Engineering, 1985
21. S. Lakhani, Industrial Engineering, 1985
22. G. Font, Industrial Engineering, 1986
23. J. Cabezas, Industrial Engineering, 1986
24. Y. Rivera, Industrial Engineering, 1986
25. A. Donelan, Industrial Engineering, 1986
26. M. Bravo, Industrial Engineering, 1986
27. A. Rodriguez, Industrial Engineering, 1986
28. J. Cunill, Industrial Engineering, 1986
29. S. Waly, Industrial Engineering, 1986
30. A. Maxwell, Industrial Engineering, 1987
31. E. LeFranc, Industrial Engineering, 1987
32. J. Kaiser, Industrial Engineering, 1987
33. M. Aquino, Industrial Engineering, 1987
34. H. Delgado, Industrial Engineering, 1987
35. L. Del Pino, Industrial Engineering, 1987
36. A. Zaki, Industrial Engineering, 1988
37. D. Martin, Industrial Engineering, 1988
38. J. Duyos, Industrial Engineering, 1988
39. G. Lu, Industrial Engineering, 1988

CURRICULUM VITAE

1.	Date:	April 1990

PERSONAL

2.	Name:	NOURREDINE BOUBEKRI
3.a	Office Phone:	(305) 284-2370
3.b	Home Phone:	(305) 386-9019
4.	Home Address:	6910 SW 132 Place Miami, FL 33183
5.	Employment Status:	Full time
6.	Current Academic Rank:	Assistant Professor
7.	Primary Department:	Industrial Engineering University of Miami Coral Gables, 33124
8.	Citizenship:	Algeria
9.	Visa Type:	Permanent Resident of the U.S.A.

HIGHER EDUCATION

10. INSTITUTIONAL TRAINING

1983 (July)	University of Nebraska at Lincoln Ph.D., Major: Industrial Engineering
1980 (May)	Boston University M.E., Major: Manufacturing Engineering
1980 (Jan)	Boston University B.S., Major: Manufacturing Engineering

11. NON-INSTITUTIONAL TRAINING

1984	Design for Automation; a short course. Amherst (MA)
1986	Robot programming languages; a short course. Algiers (Algeria).
1988	Design for Automatic Assembly; a short course. Los Angeles, California.

16.b CONTRIBUTION TO BOOKS

BOUBEKRI, N., BOUDJMA, A. and MELLATA, A.; "An Expert System for Industrial Robots Selection"; Technology Management I; Inderscience Enterprises Ltd., pp 458-467, 1988.

BOUBEKRI, N., KHALIL, T.M. and KABUKA, M.; "Human-Machine Interface in Remote Monitoring and Control of Flexible Manufacturing Systems"; Ergonomics of Hybrid Automated Systems; Elsevier Science Publishers, B. V. Amsterdam pp 311-318, 1988.

BOUBEKRI, N.; Albusairi, A. "Robot Handling Strategies for Small Parts; Expert Robots for Industrial Use, SPIE, Vol. 1008, Hall, E.L.; Casasent, D.P.; Stout, K.J.; (editors) (1988) pp. 207-214.

BOUBEKRI, N., MAZOUZ, K., ALBUSAIRI, A., ITANI, A.; "The Development of a Computer Aided System for Planning Robot Grasping Tasks"; Productivity Management Frontier II; Inderscience Publishers, 1989.

KANG, K., BOUBEKRI, N., JARMILLO, J., "Simulation Modeling and Performance Evaluation of PCB Assembly". Productivity Management Frontiers II; Inderscience Publishers, 1989.

Mazouz, A.K.; BOUBEKRI, N., Transfer of Technology; Technology Management II; Industrial Engineering and Management Press, 1990.

BOUBEKRI, N.; RAMANUJAM, G.; "Assessment of Robot Technology for Assembly", Technology Management II; Industrial Engineering and Management Press, 1990.

17. JURIED OR REFEREED JOURNAL ARTICLES

17.a REFEREED JOURNAL ARTICLES

BOUBEKRI, N.; "Robots in Flexible Manufacturing Systems"; Robotics International Journal/ Elsevier Science Publishers B.V. (North Holland, The Netherlands; Vol. 3, No. 3 & 4, 1987.

BOUBEKRI, N.; "Robotic Standards Developments in the U.S.A."; Review of Advanced Techniques; International Journal. Haut Commissariat a la Recherche Publishing Division, 1988.

BOUBEKRI, N., BOUDJMA, A., and MELLATA, A.; "Development of an Expert System for Industrial Robots Selection; accepted for publication in Computers and Industrial Engineering Journal to appear in 1990.

International Conference on Production Research; The University of NOTTINGHAM (England), August 1989.

BOUBEKRI, N.; Layton, T.S.; "Assessment of Robotic Technology for Severely Physically Disabled Microcomputer Specialists"; PROCIM conference proceedings, November 1989

BOUBEKRI, N.; Waly, S.; "Development of an Algorithm for Measuring Robot Accuracy for a SCARA Configuration." Proceedings of the 12th Computer and Industrial Engineering Conference; Pergamon Press, March 1990.

19. OTHER WORKS ACCEPTED FOR PUBLICATION

None

20. EDITORIAL RESPONSIBILITIES

Refereed papers for the following journals:

1. Computers and Industrial Engineering
2. Review of Advanced Techniques.
3. International Journal of Modeling and Simulation

Reviewed papers for the following books:

1. Technology Management I; Inderscience Enterprises, Ltd, 1988.
2. Productivity Management Frontiers II; Inderscience Publishers, 1989.
3. Technology Management II; Industrial Engineering and Management Press, 1990.

Reviewed Proposals for the following organizations:

1. National Science Foundation
2. State of Missouri Research Assistance Program

21. PROFESSIONAL AND HONORARY ORGANIZATIONS

* American Institute of Industrial Engineers (IIE), senior member.
* Society of Manufacturing Engineers (SME) - affiliate member.
* American Society for Engineering Education (ASEE),

Project funded by IBM Corporation; Boca Raton (FL), 1984, University of Miami, Florida, as (co-principal investigator); $60,000.

* Sensor Systems in Robotics"; Developed a course material for IBM personnel. Project funded by IBM Corporation; Boca Raton (FL), 1984, University of Miami (FL); $5,000.

* "Quality Control Application of Integrated Circuits Using the IBM 7535 Robot System". Project funded by IBM Corporation; Boca Raton (FL), 1985, University of Miami (FL), (Co-Principal Investigator); $8,499.

* "Development of an Assembly Cell Using the IBM 7535 Robot", Research Initiation Award, University of Miami (FL), 1985,(Principal Investigator) $7,500.

* "Design of a Flexible Manufacturing Cell Using the PUMA 761 Robot to Load and Unload Parts on an NC Lathe"; Haut Commissariat a la Recherche; Algeria, 1985-87, (Principal Investigator); $67,400.

* "Design of a Computer-Aided System for the Selection of Industrial Robots"; Haut Commisariat a la Recherche; Algeria, 1986-87, (Principal Investigator); $5,000.

* "Product and Process Design for Manufacturing Systems", Project funded by the University of Miami Quality Institute, 1988-1989 (Principal Investigator), $3,000.

* "Developing Reliability and Safety Standards Using Systematic Methodologies", Project funded by the University of Miami Quality Institute, 1989-1990 (Principal Investigator); $6000.

25.b EQUIPMENT GRANT AWARDED

1985 Industrial Controller (MODCOMP CORP.), Amount: $28,900
1988 Maintenance Contract (MODCOMP CORP.) Amount: $15,000

25.c OTHER GRANTS

ASEE Faculty Summer Course Grant, 1989 Amount: 1,500

25.d PROPOSALS SUBMITTED

* "Using Robotic technology to Assist Disabled Persons with Routine Office Activities." Submitted to the United States Department of Labor; Principal Investigator; $420,551 (Pending).

* "A Hybrid Quality Function Deployment/Optimization

to the College of Engineering, Brownell Award, 1988.

* Member of University of Miami Quality Institute; Jan 1988-present.

* Coordinator and member of the Computer Integrated Manufacturing Program at the University of Miami, College of Engineering; Jan 1988-present.

* Honor's Program Committee Chairman; Industrial Engineering Department; March 1988-present.

* Member of Faculty Search Committee at the Industrial Engineering Department, May 1988-present.

* Department of Industrial Engineering Representative to the College of Engineering Council 1989-1991

* Member of the College of Engineering Dean Search Consultative Committee 1990.

* Member of the College of Engineering Implementation Committee on General Educational Requirements. (Starting March 1990)

* Graduate Faculty Member, January 1989-present.

* Faculty advisor, The Society of Manufacturing Engineers, University of Miami Student Chapter, 1989 - present.

28. COMMUNITY ACTIVITIES

* Invited guest speaker at the Museum of Science and Exhibitions, Miami, FL, April 1985.

* United Way Member, 1988, Department Solicitator, 1989

* Representative of the Industrial Engineering Department: Manufacturing Engineering Emphasis at the University of Miami; Chamber of Commerce December 9, 1989 meeting.

29. OTHER PROFESSIONAL INFORMATION OR ACTIVITIES

* Conducted a one-day seminar on robotics implementation, University of Miami, FL, November 1984.

* Invited guest speaker; IIE Miami Chapter, April 1985.

* Invited guest speaker; SME Miami Chapter; May 1985.

* Invited guest speaker; University of Algiers, Algeria, March 1987.

Curriculum Vitae

1. October 1990

PERSONAL

2. Sara J. Czaja

3. (305) 859-8601

4. (305) 284-2371

5. 2891 Seminole St.
Miami, Florida 33133

6. Research Associate Professor

7. Industrial Engineering

8. United States

9. None

HIGHER EDUCATION

10. Institutional

Doctor of Philosophy
State University of New York at Buffalo
Industrial Engineering/Human Factors, 1980

Master of Science
State University of New York at Buffalo
Industrial Engineering, 1976

Bachelor of Science, Magna Cum Laude
State of New York College at Buffalo
Honors Psychology, 1975

11. None

12. None

EXPERIENCE

13. Academic

Associate Professor, tenured, at the
State University of New York at Buffalo
Department of Industrial Engineering
September 1986 - present

Research Associate Professor
University of Miami
Department of Industrial Engineering
September 1989 - present

Faculty Fellow
Center for Adult Development and Aging
University of Miami, August 1989 - present

14. Non-Academic

Research Director
Stein Gerontological Institute
Miami, Florida, January 1987 - present

President, Applied Ergonomics Group, Inc.
1983 - present.
Major focus: consulting in the areas of industrial ergonomics, automation, and environmental design. Clients include: International Business Machines (IBM), Hewlett Packard, United States Postal Service and Levi Strauss.

Senior Research Associate, Advanced Automation Concepts, April 1983 - May 1989. Major focus of research: human/computer interaction and aging. Served as the Principal Investigator for a study assessing the suitability of commercial training programs for teaching older workers text editing and for a follow-up study concerned with development of effective strategies to teach older learners to successfully interact with computers.

Senior Research Associate, Buffalo Organization for Social and Technological Innovation, Inc., (BOSTI), 1980 to March, 1983. Major focus of work: environmental design with an emphasis on office design, safety and aging.

Instructor for the Multidisciplinary Center on Aging, State University of New York at Buffalo, 1980.

Human Factors Engineering Consultant, People's Center for Housing Change, Buffalo, New York. Designed and implemented a Human Factors research program to assess the needs of handicapped children in elementary schools, 1979-1980.

Projects Manager, Department of Faculty and Staff Relations, State University of New York College at Buffalo, 1978-1979.

15. NONE

PUBLICATIONS

16. Books and Book Chapters

Czaja, S.J. (1990). Human Factors Research for an Aging Population. National Research Council, National Academy of Science Press: Washington, D.C. (to appear: approximately 250 pages).

Czaja, S.J. (in press). Job design for older workers. In A. Mital and W. Karwowski Ergonomics and Workplace Design. Elsewer Press.

Czaja, S.J. (1988). The use of computers by the elderly. In M.E. Helander (Ed.) Handbook of Human - Computer Interaction. New York: North - Holland.

Czaja, S. J. (1987). Human Factors in office automation. In G. Slavendy (Ed.) Handbook of Human Factors Engineering, New York: John Wiley and Sons.

17. Refereed Articles

Clark, M.C., Czaja, S. J., and Weber, R. (in press). Older adults and daily living performance. Human Factors.

Czaja, S. J., Blascovich, T., Hammond, K., and Joyce, I.B. (in press). Attitudes of older people toward computer technology. Journal of Experimental Aging Research.

Czaja, S. J. (1990). Aging and work performance. In B. Das (Ed.) Advances in Industrial Ergonomics and Safety II, London: Taylor and Francis, 27-32.

Sharit, J., Czaja, S. J., Brunskill, C. T. and Bogart, D. R. (1990). A methodology for assessing stress reactions to computer-interactive tasks. In B. Das (Ed.) Advances in Industrial Ergonomics and Safety II, London: Taylor and Francis, 373-377.

Bishu, R.M., Drury, C.G., Czaja, S.J. and Sharit, J. (1989). The effects of grouping and cuing in the performance of location tasks. Applied Ergonomics, 20, 206-212.

Gawron, V. J., Drury, C.G., Czaja, S.J. and Wilkins (1989). International Journal of Man-Machine Studies, 31, 643-672.

Czaja, S. J., Hammond, K., Blascovich, J., and Swede, H. (1989). Age group differences in learning to use a text-editing system Behavior and Information Technology, 8, 309-319.

Czaja, S. J. and Barr, R. (1989). Technology and everyday life. The Annals, American Academy of Political and Social Science, 503, 127-137.

Czaja, S. J. and Sharit, J. (1988). Aging and performance of computer-interactive tasks: job design and stress potential In F. Aghazadeh (Ed.) Trends in Ergonomics/Human Factors V. North Holland: Amsterdam, 185-190.

Czaja, S. J. (1987). Safety and security of the elderly: implications for smart house design. International Journal of Aging and Technology. 1, 49-67.

Czaja, S. J., Cary, J., Drury, C. G. and Cohen, B. (1987). An ergonomic evaluation of traditional and automated offices. Office Technology and People, 3, 231-246.

Helander, M., Czaja, S. J., Drury, C. G., Cary, J. and Burri, G. (1987). An ergonomic evaluation of office chairs. Office Technology and People, 3, 247-262.

Aykin, N. and Czaja, S. J. (1986). Simultaneous regression model for double stimulation tasks. Human Factors, 6, 633-644.

Czaja, S. J., Hammond, K., Blascovich, J. and Swede, H. (1986). Learning to use a wordprocessing systems as a function of training strategy. Behavior and Information Technology, 5, 203-316.

Brill, M., Czaja, S. J., Marqulis, S., and McFarlin, D. (1983). Take the stress out of your clean room. Industrial Research and Development, 185-188.

Czaja, S. J., and Drury, C.G. (1981). Training programs for inspection. Human Factors, 23, 485-494.

Czaja, S. J., and Drury, C. G. (1981). Aging and pretraining in industrial inspection. Human Factors, 23, 485-494

Czaja, S. J., Drury, C. G. (1978). A regional evaluation of emergency medical technicians. Journal of Emergency Medical Services, 7, 77-83.

Czaja, S. J., (1975). Age difference in life satisfaction as a function of discrepancy between real and ideal self concepts. Journal of Experimental Aging Research, 1, 81-86.

18. Other works and publications

Articles Under Review

Czaja, S. J., Guerrier, J., Weber, R. and Clark, M.C. Patterns of daily living activities by the elderly. Applied Ergonomics.

Czaja, S. J., Weber, R. A. and Nair. A human factors analysis of ADL activities - a capability-demand approach. Journal of Gerontology.

Nair, S. and Czaja, S. J. An ergonomic analysis of grocery shopping problems encountered by older people. Applied Ergonomics.

Czaja, S. J., Drury, C. G., Hammond, K. Patterns of consumer product accidents among older persons. Journal of Experimental Aging Research.

Czaja, S. J., Drury, C. G., Hammond, K., and Brill, M. Aging and accidents with consumer products: The size and nature of the problem. Journal of Experimental Aging Research.

Papers

Czaja, S. J. (1987). Aging and work Performance. Proceedings, Invitaitonal Conference on Aging and Human Factors. National Research Council,(National Academy of Science). Committee on Human Factors, August.

Czaja, S. J., and Meadows, S. (1986). Age changes in functioning: Implications for human actions engineering. Preliminary paper prepared for the National Resarch Council (National Academy of Science), Human Factors Committee.

Czaja, S. J. (1986). Training and retraining for middle age and older workers. Proceedings, Invitational Conference on Aging and Vision. National Research Council (National Academy of Science), Committee on Vision, February.

Technical Reports

Drury, C. G. and Czaja, S. J. An ergonomic redesign of the window counters. Technical report prepared for the U.S. Postal Services (USPS), April 1989.

Helander, M. E., Czaja, S. J., Drury, C. G., Cary, J. and Burri, G. An ergonomic evaluation of office seating. Technical report prepared for International Business Machines (IBM), November, 1986.

Czaja, S. J., Cary, J. and Drury, C. G. A ergonomic evaluation of office facilities. Technical report prepared for National Institute of Occupational Safety and Health (NIOSH), June, 1986.

Czaja, S. J. Safety and security of the elderly: Implications for smart house design. Technical report prepared for the National Council on Aging, 1986.

Czaja, S. J., Hammond, K., Drury, C. Accidents and Aging: A Final Report. Prepared for Administration on Aging, Grant # 90ar0035.

Czaja, S. J., Ruiz, V. A survey analysis of clean room garments. Technical report prepared for IBM Corporation. September, 1984.

Czaja, S. J., Drury, C.G., and Shealy, J. Ergonomics in Manufacturing. Training manual prepared for IBM Corporation, September 1983.

Czaja, S. J. Hand anthropometrics. Technical paper prepared for the National Center for a Barrier Free Environment, Contract #300-82-0236, March, 1983.

Steinfeld, E., Czaja, S. J. "Human factors research with disabled children" People's Center for Housing Change. August 1980.

Czaja, S. J., Drury, C. G., "Knowledge retention by EMT's Part 1." Lakes Area Emergency Medical Services, Inc., RE-107-76.

Czaja, S. J., "EMT training effectiveness in Western New York." Lake Area Emergency Medical Services Inc., RE-107-76.

Czaja, S. J., "EMT evaluation study." Lakes Area Emergency Medical Services, Inc., RE-102-75.

19. None

PROFESSIONAL

20. Funded Research

Principal Investigator, S. Czaja, "Age Differences in Task Stress for Computer Interactive Tasks", (1/1/89 - 4/31/90). The primary objective of the research is to evaluate the stress associated with computer-interactive tasks. The tasks vary along the dimensions of cognitive complexity and pacing requirements. Funded by the National Institute on Aging (NIH).

Principal Investigator. S. Czaja, "Computer-aided Communication for the Elderly" (1/1/88 - 4/31/90. The objective of the research was to test the feasibility of home computers for older adults and to evaluate system design features which impact on performance as well as applications useful for this population. The work, which was funded by the Maskle Foundation, was done in collaboration with Bell Communications Research (Bell Core).

Principal Investigator. S. Czaja, "Task Based Assessment of Functional Ability in the Aged" (7/1/84 - 11/31/89). The objective of the research was to apply Human Factors Engineering task analytic techniques to identify the physiological demands of daily living activities and sources of performance difficulties for older adults. Funded by the National Institute on Aging (NIH).

Principal Investigator. S. Czaja, "Work Processing Training for Older Workers, Phase II" (11/1/86 - 4/31/89). The goal of the research was to identify difficulties older people encounter while learning text-editing and to develop training strategies to overcome these difficulties. Funded by the National Institute on Aging (NIH).

Principal Investigator. S. Czaja, "Accidents and Aging" (1/1/81 - 12/31/82). The project examined existing accident data and identified those activities, environments or products which are most hazardous to the elderly and developed hazard patterns based on Human Factors analyses to describe the cause of accidents. Funded by the Administration on Aging.

Co-Investigator. S. Czaja, "Productivity in the Office" (1981 - 1983). Longitudinal survey of 17,000 office workers at 60 installations nationwide to determine the relationship between the physical environment of the office and workers' environmental satisfaction, job satisfaction, and job performance. Funded by the National Science Foundation and public and private organizations.

21. Editorial Responsibilities

Editor, Human Factors, Special Issue: Human Factors and Aging (in press).

Editor, Office Technology and People, Special issue: Office Automation, 3, November, 1987.

Editorial Board, International Journal of Aging and Technology.

Editorial Board, Office Technology and People.

22. Professional and Honorary Organizations

President, Technical Group on Aging, Human Factors Society, 1989-1990

Member, Human Factors Society

Member, Ergonomics Society

Member, Institute of Industrial Engineers

Member, American Psychological Association (Divisions 20 and 21)

Member, Gerontological Society

Subcommittee on Accreditation, Professional Standards Committee, Human Factors Society, 1988.

Advisory Panel, National Institute on Aging, National Institute of Health, 1988.

Secretary/Treasurer Organizational Design and Management Technical Group, Human Factors Society, 1985 - 1987.

Technical Program Chair, Aging Program, Human Factors Society Annual Meeting, 1986.

Program Committee, 2nd Annual Meeting of the Organizational Design and Management Technical Group, Human Factors Society, 1985 - 1986.

Program Committee Behavioral and Social Science Section, Annual Meeting of the Gerontological Association, 1985.

President, Human Factors Society, Western New York Chapter, 1984

Workshop Co-Chair, Occupational Ergonomics
Conference, Toronto, Canada, 1984

Workshop Chair of the 1981 Annual meeting of the Human Factors Society.

23. Honors and Awards

Graduate Student Association Dissertation
Research Award, March 1979

"Varying Training Techniques Across Age Span for a Visual Inspection Task." Administration on Aging -- Dissertation Grant, 1978-1979.

"Age Differences in Life Satisfaction as a Function of Discrepancy between Real and Ideal Self Concepts." Research Foundation of State University of New York College at Buffalo -- Student competitive grant, 1974 - 1975.

24. None

25. Other Professional Activities

Co-Chair, National Research Council
(National Academy of Science), Committee on Aging and Human Factors

Conference Proceedings

Czaja, S. J., Joyce, T. B. and Hammond, K. (1989). A comparative study of text-editing programs among a sample of older adults. Proceedings of the Human Factors Society, 33rd Annual Meeting, 179-181.

Weber, R. A., Czaja, S. J. and Bishu, R. (1989). Activities of daily living of elders - a task analytic approach. Proceedings of the Human Factors Society, 33rd Annual Meeting, 182-186.

Czaja, S. J., (1985). The role of ergonomics in clean room design. Proceedings Ninth Congress of the International Ergonomics Association, Bournemouth England, September.

Aykin, N. and Czaja, S. J. (1985). Effects of stimulus complexity on double stimulation tasks. Proceedings of the Human Factors Society, 29th Annual Meeting, Baltimore Maryland, September, 81-85.

Gallwey, T. J., Czaja, S. J. (1981). An evaluation of the Harris Inspection Test. Proceedings of the 25th Annual Meeting of the Human Factors Society, 634-638.

Drury, C. G., Schiro, S. G., Czaja, S. J., Barnes, R.E. (1977). Human Reliability in emergency medical response. Proceedings of the 1977 Annual Reliability and Maintainability Symposium.

Czaja, S. J., Zajkowski, M. M. Drury, C. G. (1976). Knowledge and skill measures of emergency medical technicians. Proceedings of the 6th Annual Congress of the International Ergonomics Association.

TEACHING

26. None

27. Thesis and Dissertation Advising

Committees Chaired

The Effect of Stimulus Complexity on Double Stimulation Tasks, Aykin, Nuray, Ph.D., 1984.

An Assessment of Falls among the Elderly, Wolley, Sandra, Ph.D., 1989.

Use of an Error Questionaire to Evaluate Text Editing Performance, Swede, Helen M.S., 1984.

The Impact of Relative Humidity on the Visual Comfort of VDT Operators, Joyce, Janet M.S., May, 1989.

An Ergonomic Analysis of Grocery Shopping Among Older People, Nair, S., M.S. May, 1990

Committee Member

Ph.D.

Vishnu Bhatnager, completed 1987
Ram Bishu, completed 1986
Brian Kleiner, completed 1990
Joseph Deeb, completed 1988
Stephen Schwabish, in progress

M.S.

Valerie Gowan, completed 1988
Kathy McKernan, completed 1988

SERVICE

28. Graduate Admissions Committee, SUNY Buffalo

Advisor, Summer Fellowship Program, Center on Aging, University of Miami, 1990.

29. None

CURRICULUM VITAE

1. Date: **February 22, 1991**

PERSONAL

2. Name:	**Chi-Ming Ip**
3a. Home Phone:	**(305)386-5949**
3b. Office Phone:	**(305)284-6472**
4. Home Address:	**10062 SW 156 Court** **Miami, FL 33196**
5. Employment Status:	**Full time**
6. Current Academic Rank:	**Assistant Professor**
7. Primary Department:	**Industrial Engineering**
8. Citizenship:	**Hong Kong** **Permanent Resident of the U. S.**
9. Visa Type:	**None**

HIGHER EDUCATION

10. Institutional:

1986 Cornell University **Doctor of Philosophy**
Major: Operations Research
Minor: Computer Science

1983 Cornell University **Master of Science**
Major: Operations Research

1979 Roosevelt University **Bachelor of Science**
Major: Engineering Science/
Mathematical Sciences

11. Non-Institutional:

1988 University of Miami Quality Institute Lecture Series

1989 MODCOMP computer training

12. Certification, Licensure:

None

EXPERIENCE

13. Instructional:

1985 - 1988 **State University of New York**
Stony Brook, New York.
Assistant Professor in the Department of
Applied Mathematics and Statistics.

Courses taught:

Operations Research, Graph Theory,
Probability and Statistics.

1988 - 1989 **University of Miami**, Coral Gables, Florida.
Research Assistant Professor of Industrial Engineering.

Courses taught:

Operations Research, Simulation, Microcomputer
Applications

1989 - present **University of Miami**, Coral Gables, Florida.
Assistant Professor of Industrial Engineering.

Courses taught:

Operations Research, Simulation, Microcomputer
Applications

14. Professional:

None

15. Military:

None

PUBLICATIONS

16. Books, Contribution to Books and Monographs published:

None

17. Juried or Refereed Articles:

17a. Refereed Articles in Journals:

1. Ip, C., "On Least-change Factored Quasi-Newton Updates." Society of Industrial and Applied Mathematics Journal on Numerical Analysis 24, pp. 1126-1132, 1987.

2. Ip, C., and Todd, M. J., "Optimal Conditioning and Convergence in Rank-one Quasi-Newton Updates." Society of Industrial and Applied Mathematics Journal on Numerical Analysis 26, pp. 206-221, 1988.

3. Ip, C. and Kyparisis, J., "Local Convergence of Quasi-Newton Methods for B-differentiable Functions." Mathematical Progrogramming, to appear.

4. Kyparisis, J. and Ip, C., "Solution Stability of Implicit Complementarity Problems." Mathematical Programming, to appear.

5. Gupta, S.K., Kyparisis, J. and Ip, C., "Project Selection and Sequencing to Maximize Net Present Value of the Total Return." Management Science, to appear.

17b. Refereed Articles in Books:

None

17c. Articles Submitted to Refereed Journals:

1. Ip, C., "Monotonicity-Preserving Secant Methods for Minimization." Journal of Optimization Theory and Applications.

2. Ip, C. and Boubekri, N., "Optimizing Tool Selection for a Manufacturing/ Assembly Cell." Journal of Manufacturing Systems.

3. Kyparisis, J., Gupta, S.K. and Ip, C. "Selection and Sequencing of Projects with Multiple Constraints." Operations Research.

4. Hagstrom, T. and Ip, C. "On Angles Between Two Equidimensional Subspaces." Society of Industrial and Applied Mathematics Journal on Matrix Analysis and Applications.

18. Other Publications:

18a. Thesis and Dissertation:

1. Ip, C., "The Distorted Stationary Point Problem." Ph. D. Dissertation, Cornell University, Ithaca, New York, 1986.

18b. Grant Reports:

1. Aboudi, R. and Ip, C. "Transformer Failure Analysis." Phase I Report, Florida Power and Light Company, 1989.

18c. Articles in Conference Proceedings:

None

18d. Additional Publications:

1. Ip, C., "A new rank-two quasi-Newton update". Department of Applied Mathematics and Statistics Report, State University of New York, Stony Brook, New York, 1986.

2. Ip, C., "Hereditary monotonicity in Huang's class of updates". Department of Applied Mathematics and Statistics Report, State University of New York, Stony Brook, New York, 1988.

3. Ip, C., Kamel, M. S., and Asfour, S. S., "The use of parametric linear programming in the biomechanical model calculation of muscle contraction forces." Department of Industrial Engineering Report, University of Miami, Coral Gables, Florida, 1989.

19. Other Works Accepted for Publication:

None

20. Editorial Responsibilities:

- Refereed articles for the following journals:
  1. Mathematical Programming.
  2. Society of Industrial and Applied Mathematics Journal on Matrix Applications.
  4. Mathematics of Operations Research.
  3. International Journal of Production Research.
  4. Computers and Industrial Engineering.

21. Professional and Honorary Organizations:

21a. Memberships:

- American Statistical Association - Member
- Institute of Industrial Engineers - Member
- Operations Research Society of America - Member
- Mathematical Programming Society - Member
- Society of Computer Simulation - Member
- Society of Industrial and Applied Mathematics - Member

21b. Positions Held:

None

22. Honors and Awards:

None

23. Postdoctoral Fellowships:

None

24. Teaching Specialization:

- Operations research
- Simulation
- Computer applications
- Statistics

25. Research Performed:

1. "Transformer Failure Analysis." Funded by the University of Miami Quality Institute, 1989, **Co-Principal Investigator, $7,500**

2. "Allocating Buffer Storages in Different Production Systems." Funded by the University of Miami, 1989, **Principal Investigator, $6,000**

26. Thesis and Dissertation Advising:

26a. Master's Theses Supervised (Chairman):

1. Parthasarathy, V., Department of Industrial Engineering, University of Miami. In progress.

27. University Committee and Administrative Responsibilities:

College of Engineering Scholastic Standards and Advising Committee, 1989-present.

College of Engineering Scholarship Committee, 1990-present.

28. Community Activities:

- Shaolin Kung Fu Club: Faculty Adviser, 1988 - 1989.
- Hong Kong Students Association: Faculty Adviser, 1990 - present.

29. Other Professional Information:

29a. Technical Presentations:

1. "The Distorted Stationary Point Problem." Paper presented at the Operations Research Institute of America/Institute of Management Science National Meeting, San Francisco, California, May, 1984.

2. "Biorthogonalization of Matrices." Paper presented at the Society of Industrial and Applied Mathematics National Meeting, Boston, Massachusetts, July, 1985.

3. "Conditioning in Secant Updates for Nonlinear Equations." Paper presented at the Society of Industrial and Applied Mathematics National Meeting, Denver, Colorado, November, 1987.

TAREK M. KHALIL

Professor of Industrial Engineering
Professor of Biomedical Engineering
College of Engineering

and

Professor of Epidemiology and Public Health
Professor of Neurological Surgery
School of Medicine

UNIVERSITY OF MIAMI

Chairman, Department of Industrial Engineering
Director, Environmental Health and Safety Program
Director, Ergonomics and Bioengineering Division
Comprehensive Pain and Rehabilitation Center

Office Address:

Department of Industrial Engineering
College of Engineering
P.O. Box 248294
Coral Gables, Florida 33124
Telephone: (305) 284-2344

Home Address:

4225 San Amaro
Coral Gables, Florida 33134
Telephone: (305) 667-4044

(February 1991)

TABLE OF CONTENTS

	Section
Personal Record and Experience	A
Societies and Organizations	B
Awards, Honors, Citations and Biographical Manuals	C
Professional Activities	D
Publications	E
Presentations	F
Research and Develoment Accomplishments	G
Post Graduate Supervisory Role	H

PERSONAL RECORD

Date of Birth:	June 12, 1941
Martial Status:	Married (Wife: Abla Danish)
Children:	Two
Current Address:	4225 San Amaro Coral Gables, Florida 33134

EDUCATION

1969	Texas Tech University	Ph.D. Major: Industrial Engineering Minors: Psychology & Mathematics
1968	Texas Tech University	Master of Science in Industrial Engineering
1964	Cairo University	Bachelor in Mechanical Engineering (Production)

EXPERIENCE - INDUSTRIAL

1969-Present	Consultant to industrial, service and educational organizations
1964-1965	The general organization for industrialization, Cairo, Egypt, Engineer
1963	H. Saacke K.G., Berlin, West Germany, workshop and assembly (Summer)
1961	Friedrick Kocks G.M.B.H., Bremen, West Germany, workshop and assembly (Summer)
1960	Salzgitter Maschinen A.G., Salzgitter, West Germany, workshop and assembly (Summer)

ACADEMIC (Cont'd)

1976-1977 Associate Professor of Epidemiology and Public Health, School of Medicine

Courses at University of Miami:

School of Engineering: Principles of Industrial Engineering, Computer Programming, Production Systems, Methods Analysis, Man-Machine Systems, Applied Statistics, Industrial Safety Engineering, Occupational Biomechanics, Industrial Hygiene, Accident Prevention Systems, Advanced Concepts in Industrial Engineering

School of Medicine: Lectures on Occupational Health

1974-1977 University of Miami, Coral Gables, Florida, Associate Professor of Industrial Engineering Director, Occupational Safety and Health Programs

Director, Graduate Studies in Industrial Engineering

1972-1974 University of Florida, Department of Correspondence Study

Courses at University of Florida:

School of Engineering: Work design, facilities planning, human factors engineering, behavior systems engineering, man-machine systems design, special topics courses

School of Dentistry: Work efficiency in the dental operatory

1971-1974 University of Florida College of Dentistry

1969-1974 University of Florida, Gainesville, Florida, Visiting and Assistant Professor of Industrial and Systems Engineering and Director, Human Performance Engineering Laboratory

1966-1969 Texas Tech University, Lubbock, Texas, Teaching Assistant in Statistics, Work Measurement, Plant Layout and Design

1965-1966 Cairo University, Cairo, Egypt, Instructor in Production Engineering, Industrial Organization, Metrology, Machine Tool Design, Cost Accounting, Industrial Safety

AWARDS, HONORS, CITATIONS AND BIOGRAPHICAL MANUALS

1990 The Phil Carroll Award "For Outstanding Achievement in Work Measurement and Methods Engineering," presented by the Institute of Industrial Engineers, Work Measurement and Methods Engineering Division at the National Meeting in San Francisco, California, 1990

1989 Elected Chairman of the Institute of Industrial Engineers Council of Fellows

1988 The Institute of Industrial Engineers David F. Baker Distinguished Research Award "For Significant Contributions to the Advancement and Progress of the Profession through Outstanding Research," presented by the Institute of Industrial Engineers in Orlando, Florida, 1988

1987 The Human Factors Society Paul M. Fitts Award "For Exceptional Contributions to the Education and Training of Human Factors Specialists," presented by the Society at the Annual Meeting in New York City, New York, 1987

1987 The Dade County Citizens Safety Council Award "For Outstanding Safety Contribution - Individual Performance," presented in the Annual Award Banquet in Miami, Florida, 1987

1982 The Institute of Industrial Engineers "Fellow Award for Professional Leadership and Outstanding Contributions to Industrial Engineering," presented in New Orleans, Louisiana, May, 1982

1982 The Outstanding Industrial Engineer Award, presented by the Miami Chapter of the American Institute of Industrial Engineers

1979 The American Institute of Industrial Engineers Ergonomics Division Award; first award presented by the Institute in this field; special citation "For Significant Accomplishments in the Theory and Applications of Ergonomics," presented in San Francisco, California, May, 1979

1977 Award of Excellence presented to the Miami Chapter of the American Institute of Industrial Engineers - Tarek M. Khalil, President, presented in the Institute's National Meeting in St. Louis, Missouri, 1977

AWARDS, HONORS, CITATIONS AND BIOGRAPHICAL MANUALS (Cont'd)

1981-1982	Who's Who in Technology Today
1980-1981	Who's Who of Experts - (Forensic Directory)
1980	Who's Who in Engineering
1972-1973	Dictionary of International Biography, Volume IX
1972	Who's Who in the South and Southwest
	Who's Who in Florida
	The Two Thousand Men of Achievements
	Who's Who in Computer Education and Research
	Community Leaders of America
	International Who's Who in Community Service

PROFESSIONAL ACTIVITIES (Cont'd)

UNIVERSITY COMMITTEES (Cont'd)

Member, SEA Space and Facilities Committee

Member, University of Miami Joint Task Force on Energy, 1978-1979

University of Miami Representative to Discussions of NSF CAUSE Program, Atlanta, Georgia

Elected College of Engineering Representative to the Faculty Senate, 1984

ADMINISTRATIVE ACTIVITIES

Chairman	Department of Industrial Engineering, College of Engineering, University of Miami, 1984-Present
Director	Ergonomics and Bioengineering Division Comprehensive Pain and Rehabilitation Center, School of Medicine, University of Miami
Chairman	Graduate Faculty of the School of Engineering and Architecture, 1978-1980
Director	The University of Miami Interdisciplinary Program in Environmental Health and Safety, 1977-Present
Acting Chairman	Industrial Engineering Department, University of Miami, Summers of 1975, 1976, 1977, 1978, 1979, 1980, 1982, and 1983
Director Graduate Studies	Industrial Engineering Department, University of Miami
Coordinator	Project HOPE Biomedical Engineering Program/Egypt

PROFESSIONAL ACTIVITIES (Cont'd)

OFFICES AND ADVISORY ROLES (Cont'd)

Visiting Professor	Cairo University, Biomedical Engineering Department, Cairo, Egypt, December 1977, January 1978
Member Public Health Residence Advisory Committee	Palm Beach County Health Department, 1978-Present
Member International	Society for Applied Human Factors Research and Service,
Board of Advisors	Calcutta, India
Member Project HOPE Advisory Committee	Project Hope Advisory Committee on Biomedical Engineering
Consultant to World Health Organization	Consultation with World Health Organization, Eastern Mediterranean Region on Problems of Technology in Health Care
Director of Research	Miami Productivity Center
Member	Productivity Research Group, Department of Industrial Engineering, University of Miami
Environmental Information Source	United States International Environmental Referral Center, U.S. Environmental Protection Agency
Program Chairman	AIIE Region IV Conference, Miami Beach, Florida, 1976
Honors and Awards Chairman	Work Measurement Division, Institute of Industrial Engineers, 1982-1985
Panelist	National Research Council (NRC) review panel for predoctoral and postdoctoral fellowships and associateship awards
Member Board of Directors	Goodwill Industries of South Florida, Inc., 1984-1989

PROFESSIONAL ACTIVITIES (Cont'd)

ROLE IN PROFESSIONAL MEETINGS (Cont'd)

Session Co-Chairman	The International Symposium-Workshop on Energy Sources, Miami Beach, Florida, December, 1977
Lecture-Session Chairman	The International Symposium-Workshop on Solar Energy, Cairo, Egypt
Invited Participant	Discussions of NSF Workshop on Biomechanics, Gainesville, Florida
Contributor	Computer Aided Plant Layout Institute, University of Wisconsin Extension, Milwaukee
Session Chairman	Session on Productivity Improvement, AIIE-Fall Conference Meeting, Atlanta, Georgia, December, 1978
Moderator	Session on Health and Population 4th International Conference in Egypt, Year 2000, Cairo, December, 1980
Session Chairman	Bioengineering Sessions, First National Meeting on Biophysics and Bioengineering, Cairo, Egypt, 1980
Coordinator and Moderator	Project HOPE, Comprehensive Strategy Meeting on Biomedical Engineering, Cairo, Egypt, 1980
Coordinator and Moderator	Project HOPE, Second Comprehensive Strategy Meeting on Biomedical Engineering, Cairo, Egypt, 1982
Moderator	Session on Productivity Improvement Production and Inventory Control Division, IIE National Meeting, New Orleans, Louisiana, May, 1982
Moderator	Session on "Requisite Foundation for Technology Utilization," Conference on Appropriate Technology in Health Care, Project HOPE, Millwood, Virginia, 1982
Moderator	Project HOPE, Third Comprehensive Strategy Meeting on Biomedical Engineering, Cairo, Egypt, 1983

PROFESSIONAL ACTIVITIES (Cont'd)

ROLE IN PROFESSIONAL MEETINGS (Cont'd)

Moderator	Project Hope Fifth Strategy Meeting on Biomedical Engineering Education and Service in Egypt, Cairo, Egypt, July, 1986
Conference Committee Member	International Conference on Productivity Research, Miami, Florida, February, 1987
Conference Organizing Committee	International Conference on Industrial Ergonomics and Safety, Miami, Florida, June, 1987
Conference Chairman	First International Conference on "Technology Management," Miami, Florida, February, 1988
Conference Committee Member	Second International Conference on Productivity Research, Miami, Florida, February, 1989
Conference Chairman	Second International Conference on Management of Technology, Miami, Florida, February, 1990
Session Moderator	Joint Labor/Management Programs, International Industrial Engineering Conference, Toronto, May, 1989
Meeting Chair	American Society of Biomechanics 14th Annual Meeting, Miami, Florida, November, 1990
Member	Scientific Committee, International Conference on Computer, Man and Organization II, Nivelle, Belgium, 1990
Session Chairman	Second International Conference on Productivity Research, Miami, Florida, February, 1991
Member	International Advisory Committee, Sixth International Conference of the Operations Management Association, Aston, England, June, 1991

PUBLICATIONS

1. Khalil, T.M. A Biomechanical Investigation in the Possibility of Relating Static and Dynamic Work by Means of a Common Parameter. Masters Thesis, Texas Tech University, 1968.

2. Khalil, T.M. Effect of Heat Stress on Human Performance. Technical Report (prepared during work under THEMIS Project), Texas Tech University, 1969.

3. Khalil, T.M. Vibration, Shock and Man. Technical Report (prepared during work under THEMIS Project), Texas Tech University, 1969.

4. Khalil, T.M. Performance and Recovery Under Prolonged Vibration. Ph.D. Dissertation, Texas Tech University, 1969.

5. Khalil, T.M. "The Biomechanical Approach to Measuring Human Work." Proceedings of the Institute of Management Science, Winter Symposium, Gainesville, Florida, February, 1970.

6. Khalil, T.M., and M.M. Ayoub. "On Prolonged Vibration and the Work/Rest Schedule." Technical Papers of the National Meeting of the Human Factors Society, San Francisco, California, October, 1970.

7. Proctor, C.L., and T.M. Khalil. "Prediction of Human Performance in a Man-Machine System Within a Stochastic Environment." Technical Papers of the National Meeting of the Human Factors Society, San Francisco, California, October, 1970.

8. Proctor, C.L., T.M. Khalil, and C. Stueve. "A Quantitative Approach to Performance Evaluation of Man Machine Systems Having a Stochastic Environment." International Journal of Man-Machine Studies, 3(2), April, 1971, pp. 127-140.

9. Khalil, T.M., and B.H. Bell. "Human Factors in Dental Health Care Delivery Systems." Technical Papers of the National Meeting of the Human Factors Society, New York, New York, 1971.

10. Khalil, T.M. "Student Projects Point Up Versatility of the IE." Industrial Engineering, April, 1971, pp. 40-42.

PUBLICATIONS (Cont'd)

22. Khalil, T.M. "Facilities Relative Allocation Technique 'FRAT'." International Journal of Production Research, Volume II, Number 2, April, 1973, pp. 183-194.

23. Khalil, T.M., and M.M. Ayoub. "Work Scheduling Under Prolonged Vibration." Abstracts of the AIHA Conference, Boston, Massachusetts, May, 1973.

24. Khalil, T.M. "An Electromyographic Methodology for the Evaluation of Industrial Design." Human Factors, Volume 15, Number 3, pp. 257-264, June, 1973.

25. Khalil, T.M. "Dentistry - A Growing Domain for Ergonomics." (invited paper to the 5th Congress of the International Ergonomics Association, Amsterdam), Abstract in Ergonomics, Volume 16, Number 3, 1973, full paper published in Ergonomics, Volume 17, Number 1, pp. 75-86, 1974.

26. Khalil, T.M., and P.E. Valisalo. "Hybrid Computer Solutions of Queueing Systems." Annales de L'Association Internationale pour le Calcul Analgique, Volume XV, Number 2, 1973, pp.49-53.

27. Khalil, T.M., and P.E. Valisalo. "Hybrid Computer Approach for Solving Stochastic Man-Machine Systems." Proceedings of the 7th AICA Congress, Czechoslavakia, 1973.

28. Khalil, T.M. "Ergonomics: The New Entity in Dental Education and Research." Journal of Dental Education, August, 1973.

29. Khalil, T.M., and V. Lovitsky. "A Process of Concept Formation." Proceedings of the 17th Annual Meeting of the Human Factors Society, Washington, D.C., October, 1973, pp. 509-512.

30. Khalil, T.M., and J.E. Otero. "On the Quantification of Electromyography.", Proceedings of the 17th Annual Meeting of the Human Factors Society, Washington, D.C., October, 1973, pp. 1-4.

31. Gentzler, G., and T.M. Khalil. "On Depth Perception and Manual Control." Proceedings of the 1973 IEEE Conference on Systems, Man and Cybernetics, Boston, Massachusetts, November, 1973.

PUBLICATIONS (Cont'd)

43. Khalil, T.M., and J.E. Otero. "Processed Muscular Activity During Static and Dynamic Loading." Journal of Human Ergology, Volume 3, Number 1, 1974, pp. 75-83.

44. Bell, B.H., and T.M. Khalil. "Human Factors in Dental Care." Chapter 2 in Pickett, R. and Triggs, T. (Eds.), Human Factors in Health Care, D.C. Heath and Co., Lexington, Massachusetts, 1975.

45. Martinez, A.G., T.M. Khalil, and W.D. Boykin. "Electromyographic Models of Mechanical Torque." Abstracts of the 5th International Congress of Biomechanics, Jyvaskyla, Finland, 1975.

46. Khalil, T.M., and B.H. Bell. "Ergonomische Utersuchungen-uber Form and Gebrauch von Handinstrumenten." Die Quintessenz, July, 1975.

47. Khalil, T.M., and M.M. Ayoub. "Work-Rest Scheduling Under Normal and Prolonged Vibration Environments." American Industrial Hygiene Association Journal, March, 1976, pp. 233-239.

48. Khalil, T.M., and M.A. Ayoub. "Applied Ergonomics." Industrial Engineering, (series on Occupational Safety and Health) April, 1976, pp. 26-31.

49. Khalil T.M., and A.G. Martinez. "Signal Processing of Short Duration Muscular Activity." Abstracts of the AIHA Conference, Atlanta, Georgia, May, 1976.

50. Khalil, T.M., A.G. Martinez, and W.D. Boykin. "Electromyographic Models of Mechanical Torque." In Paavo V. Komi (Ed.) Biomechanics V, University Park Press, Baltimore, Maryland, 1976.

51. Khalil, T.M. "The Role of Ergonomics in Increasing Productivity." Proceedings of the AIIE National Conference, St. Louis, Missouri, May, 1976.

52. Khalil, T.M. "Biotechnology for Developing Countries." Summaries of the Second Conference About Egypt Between Now and the Year 2000: The Development of Egypt's Human and Natural Resources, S. Galel, Ed., Al-Ahram Press, Cairo, 1976.

53. Khalil, T.M. (Review) "Testing Industrial Skills." A. Jones and P. Whittaker. Halstead Press Publications, John Wiley & Sons, New York, 1975, Industrial Engineering, 1976.

PUBLICATIONS (Cont'd)

64. Khalil, T.M. "Hybrid Computers in Bioengineering Research." Proceedings of the 1st National Meeting on Biophysics and Bioengineering, Cairo, Egypt, December, 1980.

65. Khalil, T.M. "Modern Health Care Delivery Systems for Developing Countries." Proceedings of the 4th International Conference: Egypt: The Year 2000, Cairo, 1980.

66. Khalil, T.M. A Comprehensive Plan for Biomedical Engineering Education and Service for Egypt. Project HOPE, Cairo, March, 1981.

67. Saada, M.J., T.M. Khalil, and A. Gaber. "A Plan for Biomedical Engineering Service in Egypt." The Egyptian Society of Biomedical Engineering, 1981.

68. Edosomwan, J., and T.M. Khalil. "Accident Prevention in Slip and Falls: A Comprehensive Approach." Professional Safety, June, 1981, pp. 30-35.

69. Khalil, T.M. "A Signal Processing Methodology for Gross Muscular Activity." Egyptian Journal of Biomedical Engineering, Volume 2, Number 1, 1981, pp. 39-50.

70. Khalil, T.M. "A Comparative Analysis of Energy Resources." The International Journal of Production Research." Volume 19, Number 4, 1981, pp. 401-409.

71. Khalil, Tarek M. (Review) Systems Engineering Models of Human-Machine Interaction, by William B. Rouse, North Holland, New York, 1980, Interfaces, 1981.

72. Greco, E.C., T.M. Khalil, and S.M. Abdel-Moty. "Vibrational Induced Synchronization in Myoelectric Activity." Proceedings of the 35th ACEMB Meeting, Philadelphia, Pennsylvania, 1982.

73. Khalil, Tarek M. "A Year of Progress." Second Comprehensive Strategy Meeting on Biomedical Engineering, Project HOPE, Cairo, Egypt, January, 1982.

74. Greco, E.C., and T.M. Khalil. Vibration Effects on Muscular Performance. Ft. Rucker, Alabama: U.S. Army Aeromedical Research Laboratory, 1982.

75. Khalil, T.M. "Occupational Biomechanics." Current Advances in Mechanical Design and Production: Second Cairo University MDP Conference (A.M. Eleich, Ed.), December 27-29, 1982, Department of Mechanical Engineering and Production, Faculty of Engineering, Cairo University, 1982, pp. 955-973.

PUBLICATIONS (Cont'd)

86. Khalil, T.M., S.S. Asfour, and E.A. Moty. "Case Studies in Low Back Pain." Proceedings of the Human Factors Society 28th Annual Meeting, Volume 1, 1984, pp. 465-470.

87. Rosomoff, H.L., T.M. Khalil, R. Steele, and S.S. Asfour. "The Facts and Myths of the Low Back Pain Problem." Program of the AIHA Annual Conference, Detroit, Michigan, May, 1984.

88. Genaidy, A.M., T.M. Khalil, S.S. Asfour, and S.M. Waly. "The Maximum Efficiency of the Human Machine During Lifting." Proceedings of the Human Factors Society 28th Annual Meeting, Volume 2, 1984, pp. 591-594.

89. Khalil, T.M., et al. "A Comparative Study of Static and Dynamic Lifting Tasks." Proceedings of the Human Factors Society 28th Annual Meeting, Volume 2, 1984, pp. 595-599.

90. Asfour, S.S., A.M. Genaidy, T.M. Khalil, and E.C. Greco. "Physiological and Psychophysical Determination of Lifting Capacity for Low Frequency Lifting Tasks." Trends in Ergonomics/Human Factors I, Mital, A. (Ed.), Elsevier Science Publishers B.V., North Holland, Amsterdam, 1984. pp. 149-153.

    Ibid. Proceedings of the 1st Mid-Central Ergonomics/Human Factors Conference, Cincinnati, Ohio, 1984.

91. Moty, E.A., and T.M. Khalil. "The Application of Information Theory In Electromyographic Processing." Proceedings of the 37th Annual Conference on Engineering in Medicine and Biology, Los Angeles, California, 1984.

92. Khalil, T.M., S.M. Waly, and M.F. Taher. "Quantitative Evaluation of Muscular Abilities." Proceedings of the 37th Annual Conference on Engineering in Medicine and Biology, Los Angeles, California, 1984.

93. Beruvides, M.G., and T.M. Khalil. "VDT Ergonomics: A Survey and Guideline Integrating People and Technology." Proceedings of the Fall Industrial Engineering Conference, 1984., pp. 357-364.

94. Khalil, T.M., E.A. Moty, and S.M. Waly. "Computerized Signal Processings in the Assessment of Muscular Fatigue." Computers and Industrial Engineering, Volume 9, Supplement 1, Pergamon Press, 1985, pp. 99-102.

PUBLICATIONS (Cont'd)

104. Asfour, S.S., A.M. Genaidy, and T.M. Khalil. "The Relationship Between Frequency of Lift and Lifting Capacity." Ergonomics International '85, (Edited by Brown, I.O., Goldsmith, R., Coombes, K., and Sinclair, M.A.), Taylor and Francis, London, 1985, pp. 865-867.

105. Genaidy, A.M., S.S. Asfour, and T.M. Khalil. "Modeling of the Human Kinetics During Repetitive Lifting." Ergonomics International '85, (Edited by Brown, I.O., Goldsmith, R., Coombes, K., and Sinclair, M.A.) Taylor and Francis, London, 1985, pp. 868-870.

106. Genaidy, A.M., S.S. Asfour, and T.M. Khalil. "A Data Base of the Mechanical Efficiency of the Human Machine during Lifting and Lowering Tasks." Ergonomics International '85, (Edited by Brown, I.O., Goldsmith, R., Coombes, K., and Sinclair, M.A.), Taylor and Francis, London, 1985, pp. 214-216.

107. Khalil, T.M., et al. "Ergonomics Contributions to the Rehabilitation of the Low Back Pain." Ergonomics International '85, (Edited by Brown, I.O., Goldsmith, R., Coombes, K., and Sinclair, M.A.), Taylor and Francis, London, 1985, pp. 466-468.

108. Waly, S.M., and T.M. Khalil. "Computerized EMG in Clinical Settings." Proceedings of the American Society of Biomechanics Conference, Ann Arbor, Michigan, October, 1985.

109. Khalil, T.M., et al. "Effect of a Low Back Pain Rehabilation Program on Muscle Functional Abilities." Proceedings of the American Society of Biomechanics Conference, Ann Arbor, Michigan, October, 1985.

110. Khalil, T.M., et al. "The Contributions of Ergonomics to Pain Programs." Abstracts of the American Pain Society, Fifth General Meeting, Dallas, Texas, October, 1985, pp. 69.

111. Waly, S.M., E.P. Asfour, T.M. Khalil, and S.S. Asfour. "Human Considerations in Systems Design." Proceedings of the 3rd Conference on Mechanical Design and Production, Cairo, Egypt, December, 1985, pp. 603-606.

112. Asfour, S.S., A.M. Genaidy, T.M. Khalil, and E.P. Asfour. "Design of Manual Materials Handling Tasks." Proceedings of the 3rd Conference on Mechanical Design and Production, Cairo, Egypt, December, 1985, pp. 617-622.

PUBLICATIONS (Cont'd)

122. Khalil, T.M. "New Era, The Road to Maturity." Proceedings of the 5th Comprehensive Strategy Meeting on Biomedical Engineering Education and Service in Egypt, Project Hope, Millwood, Virginia, 1986.

123. Asfour, S.S., T.M. Khalil, A.M. Genaidy, and S.M. Waly. (Evaluation of Lifting Capacity Determination Methodologies: A Fuzzy Set Approach." Karwowski, W. Mital, A. (Eds.) Applications of Fuzzy Set Theory in Human Factors, Elsevier Science Publishers, Amsterdam, 1986.

124. Khalil, T.M., S.S. Asfour, and H.L. Rosomoff. "The Contributions of Ergonomics to the Rehabilitation of Low Back Pain Patients." Proceedings of the 3rd Colloquium on Ergonomics and the Handicapped, LADAPT, Paris, France, December, 1986.

125. Asfour, S.S., T.M. Khalil, A.M. Genaidy, and S.M. Waly. "Evaluation of Lifting Capacity Determination Methodologies: A Fuzzy Set Approach." W. Karwowski and A. Mital (Eds.), Applications of Fuzzy Set Theory in Human Factors, Elsevier Science Publishers, Amsterdam, 1986.

126. Waly, S.M., and T.M. Khalil. "Computerized EMG in Clinical Settings." Journal of Biomechanics, Volume 19, Number 6, 1986 (Abstract Only).

127. Khalil, T.M., et al. "Effects of Low Back Pain Rehabilitation Program on Muscle Functional Abilities." Journal of Biomechanics, Volume 19, Number 6, 1986 (Abstract Only).

128. Asfour, S.S., A.M. Genaidy, and T.M. Khalil. "An On-Line Microcomputer-Based Metabolic Monitoring System." International Journal of Industrial Ergonomics, Volume 1, Number 3, 1987, pp. 169-177.

129. Khalil, Tarek M., et al. "Acceptable Maximal Effort (AME): A Psychophysical Measure of Strength in Back Pain Patients." Spine, 1987, pp. 372-376.

130. Khalil, T.M., et al. "Effects of Feedback Information on Isometric Training." Jonsson B. (Ed.), Biomechanics X-A, Human Kinetics Publishers, Champaign, Illinois, 1987, pp. 491-494.

PUBLICATIONS (Cont'd)

140. Khalil, T.M., et al. "Effects of Muscle Stretching on Low Back Pain." A Poster - International Society for the Study of the Lumber Spine, Rome, Italy, 1987.

141. Khalil, T.M., S.M. Waly, A.M. Genaidy, and S.S. Asfour. "Determination of Lifting Abilities: A Comparative Study of Four Techniques." American Industrial Hygiene Journal, 48(12), 1987, pp. 951-956.

142. Khalil, T.M. "Ergonomics Contributions to Rehabilitation." Innovative and Controversial Strategies in Rehabilitation: Technology and Practice, Miami, 1987.

143. Khalil, T., et al. "Utility of EMG Biofeedback in the Treatment of Conversion Paralysis Associated with Chronic Pain." Pain, Supplement 4, 1987 (Poster 108 Fifth World Congress on Pain, Hamburg, Fr.G.).

144. Rosomoff, H.L., Tarek Khalil, and Renee Steele-Rosomoff. "Evolution to Revolution in the Treatment of Low Back Disorders." Abstracts of Fifth World Congress on Pain, Hamburg, Germany, August 1987.

145. Khalil, T.M., et al. "The Use of Functional Electrical Stimulation in the Reversal of Conversion Disorder Paralysis Type." Archives of Physical Medicine and Rehabilitation, 69:7, 1988, pp. 545-547.

146. Khalil, T.M., B.A. Bayraktar, and J.A. Edosomwan (Eds.), Technology Management, Inderscience Enterprises Ltd., Geneva, Switzerland, 1988, pp. 863.

147. Omachonu, V.K., and T.M. Khalil. "Conceptual and Policy Framework for the Management of Technology in Developing Economies." Khalil, T.M., Bayraktar, B., and Edosomwan, J.A. (Eds.), Technology Management, Inderscience Enterprises Ltd., Geneva, Switzerland, 1988, pp. 59-65.

148. Khalil, T.M., and S.M. Waly. "Planning for Health Care Technology Transfer." Khalil, T.M., Bayraktar, B., and Edosomwan, J.A. (Eds.), Technology Management, Inderscience Enterprises Ltd., Geneva, Switzerland, 1988, pp. 424-431.

149. Newberry, E., M.A. Carillo, and T.M. Khalil. "Cost Models for Evaluating Industrial Investments." Khalil, T.M., Bayraktar, B., and Edosomwan, J.A. (Eds.), Technology Management, Inderscience Enterprises Ltd., Geneva, Switzerland, 1988, pp. 710-718.

PUBLICATIONS (Cont'd)

159. Khalil, T.M., et al. "Quantitative Assessment of Outcome of a Low Back Pain Rehabilitation Program." Abstracts of the International Society for the Study of the Lumbar Spine, Miami, Florida, April, 1988.

160. Khalil, T.M., S.S. Asfour, and S.M. Waly. "Electromyographic Methodologies in Rehabilitation." Ergonomics in Rehabilitation, A. Mital and W. Karwowski (Eds.), Taylor and Francis, London, England, 1988, pp. 171-181.

161. Fishbain, D., M. Goldberg, T.M. Khalil, B. Meagher, R. Rosomoff, and H.L. Rosomoff. "The Utility of EMG Biofeedback in the Treatment of Conversion Paralysis." American Journal of Psychiatry, December, 1988, pp. 1572-1575.

162. Khalil, T.M., et al. "Ergonomics Contribution to Low Back Pain Rehabilitation." Pain Management, 1988, pp. 225-230.

163. Genaidy, Ashraf M., Shihab S. Asfour, and Tarek Khalil. "Preliminary Physiological Guidelines for Continuous Lifting Tasks." Proceedings of the Human Factors Society Conference, Anaheim, California, 1988.

164. Waly, S.M., S.S. Asfour, T.M. Khalil, R.S. Rosomoff, and H.L. Rosomoff. "A Multidisciplinary Approach for the Treatment of Back Pain." Miami Engineer, 6:1, Spring, 1988.

165. Genaidy, A.M., K.M. Bafna, T.M. Khalil, S.S. Asfour, and K. Zandin. "Ergonomic Considerations of Predetermined Motion Time Systems." Proceedings of the Annual International Industrial Engineering Conference, Orlando, 1988.

166. Boubekri, Nourredine, Tarek M. Khalil, and Mansur Kabuka. "Human-Machine Interface in Remote Monitoring and Control of Flexible Manufacturing Systems." Karwowski, W. (Ed.), Elsevier Science Publisher, 1988, pp. 311-318.

167. Abdel-Moty, Elsayed, Tarek Khalil, Shihab Asfour, Renee Rosomoff, and Hubert Rosomoff. "Correlation of the Ergonomics AME: A Method of Defining Patients Progress in a Low Back Pain Rehabilitation Program." Proceedings of the Annual Conference of the Human Factors Association of Canada, Edmonton, Alberta, September, 1988, pp. 65-67.

PUBLICATIONS (Cont'd)

177. Fishbain, D., M. Goldberg, T. Khalil, S. Asfour, E. Abdel-Moty, R. Santana, R. Steele-Rosomoff, and H. Rosomoff. "Utility of EMG Biofeedback in the Treatment of Conversion Paralysis in Chronic Pain Patients." Abstracts Canadian and American Pain Societies Joint Meeting, Toronto, Canada, November 10-13, 1988.

178. Abdel-Moty, E., T.M. Khalil, S.S. Asfour, M. Howard, R.S. Rosomoff, and H. Rosomoff. "Effects of Low Back Pain on Psychomotor Skills." Mital, A. (Ed.), Advances in Industrial Ergonomics and Safety, 1989, pp. 465-471.

179. Abdel-Moty, E., and T.M. Khalil. "Computer-Aided Design and Analysis of the Sitting Work Place for the Disabled." Mital, A. (Ed.), Advances in Industrial Ergonomics and Safety, 1989, pp. 863-870.

180. Abdel-Moty, E., D. Fishbain, M. Goldberg, T. Khalil, and R. Rosomoff. "Functional Electrical Stimulation (FES) Treatment of Residual Radiculopathy-Muscle Weakness (RR-MW) in Chronic Pain Patients (CPP)." American Pain Society: Abstracts, Eighth Annual Scientific Meeting, October 26-29, 1989, Phoenix, Arizona.

181. Goldberg, M., D. Fishbain, M. Coya-Orozo, S. Asfour, T. Khalil, and R. Rosomoff. "Electromyographic (EMG) Biofeedback and Body Mechanics Instruction for chronic Pain Patients: A Controlled Study." American Pain Society: Abstracts, Eighth Annual Scientific Meeting, October 26-29, 1989, Phoenix, Arizona.

182. Asfour, S., T.M. Khalil, S.M. Waly, M. Goldberg, R. Rosomoff, and H. Rosomoff. "Biofeedback in Back Muscle Strengthening." Spine, Volume 15, Number 6, 1990, pp. 510-513.

183. Beruvides, M.G., and T.M. Khalil. "Intrafirm Technology Transfer: A Model and Case Study." Khalil, T.M. and Bayraktar, B. (Eds.), Management of Technology 2, Industrial Engineering and Management Press, Atlanta, Georgia, 1990, pp. 195-205.

184. Khalil, T.M., and B.A. Bayraktar. "Challenges and Opportunities for Research in the Management of Technology." Khalil, T.M. and Bayraktar, B. (Eds.), Management of Technology 2, Industrial Engineering and Management Press, Atlanta, Georgia, 1990, pp. 255-268.

PUBLICATIONS (Cont'd)

195. Khalil, T.M., and B. Bayraktar (Eds.). Management of Technology II, Industrial Engineering and Management Press, February, 1990, pp. 1337.

196. Abdel-Moty, E., D. Fishbain, M. Goldberg, T. Khalil, R. Rosomoff, and H. Rosomoff. "Functional Electrical Stimulation (FES) Treatment of Residual Radioculopathy - Muscle Weakness in Chronic Pain Patients." Abstracts of the World Congress on Pain, Adelaide, Australia, April 1-6, 1990.

197. Goldberg, M., M. Jorge, E. Abdel-Moty, T. Khalil, D. Fishbain, R. Rosomoff, and H. Rosomoff. "Magnesium Levels in Chronic Pain Patients." Abstracts of the World Congress on Pain, Adelaide, Australia, April 1-6, 1990.

198. Abdel-Moty, E., T. Khalil, M. Goldberg, S. Asfour, E. Eckstein, and H. Rosomoff. "Functional Electric Stimulation (FES) Versus Regular Isometric Exercises in the Rehabilitation of Chronic Low Back Pain Patients (CLBPP) with Quadriceps Muscular Weakness." Abstracts of the Annual Meeting of the International Society for the Study of the Lumbar Spine, Boston, Massachusetts, June 13-17, 1990, pp. 43.

199. Khalil, T., et al. "The Relationship Between Self-Report of Pain Level (SRPL) and Psychophysical Static Lifting Abilities in Chronic Low Back Pain (CLBP) Patients." Abstracts of the Annual Meeting of the International Society for the Study of the Lumbar Spine, Boston, Massachusetts, June 13-17, 1990, pp. 16.

200. Genaidy, A.M., T.M. Khalil, S.S. Asfour, and R.C. Duncan. "Human Physiological Capabilities for Prolonged Manual Lifting Tasks." IIE Transactions, Volume 22, Number 3, September, 1990, pp. 270-280.

201. DeVito, C., T. Khalil, M. Goldberg, E. Moty, and S. Hilsenbeck. "Identifying Elderly at High Risk of Fall Related Injuries." Abstract of the American Public Health Association 118th Annual Meeting, New York, New York, September 30-October 4, 1990.

202. Diaz, E., S. Asfour, T. Khalil, and E. Abdel-Moty. "Integrating Human Factors/Ergonomics Principles in Facilitating the Design or Analysis of Consumer Products: A Computerized Knowledge-Base System." Proceedings of the 34th Annual Human Factors Meeting, Orlando, Florida, October 8-12, 1990.

PUBLICATIONS (Cont'd)

211. Abdel-Moty, E., T.M. Khalil, D. Fishbain, R.S. Rosomoff, and H. Rosomoff. "Functional Capacity Assessment of Low Back Pain Patients." Advances in Industrial Ergonomics and Safety III, Karwowski, W., and J.W. Yates (Eds.), Taylor and Francis, Ltd., 1991.

212. Khalil, T., et al. "Age and Responsiveness to Low Back Pain Rehabilitation." Abstracts of the International Society for the Study of the Lumbar Spine Annual Meeting, Heidelberg, Germany, May 13-16, 1991.

213. Field, E., E. Abdel-Moty, T. Khalil, and S. Asfour. "Postural Proprioception in Healthy and Back Injured Adults." Abstracts of the APTA Annual Conference, Boston, Massachusetts, June 23-27, 1991.

214. Abdel-Moty, E., T. Khalil, E. Diaz, S. Sadek, R.S. Rosomoff, and H.L. Rosomoff. "Ergonomic Job Analysis for Patients with Chronic Low Back Pain During Rehabilitation." Proceedings of the 11th Congress International Ergonomics Association, Paris, France, July 15-20, 1991.

215. Diaz, E., T. Khalil, S. Asfour, and E. Abdel-Moty. "Integration of Ergonomics and Product Design: A Computerized Database System." Proceedings of the 11th Congress International Ergonomics Association, Paris, France, July 15-20, 1991.

PRESENTATIONS (Cont'd)

1972 Washington, D.C.
"Hybrid Computer Simulation of a Man-Machine System," International Conference on Cybernetics and Society, IEEE Systems, Man and Cybernetics and American Cybernetics Society, October, 1972

Beverly Hills, California
"Effectiveness Indices for Dental Operatory Delivery Systems," The Sixteenth Annual Meeting of the Human Factors Society, October, 1972

New Orleans, Louisiana
"Hybrid Computer Solution of Queuing Systems," 42nd International Meeting, ORSA, February, 1972

Gainesville, Florida
"Biodental Engineering," Engineering and Industries Experiment Station Research Review, March, 1972

Anaheim, California
"Ergonomics in Dentistry," National Conference of the American Institute of Industrial Engineers, May 1972

1973 Jacksonville, Florida
"Human Factors Engineering," AIIE Northeastern Florida Annual Conference, March, 1973

Boston, Massachusetts
"Work Scheduling Under Prolonged Vibration," Annual Meeting of the American Industrial Hygiene Association, May, 1973

Amsterdam, The Netherlands
"Ergonomics: A Growing Domain for Dentistry," Invited paper to the 5th Congress of the International Ergonomics Association, June, 1973

"Use of Ergonomics in Designing Dental Facilities," The Free University of Amsterdam, June, 1973

PRESENTATIONS (Cont'd)

1975 Cont'd — Coral Gables, Florida

"Industrial Engineering in Dental Health Care Delivery," Joint Management Science--Industrial Engineering Colloquium, University of Miami, November, 1975

1976 — Orlando, Florida

"Ergonomics, Physical Stresses in the Work Environment," Florida Section of the American Industrial Hygiene Association Meeting, March, 1976

Miami, Florida

"Processing of Muscular Signals," Veterans Administration Hospital, University of Miami Biomedical Engineering Colloquium, April, 1976

"An Ergonomics Approach to OSHA," Miami Chapter of AIIE, April, 1976

St. Louis, Missouri

"The Role of Ergonomics in Increasing Productivity," National Conference of the American Institute of Industrial Engineers, May, 1976

"The Nature and Application of Human Factors in Industrial Engineering," University of Florida, July, 1976

Miami, Florida

"OSHA and the Business Man," Miami Rotary Club, July, 1976

Cairo, Egypt

"Biotechnology for Developing Countries," International Conference on Development of Egypt's Natural and Human Resources, December 1976

"The Systems Approach in Biomedical Engineering," Cairo, Cairo University, December, 1976

1977 — Cairo, Egypt

"Biotechnology and Industrial Engineering," Al-Azhar University, January, 1977

"Biomechanics and Applications," Cairo Rehabilitation Engineering Center, January, 1977

PRESENTATIONS (Cont'd)

1978 Cont'd

Raleigh, North Carolina

"Orientations and Careers in Biomedical Engineering," A Lecture to Undergraduate Students, Biomedical Engineering Department, Cairo University, January, 1978

"Product Liability," Graduate Seminar, Industrial Engineering Department, North Carolina State University, March, 1978

"Application of Ergonomics in the Design of Dental Operatory Delivery System," Lecture, Industrial Engineering Department, North Carolina State University, March, 1978

Los Angeles, California

"Principles and Applications of Ergonomics," A 5-hour Refresher Course, National Meeting of the American Industrial Hygiene Association, May, 1977 (with M.A. Ayoub)

Cairo, Egypt

"The Economics and Policy of Alternative Energy Sources - A Review," Invited Lecturer, International Symposium-Workshop on Solar Energy, June, 1978

"Solar Energy Planning for Developing Countries," Invited Lecturer, International Symposium-Workshop on Solar Energy, June, 1978

"Manual Lifting and Optional Performance," National Conference of the AIHA, 1978

1979

Chicago,Illinois

"Introduction to Occupation Safety," A Three Hour Refresher Course, National Meeting of the American Industrial Hygiene Association, May, 1979 (with M.A. Ayoub and F.G. Freiberger)

"Principles and Applications of Ergonomics," A Five Hour Refresher Course, National Meeting of the AIHA, May, 1979 (with M.A. Ayoub)

Cairo, Egypt

"Productivity Improvement Approaches," Training Program for Engineers and Technicians of the Suez Cement Company, Ministry of Industry, June, 1979

PRESENTATIONS (Cont'd)

1980 Cont'd

Houston, Texas

"Advanced Methods in Ergonomics," A Four Hour Refresher Course, National Meeting of the American Industrial Hygiene Association, May, 1980

Fort Rucker, Alabama

"Quantified Electromyography," Presented in the Seminar of the U.S. Army Aeromedical Research Laboratory, Fort Rucker, June, 1980

Cairo, Egypt

"Research Activities in Bioengineering," Cairo University, November, 1980

"Philosophy of Bioengineering Education," Egyptian Society of Biomedical Engineering, Cairo, November, 1980

"Modern Health Care Delivery for Developing Countries," 4th International Conference on Egypt: The Year 2000, December, 1980

"Ergonomics for Productivity, Safety and Health," 4th International Conference on Egypt: The year 2000, December, 1980

"Modern Technology in Bioengineering and Industrial Engineering," A Series of Interviews on the Egyptian Radio and Television Broadcasting System

Interview with Madiha Sultan
Arab Broadcasting to North America
5:00-7:00 p.m., U.S. Time, December 27, 1980

T.V. Scientific Magazine Samia El-Etreby
5:00 p.m., December 27, 1980

"Hybrid and Digital Computers in Bioengineering Research," 1st National Meeting on Biophysics and Bioengineering, Cairo, Egypt, December, 1980

"An Electromyographic Methodology for Gross Muscular Activity," 1st National Meeting on Biophysics and Bioengineering, Cairo, Egypt, December, 1980

PRESENTATIONS (Cont'd)

1982 Sarasota-Bradenton, Florida
"Technology, Automation and Industrial Development," Southwest Florida Chapter of AIIE, Chapter Award Ceremony, April, 1982

Lake Buena-Vista, Florida
"Future Challenges for the IE's," Central Florida Chapter of AIIE, May, 1982
Lake Buena Vista, Florida
"How to have A Better Chapter Year," Region IV Leadership Conference, Hosted by the Orlando Chapter, AIIE, July, 1982

Miami, Florida
"How to Have A Better Chapter Year," Region IV Leadership Conference, Hosted by the Miami Chapter, AIIE, July, 1982

Atlanta, Georgia
"How to Have A Better Chapter Year," Region IV Leadership Conference, Hosted by the Atlanta Chapter, AIIE, September, 1982

Marietta, Georgia
"Dimensions of Service and Productivity Challenges - Japan vs. U.S.," The Atlanta Chapter of AIIE, September, 1982

Gainesville, Florida
"New Horizons in Human Factors Research and Applications," Gainesville Chapter of AIIE, October, 1982

"New Horizons in Human Factors/Ergonomics Applications," Graduate Seminar of the ISE Department, University of Florida, Gainesville, October, 1982

"The Role of Ergonomics in Improving Productivity," AIIE Student Chapter Meeting, University of Florida, Gainesville, October, 1982

San Juan, Puerto Rico
"Human Factors: Key to Productivity Improvement," 2nd Inter American Productivity Symposium, American Institute of Industrial Engineers, November, 1982

PRESENTATIONS (Cont'd)

1983 Cont'd

Cairo, Egypt
"Review and Introduction to the Third Comprehensive Strategy Meeting on Biomedical Engineering," Cairo University, May, 1983

Louisville, Kentucky
"The Management of Low Back Pain: A Comprehensive Approach," National Meeting of the Institute of Industrial Engineers, May, 1983

Atlanta, Georgia
"How to Have a Better Chapter Year," Region IV, AIIE Leadership Meeting, hosted by Atlanta Chapter, June, 1983

Orlando, Florida
"How to Have a Better Chapter Year," Region IV, AIIE Leadership Meeting, Hosted by Orlando Chapter, June, 1983

Windsor, Canada
"Back Pain: A Challenge to Productivity," Seventh International Conference on Production Research, August, 1983

Miami, Florida
"Minimizing Physiological Stress in the Working Place," University of Miami and Florida Institute of Public Accountants Accounting Conference, September, 1983

Pensacola, Florida
"Productivity and Technology," Pensacola Chapter of AIIE, September, 1983

Rome, Georgia
"Productivity and Technology," Rome Chapter of AIIE, September, 1983

Norfolk, Virginia
"Human Factors in Rehabilitation," A Three Hour Workshop, Annual Meeting of the Human Factors Society, October 1983 (with H.L. Rosomoff, and R. Steele and R. Lennne)

Knoxville, Tennessee
"Productivity Problems in the U.S.A.," East Tennessee Chapter of AIIE, October, 1983

PRESENTATIONS (Cont'd)

1984 Cont'd

Alexandria Egypt
"New Concepts in the Development and Treatment of Low Back Pain," Meeting of the Alexandria Rotary Club, August, 1984

San Antonio, Texas
"Case Studies in Low Back Pain," Annual Meeting of the Human Factors Society, October, 1984

Cairo, Egypt
"Evaluation of Progress," Third Comprehensive Strategy Meeting on Biomedical Engineering, Cairo University, December, 1984

1985

Orlando, Florida
"Computerized Signal Processing in the Assessment of Muscular Fatigue," The 7th Annual Conference on Computers and Industrial Engineering, March, 1985

Beijing, China
"Technology, Productivity and Profitability in Industrial Development," Beijing Institute of Technology, May, 1985

Manama, Bahrain
"Modern Health Care Delivery Systems: Needs and Problems in Developing Countries"

"A Bioengineering Education Plan for the Arabian Gulf University"

Workshop on Bioengineering, Arabian Gulf University, September, 1985

Dallas, Texas
"The Contributions of Ergonomics to Pain Programs," The Annual Meeting of the American Pain Society, October, 1985

Ann Arbor, Michigan
"Effects of Low Back Pain Rehabilitation Program on Muscle Functional Abilities," American Society of Biomechanics Conference, October, 1985

PRESENTATIONS (Cont'd)

1986 Cont'd — Paris, France
"The Contributions of Ergonomics to the Rehabilitation of Low Back Pain Patients," Third Colloquium on Ergonomics and the Handicapped, LADAPT, December, 1986

1987 — Washington, D.C.
"Computerized Expert Systems for Work Simplification and Workplace Design", IIE Annual Conference & Productivity Forum, May, 1987

Rome, Italy
"Effects of Muscle Stretching on Low Back Pain", Poster Session, International Society for the Study of the Lumbar Spine, May 1987

Miami, Florida
"Isometric Exercise and Biofeedback in Strength Training, Computerized Electromyography in the Quantification of Functional Neuromuscular Stimulation," Second International Institute of Ergonomics and Safety Conference, June, 1987

Hamburg, West Germany
"Evolution to Revolution in the Treatment of Low Back Disorders," A Topical Seminar, Fifth World Congress on Pain, with H.L. Rosomoff and R.S. Rosomoff, August, 1987

Orlando, Florida
"The Role of Ergonomics and Rehabilitation," Southern Pain Society, October, 1987

New York City
"Sport and Rehabilitation," Human Factors Society, October, 1987

1988 — Miami Beach, Florida
"Quantitative Assessment of Outcome of a Low Back Pain Rehabilitation Program," The International Society for the Study of the Lumbar Spine Meeting, April, 1988

Toronto, Canada
"Aggressive Nonsurgical Management of Low Back Pain: State of the Art - A Symposium," (with H. Rosomoff and R. Rosomoff), Annual Meeting of the American Association of Neurological Surgeons, April, 1988

PRESENTATIONS (Cont'd)

1989 Cont'd

Hollywood, Florida
"Managing Technology," Featured Speaker on the Ron King Show, Aired on WLYF 101.5 FM Radio Station, November 5, 1989

1990

Ft. Lauderdale, Florida
"Ergonomics in Rehabilitation: Role, Contribution and Significance," Eighth Annual State Conference of the Florida Associatio of Rehabilitation Professionals in the Private Sector (F.A.R.P.P.S.), June, 1990

Montreal, Canada
"The Effect of Load Expectation on Muscle Recruitment," International Conference on Industrial Ergonomics and Safety Research, June, 1990

Boston, Massachusetts
"The Relationship Between Self-Reported Pain Level and Psychophysical Static Lifting Abilities in Chronic Low Back Pain Patients," International Society for the Study of the Lumbar Spine, June, 1990

Hsinshu, Taiwan
"A Review of Critical Issues in Technology Management," National Chiao Tung University, Closed Circuit Television, October, 1990

Invited Keynote Address, Taiwan First National Meeting on Technology Management, October, 1990

Workshop on Management of Technology, Taiwan First National Meeting on Technology Management, October, 1990

Sao Paulo, Brazil

"Educational Programs in Management of Technology," Invited Conference Presentation, XV National and IV International Meeting on Science and Technology Management," October, 1990

St. Louis, Missouri
"Functional Capacity Assessment of Patients with Chronic Low-Back Pain," Symposium Chairman and Presenter, Annual Meeting of the American Pain Society, October, 1990

RESEARCH AND DEVELOPMENT ACCOMPLISHMENTS (Cont'd)

Produced first module of its kind pertaining to "work efficiency in dentistry", this includes syllabus, video tapes, slide tapes and practical demonstrations

Author of two correspondence study courses in Human Engineering and work study, University of Florida, Gainesville

Chaired and participated in supervisory committees of a number of graduate students

Chaired supervisory committees for a number of high honors projects of students

Supervisor for postdoctoral research

Co-Principal Investigator of the research project "Mechanics and Performance of Human Motion," NSF-1973, 1974 ($125K*)

Project Coordinator and Co-Principal Investigator on the organized research project "Systems Effectiveness of Dental Health Care Delivery," University of Florida, Division of Sponsored Programs and College of Dentistry, 1970-1974 ($15K/year)

Principal Investigator of the research project "Manual Lifting and the Biomechanical Origin of Low Back Pain," NIH Biomedical Research Support Grant (Institutional), 1977-1978

Co-Investigator of the research project "Protection of Pesticide Applicators," National Institute for Occupational Safety and Health ($90K)

Director of the Occupational Safety and Health Training P.H.S. Grant, Number LT01 OH 07012-01, 1975-1979 ($140K)

Principal Investigator of the research project "Study for Vibration Effects of Muscular Performance," U.S. Army Aeromedical Research Laboratory, Fort Rucker, Alabama, 1979-1980 ($80K)

Directed the University of Miami effort to establish a Southeastern Educational Resource Center in Occupational Safety and Health

*Figures Rounded

RESEARCH AND DEVELOPMENT ACCOMPLISHMENTS (Cont'd)

Principal Investigator "Industrial Development Cost," Inter-American Development Bank, 1987 ($4.3K)

Principal Investigator "Workshop on Technology Management," National Science Foundation, 1988 ($9.2K)

Co-Principal Investigator "Ergonomics Injury Control in High Frequency Lifting Tasks," NIOSH 1988 ($92K), 1989 ($96K)

Principal Investigator "Development of the Orthoranger III, A Goniometric System for Measuring Body Ranges of Motion," Florida High Tech & Industry Council, 1989 ($84K), 1990 ($82K), 1991 (63K)

A Founder of the University of Miami Institute for the Study of Quality in Manufacturing and Service, institutional funding by Florida Power & Light Company ($1M)

Co-Principal Investigator of the research project "Prediction of Vocational Outcome in Chronic Low Back Pain," NIDRR (first year budget $178K)

Co-Principal Investigator of the research project "Development of Functional Abilities Computerized Testing System," Florida High Tech & Industry Council, 1991 ($62K)

Co-Principal Investigator of the research project "Reducing Frailty and Falls in Elderly: Randomized Trial," NIH/NIA (approved for funding by study section, 1990-1993 (Funding pending)

Developed the M.S. Program in Management of Technology, as a joint effort between the College of Engineering and the School of Business Administration's Department of Management, in collaboration with the School of Continuing Studies.

POST GRADUATE SUPERVISORY ROLE (Cont'd)

Graduate Student's Theses (Cont'd)

Chairman, supervisory committee of A. Momayezzadeh, M.S. Thesis entitled "Relationship Between Maximum Comfortable Weight of Lift, Angular Lift and Method of Lift Under Dynamic and Static Settings," University of Miami, 1979

Member, supervisory committee of J.A. Edosomwan, M.S. Thesis entitled "Implementation of the Total Productivity Model (TPM) in a Manufacturing Company," University of Miami, 1980

Member, supervisory committee of V.K. Omachuno, M.S. Thesis entitled "Productivity Improvement: Conceptual Framework, Model and Implementation Methodology for Manufacturing Companies," University of Miami, 1980

Member, supervisory committee of Jairo Lascarro, D.A. Dissertation entitled "Principles of Management of Municipal Solid Waste Anaerobic Bioconversion Facilities," University of Miami, 1980

Member, supervisory committee of El-Sayed M. Abdel Moty, M.S. Thesis entitled "Computer Analysis in Electromyograph and its Applications," Cairo University, 1981

Member, supervisory committee of Filiz P. Yavuz, M.S. Thesis entitled "Company-Level Investigation of Performance Measures As Related to Total Productivity," University of Miami, 1982

Member, supervisory committee of Ashraf Genaidy, M.S. Thesis entitled "Physiological and Psychophysical Determination of Lifting Capacity at Low Frequency Lifting Tasks," University of Miami, 1983

Chairman, supervisory committee of Elaine Marshall Asfour, Ph.D. Dissertation entitled "Strategies for the Design of Work Day for Users of VDT," May, 1987

Chairman, supervisory committee of E.A. Moty, Ph.D. Dissertation entitled "Effects of Functional Electrical Stimulation on the Neuromuscular System," May, 1987

Co-Chairman, supervisory committee of A.M. Genaidy, Ph.D. Dissertation entitled "Physiological Models and Guidelines for the Design of Prolonged Leg Lifting Tasks," December, 1987

POST GRADUATE SUPERVISORY ROLE (Cont'd)

Graduate Student's Theses (Cont'd)

Member, supervisory committee of Edelle C. Field, M.S. Thesis entitled "Postural Proprioception in Healthy and Back-Injured Adults," December, 1990

Master's Projects Directed

Hauge, R.S., "An Evaluation of Tactual Stimulus in a Vigilance Task," University of Florida, 1974

Ringo, D.W., "A Study of Low Back Pain," University of Florida, 1974

Lauffer, R., "Mandibular Movement Recordings Into Standard Groups," University of Florida, 1974

Dela Cruz, A., "Methods of Parameter Estimation and Application to Physiology and to the Study of Human Motion," University of Florida, 1974

Rebello, R.E., "Trigger Sprayer Assembly Line Modification and Expansion," University of Miami, 1975

Berg, H.E., "The Relationship Between Force and Electromyograms With Anthropometric Data at Various Angles of Application," University of Miami, 1976

Jorcyk, G.M., "Proposed Production System Design for a Glass Fabrication Department," December, 1976

Roberts, A., "Occupational Health and Postural Problems of Anaesthesiologists," 1978

Hunter, G., "Creating an Effective Motivational Safety Videotape Production," 1978

Morales, Gustavo A., "Mercury," 1978

Singer, Marthe, "The Female Work Force," 1979

Petrone, Donna, "A Calendar Incentive Program," designed for Burger King Safety Department, June, 1979

POST GRADUATE SUPERVISORY ROLE (Cont'd)

M.S.I.E. Committee Member (Cont'd)

Brandt, Charles, M.S.I.E. project, June, 1984

Jarp, George, M.S.I.E. project, June, 1984

Genie-ow, Idsa, M.S.I.E. project, June, 1985

Kakhani, Sunil, M.S.I.E. project "Development of Sensor System on the IBM-7535 Robot," June 1985

Ruiz, David, M.S.I.E. project, June 1985

Cevenini, Mauro, M.S.I.E. project "An On-Line Microcomputer-Based Physiologic Monitor for Manual Materials Handling," December, 1985

Cabezas, Juan, M.S.I.E. project "Software Ergonomics," August, 1986

Font, Gary, M.S.I.E. project "Physiological Monitor Program," August, 1986

Pimenta, Orlando, M.S.I.E. project, August, 1986

Rivera, Yamile, M.S.I.E. project "Software Ergonomics," August, 1986

Vaughters, William, M.S.I.E. project "A Study of an American Company That Has Adopted a Total Quality Control Program," August, 1986

Saca, Carlos Miguel, M.S.I.E. project "Computer Robot Simulator," December, 1988

Miloud, Mebrek, M.S.E.H.S. project "Comparison Between Strength Tests and an Isokinetic Strength Test for the Prediction of Lifting Capabilities," December, 1986

Willis, William Barton, M.S.I.E. project "Strategic Plan and Branch Office Location Study for Bliss & Nyitray, Inc," May, 1987

Donelan, Allen C., M.S.I.E. project "White Collar Knowledge Worker Productivity Measurement and Evaluation," June, 1987

Paz, Ronald, M.S.I.E. project "Project Management in Construction," June, 1987

POST GRADUATE SUPERVISORY ROLE (Cont'd)

M.S.I.E. Committee Member (Cont'd)

Vega, Hernan, M.S.I.E. project "PC SELSPOT (PCSPOT) Work Station User's Reference Manual," August, 1989

Curriculum Vitae

1. December 31, 1990

PERSONAL

2.	Name:	Charles N. Kurucz
3.	Home Phone:	(305) 253-9143/9023
4.	Office Phone:	(305) 284-6595
5.	Home Address:	7985 S.W. 135 Street Miami, Florida 33156
6.	Academic Rank:	Associate Professor
7.	Primary Department:	Management Science
	Secondary Department:	Industrial Engineering
8.	Citizenship:	U.S.
9.	Visa Type:	NONE

HIGHER EDUCATION/CERTIFICATION

10. Institutional:

SUNY at Buffalo Ph.D. (Operations Research/Applied Statistics) 1969.
SUNY at Buffalo M.S. (Industrial Engineering/Operations Research) 1964.
Univ. of Buffalo B.S. (Industrial Engineering) 1962.

11. Non-Institutional:

NONE

12. Certification:

Registered Professional Engineer - State of Florida P.E. #35559

EXPERIENCE

13. Academic:

University of Miami	Associate Professor	1974-
University of Miami	Assistant Professor	1968-1974
SUNY at Buffalo	Instructor	1966-1968

SUNY at Buffalo	Teaching/Research Assistant	1963-1966

EXPERIENCE

14. Non-Academic:

General Motors Corp. Buffalo, New York	Industrial Engineer: Engine manufacturing methods and process layouts.	1962
U.S.A. Ballistics Research Labs, Md.	Operations Research Analyst: Tactical logistic vehicle systems modeling.	1967
Florida Power and Light Company	Consultant: Development of materials for an in-house technical education program.	1970-71
Dade County Public Schools	Consultant: Experimental design and data analyses for various program evaluations.	1971
Florida Power and Light Company	Consultant: Development of load forecast and standard time models.	1972-73
Deltona Corporation	Consultant: Statistical analysis of land use and purchaser characteristics.	1974
Dade County Public Schools	Consultant: Systems design of a placement and follow-up service.	1974
Florida Power and Light Company	Consultant: Evaluation of work measurement standards accuracy.	1975-76
Dade County Dept. of Traffic and Transportation	Consultant: Development of evaluation designs for a pedestrian accident counter measure demonstration project.	1978
National Park Service, Everglades National Park	Consultant: Development of statistical methodology for establishing water quality standards.	1978
Various Law Offices	Expert Witness: Reconstruction of accidents and accident data analysis.	1978-
Dade County Public Schools	Consultant: Evaluation of the Emergency Student Assistance Act Pilot Project.	1979,1980
Florida Power and	Consultant: Statistical analysis of	

Light Company	voltage reduction energy conservation.	1984
Florida Power and Light Company	Consultant: Development of load management optimization models.	1988-89

15. Military

NONE

PUBLICATIONS

16. Books and monographs:

1) Khalil, T. and C.N.Kurucz : "Biorhythms," Chapter in Science and the Paranormal, Edited by Abell and Singer, Department of Astronomy, UCLA, Scribners' Sons, 1982.

17. Refereed Journal Articles:

1) Waite, T.D. and C.N. Kurucz, "The Kinetics of Bacterial Degradation of the Aquatic Weed Hydrilla Sp., "Journal of Water, Air and Soil Pollution, 7, 33-43, 1976.

2) Khalil, T. and C.N. Kurucz, "The Influence of 'Biorhythm' on Accident Occurrence and performance," Ergonomics, 20(4), 389-398, 1977.

3) Kurucz, C.N. and T. Khalil, "Probability Models for Analyzing the Effects of Biorhythms on Accident Occurence," Journal of Safety Research, 9(4), 150-158, 1977.

4) Kurucz, C.N. "Injury Reduction Capabilities of Breakaway Light Standards and Various Guardrails," Accident Analysis and Prevention, 16(2), p105, 1984.

18. Other works and publications:

1) Shah, J.C. and C.N. Kurucz, Design and Development of a Manufacturing Systems Simulator, I. E. Research Report No. 1, State University of New York at Buffalo, 1963.

2) Kurucz, C.N., Design and Development of a Manufacturing Systems Stimulator, I. E. Research Report No. 2, State University of New York at Buffalo, 1964.

3) Kurucz, C.N., A Production Line Manufacturing Systems Simulator, I.E. Research Report No. 3, State University of New York at Buffalo, (1965).

4) Thomas W.H., C.N. Kurucz, R.S. Smith and P. Kelley, A Model of a Hospital Information System, I.E. Research Report No. 4, State University of New York at Buffalo, 1965.

5) Kurucz, C.N. and W.P. Smith "Simulation for the Design and Analysis of Manufacturing System," ASTME VECTORS, 1(1), November 1966.

6) Kurucz, C.N., An Application of Renewal Theory to the Determination of Response Characteristics for a Logistic Vehicle System, Doctoral Dissertation - State University of

New York at Buffalo, 1968.

7) Kurucz, C.N. and B.W. Morrow, "A Causal Model for Single Vehicle Accidents," Proceedings of the Motor Vehicle Collision Investigation Symposium, CALSPAN, October, 1975.

8) Adt., R.R. and C.N. Kurucz, et. al., Characterization of Methanol/Gasoline Blends as Automotive Fuel-Performance and Emissions Characteristics, Final Report, US. Environmental Protection Agency, Offices of Air and Waste Management, Mobile Source Air Pollution Control, and Alternative Automotive Power Systems Division, March 1976.

9) Adt, R.R. and C.N. Kurucz, et. al., "The Effect of up to 30 percent Volume Methonal Addition on the Basic Performance and Exhaust Emissions Characteristics of a Carburetted SparkIgnition Engine," Proceedings of the International Symposium on Automotive Technology and Automation, Rome, 1976.

10) Kurucz, C.N., Morrow, B.M., Fogarty, W.J. et. al., Multidisciplinary Accident Investigation: Single Vehicle Study: Appendices, Vol. III, DOT HS-803 654, 415 p., November 1977.

11) Kurucz, C.N., Morrow, B.M., Fogarty, W.J. et. al., Multidisciplinary Accident Investigation - Single Vehicle Study: Technical Section, Vol. II, DOT HS-803-653, 143 p., November 1977.

12) Kurucz, C.N., B.W. Morrow, W.J. Fogarty, et. al., Multidisciplinary Accident Investigation - Single Vehicle Study: Executive Summary, Vol. I, DOT HS-803-652, 26 p., November 1977.

13) Kurucz, C.N. and B.W. Morrow, DOT National Crash Severity Study - Final Report, Contract No. DOT HS-6- 01389, August 1980.

14) Waite, T.D., Kurucz, C.N., Cooper, W.J., Narbaitz, R.N. and J.H. Greenfield, Disinfection of Wastewater Effluents with Electron Radiation. Proceedings of the American Society of Civil Engineers National Conference on Environmental Engineering, Austin Tx., July 1989.

15) Waite, T.D., Cooper, W.J., Kurucz, C.N. Narbaitz, R.N. and J.H. Greenfield, Full Scale Treatment of Wastewater Effluents with High Energy Electrons. Proceedings of VII International Conf. on Chemistry for Protection of the Environment. Lublin, Poland. October 1989.

16) Kurucz, C.N., Waite, T.D., Cooper, W.J. and M.G. Nickelsen, Full Scale Electron Beam Treatment of Hazardous Wastes - Effectiveness and Costs, Proceedings of the 45th

Annual Purdue Industrial Waste Conference, W. Lafayette, Indianna, May 1990.

17) Waite, T.D., Cooper, W.J., and C.N. Kurucz, Recent Advances in Electron Beam Irradiation of Wastewater and Hazardous Waste. Proceedings of the American Society of Civil Engineers National Conference on Environmental Engineering, Washington D.C., July 1990.

19. Other works accepted for publication:

NONE

PROFESSIONAL

20. Funded Research Performed

1) "Design and Development of A Production Line Manufacturing System Simulator", American Society of Tool and Manufacturing Engineers, $7,000 1963-1965, Co-Principal Investigator.

2) "A Model of a Hospital Information System", National Institute of Health-Institutional Grant, $5,000, 1965, Co-Principal Investigator.

3) "Single Vehicle Accident Study," U.S. Depatment of Transportation, $230,000, 1973-1976. Co-Principal Investigator.

4) "Investigation of Air Cushion Restraint System Accidents (Southeast Region)," U.S. Department of Transportation, $86,584, 1975-1976. Co-principal Investigator.

5) "Development of an Accident Investigation System Report Module," Dade County Public Safety Department, $19,350, 1975-1976. Principal Investigator.

6) "National Crash Severity Study," U.S. Department of Transportation, $785,000, 1976-1980. Co-Principal Investigator.

7) "High Risk Vehicles in Rollover Accidents," University of Miami, School of Business Summer Grant, $4100, 1981. Principal Investigator.

8) "High Energy Electrons for Treatment of Water and Wastewater," National Science Foundation, $775,000, 1989-1991. Co-Principal Investigator (with T. Waite).

9) "Research Experience for Undergraduates," National Science Foundation, $38,000, 1989-1990. Co-Principal Investigator (with T. Waite).

10) "Electron Irradiation of Hazardous Organic Compounds," U.S. Environmental Protection Agency SITE Program, $300,000 (FIU prime contractor), 1990-1992, Co-Principal Investigator (with W. Cooper and T. Waite).

11) "High Energy Electrons for Treatment of PCBs," U.S. Environmental Protection Agency Exploratory Research Program, $300,000 (FIU prime contractor), 1991-1992, Co-Principal Investigator (with W. Cooper and T. Waite).

21. Editorial responsibilities:

Article reviews for - Journal of Computers and Operations Research, 1981-1983

Journal of the Operational Research Society, 1981-present.

Journal of Accident Analysis and Prevention, 1983-1985

22. Professional and Honorary Organizations:

American Institute of Decision Science (AIDS). Member 1973-1985
American Institute of Industrial Engineers (AIIE). Member 1959-present
Operations Research Society of America (ORSA). Member 1968-present
Transportation Research Board (TRB). Member 1981-present
Alpha Pi Mu (Industrial Engineering Honor Society). Member 1979-present
Beta Gamma Sigma (Business Honor Society). Member 1982
American Association for Automotive Medicine (AAAM) Member 1985-present
Society of Automotive Engineers (SAE). Member 1986-present
Hazardous Materials Control Research Institute(HMCRI). Member 1989-present

23. Honors and Awards:

NONE

24. Post- Doctoral Fellowships:

NONE

25. Other Professional Activities:

Papers/Presentations(presenter underlined)-

1) Kurucz, C.N., Minimum Required Transportation Assignments of Pupils to Schools to Satisfy Desegregation Constraints, AIIE Miami, FL, November 1971.

2) Kurucz, C.N., A Causal Model for Single Vehicle Accidents, Invited paper, Motor Vehicle Collision Investigation Symposium, National Highway Traffic Administration, Buffalo, NY, August, 1976.

3) Kurucz, C.N., Traffic Accident Research, AIIE Miami, FL, February, 1979.

4) Kurucz, C.N., Computer Assisted Accident Reconstruction, NHTSA Training Course Presentation, Phoenix, Arizona, March 1979 and May 1979.

5) Kurucz, C.N., Basic Concepts in Reliability, Tutorial Presentation, Electrical Power Conference, Miami Beach, April 1979.

6) Kurucz, C.N., Automobile Accident Reconstruction, Tutorial Presentation, Multi-disciplinary Accident Investigation Course, NHTSA, Phoenix, Arizona, May 1980.

7) Kurucz, C.N., Accident Facts, Statistics and the Computer, Tutorial Presentation, First Engineering Institute for Attorneys, University of Miami, March 1985.

8) Kurucz, C.N., Automobile Accident Reconstruction, Tutorial Presentation, Multi-disciplinary Highway Collision Investigation Training Course, National Highway Traffic Safety Administration, Phoenix, Arizona, June 1980.

9) Cooper, W.J., Sosa, D., Cadavid, E.M., Waite, T.D. and C.N. Kurucz, Formation of Hydrogen Peroxide in Electron Irradiated Secondary Effluent. Div. Environmental Chemistry, 197th ACS National Mtg. Dallas, Tx. April 1989.

10) Waite, T.D., Cooper, W.J., Kurucz, C.N., Narbaitz, R. and J.H. Greenfield, Disinfection of Wastewater Effluents with Electron Radiation. National ASCE/NSCEE Mtg. Austin Tx. July 1989.

11) Waite, T.D., Cooper, W.J., Kurucz, C.N. Narbaitz, R.N. and J.H. Greenfield, Full Scale Treatment of Wastewater Effluents with High Energy Electrons, VII International Conf. on Chemistry for Protection of the Environment, Lublin, Poland, October 1989.

12) Cooper, W.J., Sosa, D., Cadavid, E.M., Waite, T.D. and C.N. Kurucz, Removal of Halogenated Methanes, Ethanes and Ethenes in Wastewater Using High Energy Electrons. American Chemical Society, Division of Industrial and Engineering Chemistry, May 1989, Atlanta, Georgia.

13) Cooper, W.J., Waite, T.D., Kurucz, C.N., Narbaitz, R. and J.H. Greenfield, Electron Beam Irradiation an Emerging Technology for Treatment of Water and WasteWater. AWWA/WPCF Joint Residuals Management Conference, August 1989, San Diego, California.

14) Cooper, W.J. and T.D. Waite, Hazardous Waste Treatment Using an Innovative Treatment Technique, High Energy Electrons: An Overview. 198th American Chemical Society National Meeting, Division of Environmental Chemistry, Miami, Florida, September 1989.

15) Cadavid, E.M., Cooper, W.J., Sosa, D.B., Nickelsen, M.G., Meacham, D.E., Kurucz,

C.N. and T.D. Waite, Removal of Trihalomethanes in Wastewater by High Energy Electrons. 198th American Chemical Society National Meeting, Division of Environmental Chemistry, Miami, Florida, September 1989.

16) Nickelsen, M.G., Cooper, W.J., Meacham, D.E., Quinones, M.A., Kurucz, C.N., Waite, T.D., Merrill, E.W. and D.E. Savage, High Energy Irradiation of Oxygenated Secondary Effluent for the Removal of Benzene and Substituted Benzene Compounds. 198th American Chemical Society National Meeting, Division of Environmental Chemistry, Miami, Florida, September 1989.

17) Sosa, D.B., Cooper, W.J., Cadavid, E.M., Narbaitz, R., Waite, T.D.and C.N. Kurucz, Formation of Hydrogen Peroxide in Electron Irradiated Secondary Effluent. 198th American Chemical Society National Meeting, Division of Environmental Chemistry, Miami, Florida, September 1989.

18) Quinones, M.A., Cooper, W.J., Nickelsen, M.G., Meacham, D.E., Waite, T.D. and C.N. Kurucz, Removal of Phenols and Substituted Phenols from Chlorinated Wastewater Using High Energy Electrons. 198th American Chemical Society National Meeting, Division of Environmental Chemistry, Miami, Florida, September 1989.

19) Meacham,D.E., Cooper, W.J., Nickelsen, M.G., Waite, T.D. and C.N. Kurucz, Halogenated Ethanes and Ethenes Removal from Anaerobic Secondary Effluent by High Energy Electron Radiation. 198th American Chemical Society National Meeting, Division of Environmental Chemistry, Miami, Florida, September 1989.

20) Greenfield, J.H., Cooper, W.J., Narbaitz, R., Waite, T.D. and C.N. Kurucz, Electron Beam Irradiation of Secondary Effluents. Water Pollution Control Federation 62nd Annual Conference, San Francisco, California, October 1989.

21) Cooper, W.J., Waite, T.D., Kurucz, C.N., Narbaitz, R. and J.H. Greenfield, High Energy Electrons as a Process for the Treatment of Wastewater. Water Pollution Control Federation Asia/Pacific Conference on Water Pollution Control, Honolulu, Hawaii, October 1989.

22) Cadavid, E.M., Cooper, W.J., Nickelsen, M.G., Waite, T.D. and C.N. Kurucz, Removal of the Trihalomethanes From Waters of Varying Quality Utilizing High-Energy Electrons. American Chemical Society, Division of Environmental Chemistry, April 22-27 1990, Boston, Mass.

23) Taylor,T.C., Cooper, W.J., Nickelsen, M.G., Waite, T.D. and C.N. Kurucz, Removal of Bicyclic Organochlorine Pesticides From Waters of Varying Quality utilizing High-Energy Electrons: Dieldrin. American Chemical Society, Division of Environmental Chemistry, April 22-27 1990, Boston, Mass.

24) Kurucz, C.N., Waite, T.D., Cooper, W.J. and M.G. Nickelsen, Full Scale Electron Beam

Treatment of Hazardous Wastes - Effectiveness and Costs, 45th Annual Purdue Industrial Waste Conference, W. Lafayette, Indianna, May 8-10, 1990.

25) Cooper,W.J., Nickelsen, M.G., Waite, T.D. and C.N. Kurucz, High Energy Electron Beam Irradiation: An Innovative Treatment Proces for the Treatment of Aqueous Based Organic Hazardous Wastes. Presented at the Fifth Annual Aerospace Hazardous Waste Minimization Conference, May 22-24, 1990, Costa Mesa, California.

26) Cooper, W.J., Waite, T.D. and C.N. Kurucz, High Energy Electron Beam Irradation: An Advanced Oxidation Process for the Treatment of Aqueous Based Organic Hazardous Wastes. Symposium on Advanced Oxidation Processes for the Treatment of Contaminated Water and Air, June 4-5, 1990 Toronto, Ontario, Canada.

27) Waite, T.D., Cooper, W.J. and C.N. Kurucz, Recent Advances in Electron Beam Irradiation of Wastewater and Hazardous Waste. American Society of Civil Engineers National Conference on Environmental Engineering, Washington D.C., July 8-11, 1990.

28) Waite, T.D., Kurucz, C.N. and W.J. Cooper, Recent Advances in Electron Beam Irradiation of Wastewater and Hazardous Waste. Meeting of the International Atomic Energy Agency. Washington, D.C., July 8-13, 1990.

30) Mane,S., Greenfield, J., Narbaitz, R., Bhatt, T., Cooper, W.J., Waite, T.D. and C.N. Kurucz, BOD, COD, and TOC Relationships of Various Wastewaters Subjected to Electron Beam Irradiation. Presented at the ASCE National Conference on Environmental Engineering, July 8-11, 1990, Washington, D.C.

31) Waite, T.D., Kurucz, C.N., Cooper, W.J. and M. G. Nickelsen, Utilizing High Energy Electrons for Treatment of Industrial Wastes Containing Non-Biodegradable and Toxic Organic Compounds. Presented at the 22nd Mid-Atlantic Industrial Waste Conference, July 25-27, 1990 Drexel University, Philadelphia, Pennsylvania.

32) Waite, T.D., Greenfield, J., Narbaitz, R., Cooper, W.J., Mane, S. , Bhatt, Electron Beam Irradiation of Domestic Sewage for Direct Disposal to the Environment. Presented at the 63rd Annual Conference of the Water Pollution Control Federation, October 7-11, 1990, Washington, D.C.

33) Cooper,W.J., Nickelsen, M.G., Meacham, D.E., Waite, T.D. and C.N. Kurucz, Treatment of Complex Mixtures of Toxic Chemicals Using an Innovative Treatment Process: High Energy Electron Irradiation. Presented at the 63rd Annual Conference of the Water Pollution Control Federation, October 7-11, 1990, Washington, D.C.

34) Waite, T.D., Kurucz, C.N., Cooper, W.J. and M. G. Nickelsen, Destruction of Toxic Organics in Industrial Effluents by Electron Beam Radiation. Presented at the Annual Meeting of the American Institute of Chemical Engineers, November 12-14, Chicago, Ill.

35) Cooper,W.J., Waite, T.D., Kurucz, C.N., Nickelsen, M.G. and D.E. Meacham, High

Energy Electron Beam Irradiation: Quantitative Evaluation of Factors Affecting Remaval of Toxic Chemicals from Aqueous Solution. Presented at the 11th Annual Superfund '90 Conference and Exhibition, November 26-28, 1990, Washington, D.C.

Other-

Facilities Chairman - ORSA/TIMS National Meeting, Americana Hotel, Miami Beach,November, 1969.

Facilities Chairman - ORSA/TIMS National Meeting, Americana Hotel, Miami Beach,November, 1976.

"Japanese Methods for Productivity and Quality," short course by W. Edwards Deming, attended January 12-15, 1981.

Program Co-Chairman - American Institute of Industrial Engineers Region IV (Southeast) Technical Conference, February, 1983.

Arrangements Co-Chairman - ORSA/TIMS National Meeting, Fountainbleu Hotel, Miami Beach, October 1986.

Session Chair - NSF Electron Beam Conference, Sheraton Hotel, Key Largo, January, 1988.

TEACHING

Graduate Courses Taught:

MAS 657 - Maintenance, Replacement, and Reliability Models
MAS 655 - Introduction to Stochastic Processes
MAS 642 - Application of Management Science Methods
MAS 616 - Statistical Methodology in Research II
MAS 615 - Statistical Methodology in Research I
IEN 607 - Mathematical Programming I
MAS 603 - Design of Experiments
MAS 543 - Statistical Analysis in Decision Making
MAS 542 - Quantitative Foundations of Management Science

Undergraduate Courses Taught:

MAS 442 - Stochastic Models in Operations Research
MAS 441 - Deterministic Models in Operations Research
MAS 312 - Applied Statistics II
MAS 311 - Applied Statistics I
MAS 302 - Operations Management Modeling
IEN 380 - Engineering Economy
IEN 201 - Principles of Industrial Engineering
IEN 122 - Introduction to Computer Programming

26. Teaching Awards Received:

NONE

27. Thesis and Dissertation Advising*:

Chairman:

1. Roque, Diego	"A Mathematical Model for Prediction of Workload at Airline Reservation System Primary Stations," 1971.
2. Porush, Elaine	"A Computerized System for Generating School Attendance Zones," 1972.
3. Ford, Lawrence	"Contour Reaggregation," 1972.
4. Moore, William	"Optimal Distribution Transformer Replacement," not completed.

5. Jones, Elwood	"Airline Flight Information Using Audio Computer Response," 1974.
6. Eden, Jane	"A Model for Area/Time Prediction of Rainfall," not completed.
7. Thompson, Chip	"Scheduling Maintenance Activities to Maximize Aircraft Dispatch Reliability," not completed.
8. Hilsenbeck, Sue (Ph.D.)	"Acquisition and Use of Information on Data Quality in a Large Population-Based Tumor Registry," 1990.
9. Martinez, Juan (Ph.D.)	"A Multiple Server Queueing Network System Optimization", in progress.

Member:

1. Kahn, Henry	"Restricted Random Activity Sampling," 1969.
2. Yarnall, James	"Narrowband Signals and the Influence of Fades on Phase Measurements," 1970.
3. Wu, Man-Li Chou	"Radioactive Heat Transfer System in Global Climatology," 1970.
4. Iyer, Harihar	Mechanical Engineering, not completed.
5. Rao, Prakash	Mechanical Engineering, not completed.
6. Blount, Thomas	Ocean Engineering, not completed.
7. Hilsenbeck, Charles	"A Comparison of Forest Sampling Methods in Tropical Hammock Vegetation," 1976.
8. Galloway, Sue	"Competition and Habitat Selection in Two South Florida Kingbirds (Tyrannidae)," 1977.
9. Klapper, Jim	"Effects on Vehicle Performance of Typical Curb Geometries," 1976.
10. Moss, Miles	"Vehicular Accident Reduction Thru Coordi-

	nation of TE and LEA Activities," 1978.
11. Dudek, Chris	"Slip Characteristics of Various Walkway Surfaces," 1978.
12. Sochinski, James (Ph.D.)	"Instrumental Doubling and Usage in Windband Literature, 1908-1966," 1980.
13. Hilsenbeck, Charles (Ph.D.)	"A Quantitative Study of the Relationship Between the Vegetation and Distribution of Avifauna in Everglades National Park," 1984.
14. Thornton, Henry	"Statistical Analysis of the Long-Term Durability of Series "B" Beams," 1984.
15. Gray, Kimberly	Completed.
16. Tewari, Ram N. (Ph.D.)	"Targeted Chlorination Studies",In progress.
17. Sadeek, Anna	Completed.
18. Seiler, Susan	"Injury vs. Accident Characteristics" Not completed.
19. Coll, Illeana	"The Seating Configuration Problem," in progress.
20. Mazzagatti, Roy (Ph.D.)	"An Investigation of the Sampling Distribution of Variance Components in a Three Factor Hierarchial Design Using Monte Carlo Techniques," in progress.
21. McKenry, Mary	In progress.
22. Helena, Solo	Completed, 1989.
23. Al-Hoti, Bader (Ph.D.)	"Predicting Salt Water Fouling in Heat Exchanger Tubes," 1988.
24. Carrillo, Manuel	"Evaluation of Policy Rules Performance in Scheduling Carousel Conveyors," 1987.

25. Alvarez, Ed In progress.

* From 1975 to present M.S. students were offered an all coursework degree option.

SERVICE

28. University Committee and Administrative Responsibilities:

University Committees-

1. Institutional Self Study Committee (1975).
2. President's Adhoc Committee on Revision of Tuition Benefits Policy, 1975.
3. Faculty Senate Fringe Benefits Committee (1972-76, Chairman 72).
4. Faculty Senate Budget Committee (1978).
5. Faculty Senate Forms and Procedures Committee (1980).
6. Faculty Senate Retirement Committee (1988).
7. Research Council-Business and Social Sciences Subcommittee(1990)

School/Departmental Committees:

1. Engineering School Teaching Excellence Committee (1972).
2. Engineering School Scholarship Committee (1972).
3. IEN Graduate Studies Committee, Chairman (1972).
4. MBA Student Evaluation and Review Committee (1973).
5. MAS Course Consolidation Committee (1972-1973).
6. I.E. Program Coordinating Committee (1974-1975).
7. M.S. Program Committee (1980-1981).
8. MAS Graduate Student Examining Committee (1974-present).
9. Ph.D. Program Development Committee (1980-1981).
10. MBA Curriculum Revision Committee (1988).
11. SBA Undergraduate Experience Committee (1988).
12. SBA School Council (Spring 1990).
13. SBA International Policy Group(1990).

Administrative:

1. Coordinator, B.S. Program in Systems Analysis (1974-present).
2. MAS 311/312 Course Coordinator (1979-present).
3. MAS 441/442 Course Coordinator (1979-present).
4. MAS Liason with Marketing Department (1973-1975).
5. Systems Analysis Program Advisor (1974-present).
6. Faculty Mentor - SBA Peer Counseling Program (1990).

UNIVERSITY OF MIAMI
Curriculum Vita

1. Date: February, 1991

PERSONAL

2. Name: Joseph J. Moder

3. Home Phone: 235-1392 3b. Office Phone: 284-6595

4. Home Address: 7801 S.W. 133rd Terrace
Miami, Florida 33156

5. Employment Status: Part-time

6. Current Academic Rank: Professor/Emeritus

7. Primary Department: MAS

8. Citizenship: USA 9. Visa Type: N/A

HIGHER EDUCATION

10. Institutional:

B.S. in Chemical Engineering, Washington University	1947
M.S. in Chemical Engineering, Northwestern University	1949
Ph.D. in Chemical Engineering, Northwestern University	1950
Post Doctoral in Statistics, Iowa State University	1960-61
Post Doctoral in Operations Research, Stanford University	1961-62

11. Non-Institutional Training: None

12. Certification, licensure: Registered Engineer State of Georgia.

EXPERIENCE

13. Instructional:

Georgia Institute of Technology, Associate & Full Professor of Industrial Engineering	1950-64
Stanford University, Visiting Professor of Statistics	1961-62
University of Birmingham, England, Visiting Joseph Lucas Professor of Engineering Production	1973-74
University of Miami, Professor of Industrial Engineering (Chairman 1968-72)	1964-72
University of Miami, Professor of Management Science (Chairman 1978-82, and 1989-90) 1972-	

14. Professional:

Tret-O-Lite Company, Chemical Engineer	1947
Freeport Sulphur Company, Consultant on Liquid Cyclone Applications (Summer)	1952
American Viscose Corporation, Consultant on Experimental Design Problems (Summer)	1954
Army Signal Corps, Operations Research Studies of Counter-Battery Radar	1954-57
U.S. Air Force, Statistical Analysis	1958
International Paper Company, Consultant and Training in Statistical Methods and Quality Control (Summer)	1954-57
Management Science Atlanta, Inc., Consultant on Applications of Operations Research and Numerous Courses in Project Management	1961-62
National Science Foundation, Statistical Studies of Work Sampling	1962-64
NASA, Use of GERT in Project Management	1969-70
Eastern Airlines, Consultant on Project Management in Aircraft Maintenance	1966-70
Florida Power & Light Company, Training Courses in Project Management	1981 1983-
Dade County Transportation Administration	1983
IBM Corporation, Training Courses in Statistical Quality Control & Project Management	1983-89
American Dade (Division of American Hospital Supply Corp.), Training Courses in Project Management	1983
Institute of Industrial Engineers, Project Management Training Courses	1984-
Cordis Corporation, Miami, Florida, Design of Experiments in Quality Control	1986
Summer Mission to China on Project Management	1986
Florida Power & Light Company, Training in Project Management	1987

Following is a partial list of firms that I have worked on planning and control of project networks.

M.R. Harrison Company	1965
Eastern Air Lines	1966-70
Montgomery Pipe & Tube Company	1967
First Florida Building Corporation	1968
Schafer & Miller General Contractors	1967,72
Lane Engineering Company	1972

15. Military:

U.S. Navy, Electronics Technician	1944-45

PUBLICATIONS

16. Books and monograms published:

"Operational Research Studies on Army Counter Battery Radar," Evans Signal Laboratory. Three reports issued in 1954, 56, and 57. (by Moder and others)

"Industrial Engineering and Economic Studies of the Peanut Shelling Industry," Engineering Experiment Station, Bulletin No. 286, 1954 (by Moder and Penny)

Project Management with CPM and PERT, Reinhold Publishing Company, New York, July 1964 (Also published in Russian, Chinese, Spanish, Finnish, and Dutch) (by Moder and Phillips)

"Applications of PERT and CPM in Multi-Project Scheduling," in Proceedings, Seminar on Scientific Program Management, Texas A & M University, June 15-17, 1967, pp. 51-66 (by Moder)

Project Management with CPM and PERT, Van-Nostrand Reinhold Company, New York, June 1970 (2nd Edition by Moder and Phillips)

Critical Path Methods, Vol. 6, Encyclopedia of Computer Science and Technology, pp. 403-44, Marcel Dekker, Inc., 1977 (by Moder)

Handbook of Operations Research: Foundations and Fundamentals, Van-Nostrand Reinhold Co., New York, 1978 (Co-Editor: Moder and Elmaghraby). Also published in Russian 1981.

Handbook of Operations Research: Models and Applications, Van-Nostrand Reinhold Co., New York, 1978 (co-Editor: Moder and Elmagraby)

"PERT" McGraw-Hill Encyclopedia of Science and Technology, 5th Edition, April 1982, pp. 46-49.

Network Techniques in Project Management," Chapter 16 in Project Management Handbook, Van-Nostrand Reinhold Co., 1982. (Handbook Editors: D.I. Cleland & W.R. King)

Project Management with CPM, PERT and PRECEDENCE DIAGRAMMING, Van-Nostrand Reinhold Co., New York, June 1983 (3rd Edition by Moder Phillips and Davis.)

Precedence Diagramming: Time Computations, Anomalies and Remedies, published in Project Management; Methods and Studies, edited by Burton V. Dean, Elsivier Science Publishing Co., North Holland, 1985, pp. 95-110.

Network Techniques in Project Management, Chapter 15 in Project Management Handbook, Van-Nostrand Reihnold Co., 2nd Edition, 1988 (Handbook Editors D.I. Cleland & W.R. King)

Project Management with CPM, PERT and PRECEDENCE DIAGRAMMING, Van-Nostrand Reinhold Co., New York, (4th Edition in Preparation)

17. Juried or refereed journal articles:

"Prediction of Latent Heats of Vaporization," Industrial and Engineering Chem., Vol. 41, page 131, January 1949 (by Chu, Dmytryszyn, Moder and Overback)

"Fine-Size, Close-Specific-Gravity Solid Separation with the Liquid Solid Cyclone," Vol. 48, No. 2, Chemical Engineering Progress, pp. 75-88, February 1952 (by Moder and Dahlstrom)

"More Data on Solids Recovery from Slurries by Cyclones," Chemical Engineering, November 1951 (by Moder)

"Statistics in Time Study," The Journal of Industrial Engineering, February 1953 (by Lehrer and Moder)

"Mathematical Characteristics of Performance Times," Time and Motion Study, October 1955 (by Lehrer and Moder)

"Work Sampling Applied to a Long-Cycle Operation with a Variable Labor Force," The Journal of Industrial Engineering, Vol. 7, No. 4, pp. 164-7, 1956 (by Moder and Halladay)

"A Teaching Aid for Regression, Correlation, Analysis of Variance and Other Statistical Techniques," Industrial Quality

Control, Vol. 13, No. 4, pp. 1-6, 1956 (by Moder)

"Procedures for Forecasting Aircraft Engine Maintenance Removal Quantities," The Journal of Industrial Engineering, Vol. 11, No. 6, pp. 471, 7, November-December 1960 (by Hines and Moder)

"A Note on the Effects of Humidity and Actinic Exposure on Fabric Strength,"Textile Research Journal, Vol. 30, No. 8, pp. 620-2, August 1960 (by Moder)

"Design Criteria for Pellet-Dispersing Warheads," Operations Research, Vol. 9, No. 4, pp. 500-521, July-August 1961 (by Knollman and Moder)

"Queuing with Fixed and Variable Channels," Operations Research, Vol. 10, No. 2, pp 218-231, March-April 1962 (by Moder and Phillips)

"A Sequential Search Procedure for Locating a Response Jump," Technometrics, Vol. 4, No. 4, pp. 610-614, November 1962 (by Moder)

"How to do CPM Scheduling Without a Computer," Engineering News-Record, pp. 30-33, March 14, 1963 (by Moder)

"Quantitative Analysis of the Factors Affecting Floor Space Utilization of Palletized Storage," The Journal of Industrial Engineering, Vol. 16, No. 1, pp. 8-18, (by Moder and Thornton), 1965

"Recent Advances in Systematic Activity Sampling," The Journal of Industrial Engineering, Vol. 16, No. 5, pp. 295-304, September-October 1965 (by Hines and Moder)

"Activity Sampling with Applications to Time Standard Estimation," The Journal of Industrial Engineering, Vol. 18, No. 1, pp. 24-29, January 1967 (by Moder)

"Judgement Estimates of the Moments of PERT Type Distributions," Management Science, Vol. 15, No. 2 pp. B76-83, October 1968, (by Moder and Rogers)

"An Optimal Allocation of Resources for the Capital Budgeting Problem," Socio-Econ. Plan. Sci., Vol. 3, pp. 135-150, 1969 (by Moder and Nickl)

"Activity Sampling Using Attribute and Variable Data," AIIE Transactins, Vol. 3, No. 3, pp. 212-220, September 1971 (by Moder and Gaver)

"Application of a GERT Simulator to a Repetitive Hardware Development Type Project," AIIE Transactions, Vol. 3, No. 4, pp. 271-280, December 1971 (by Moder, Clark and Gomez)

"Selection of Work Sampling Observation Times: Part I-Stratified Sampling," AIIE Transactions, Vol, 12, No. 1, March 1980 (by Moder)

"Selection of Work Sampling Observation Times: Part II-Restricted Sampling," AIIE Transactions, Vol. 12, No. 1, March 1980 (by Moder and Kahn)

18. Other publications: None

19. Other works accepted for publication: None

20. Editorial responsibilities:

Member, Editorial Board of International Journal of Project Management

21. PROFESSIONAL AND HONORARY ORGANIZATIONS:

Member of American Institute of Industrial Engineers, American Statistical Association, Institute of Management Science, Operations Research Society of America, American Institute of Decision Sciences, Project Management Institute, and Registered Professional Engineer (Georgia). Listed in Leaders in American Science, Who's Who in Engineering.

22. HONORS AND AWARDS:

University of Birmingham, England, Visiting Joseph Lucas Professor of Engineering Production
1973-74

23. POST-DOCTORAL FELLOWSHIPS:

Iowa State University, NSF Faculty Fellow in Statistics 1960-61

Stanford University, NSF Faculty Fellow and Visiting Professor in Statistics 1960-61

24. TEACHING SPECIALIZATION:

Joint appointment with Industrial Engineering Department

Industrial Statistics -- particularly activity (work) sampling procedures, experimental design and quality control.

Operations Research -- particularly critical path methods in resource allocation and project planning and control, and large scale systems analysis studies.

25. RESEARCH PERFORMED:

Industrial Consulting only.

26. THESIS AND DISSERTATION ADVISING:

Member of numerous thesis committees, the most recent are:

Zeda Heavender, M.S. Degree in MAS Department
Moises Tackle, Ph.D. in Economics Department

27. UNIVERSITY COMMITTEE AND ADMINISTRATIVE RESPONSIBILITIES:

None at present.

28. COMMUNITY ACTIVITIES:

Board of Directors of Community Habilitation Center

29. OTHER PROFESSIONAL INFORMATION OR ACTIVITIES: None

Vincent K. Omachonu

Assistant Professor of Industrial Engineering
College of Engineering
University of Miami

Office Address: Department of Industrial Engineering
College of Engineering
P.O. Box 248294
University of Miami
Coral Gables, Florida 33124

Telephone: (305) 284 - 2344

Home Address: 13270 S.W. 260th street
Miami, Florida 33032

Telephone: (305) 258 - 6273

Curriculum Vitae

1. Date : **February, 1991**

PERSONAL

2. Name:	**Vincent K. Omachonu**
2a. Date of Birth:	**March 12, 1954**
3a. Home Phone:	**(305) 258-6273**
3b. Office Phone:	**(305) 284-2372**
4. Home Address:	**13270 S.W. 260th Street Princeton, Florida 33032**
5. Employment Status:	**Full-Time**
6. Current Academic Rank:	**Assistant Professor**
7. Primary Department:	**Industrial Engineering**
8. Citizenship:	**Nigeria**
9. Visa Type:	**U.S. Permanent Resident**

HIGHER EDUCATION

10. Institutional:

1987	Polytechnic Institute of New York, Brooklyn, N.Y.	**Ph.D.** Major: Industrial Engineering
1983	Columbia University, New York, N.Y.	**Master of Science** Major: Operations Research
1980	University of Miami	**Master of Science** Major: Industrial Engineering
1979	University of Miami	**Certificate in** Occupational Health & Safety
1978	University of Miami	**Bachelor of Science** Major: Industrial Engineering

11. Non-Institutional:

1979	Jackson Memorial Hospital, Miami, Florida. Industrial Engineering Assistant, Department of Management Engineering (Summer)
1978	Sunglo Designs Corporation, Miami, Florida. Industrial Engineering Assistant (Summer).

12. Certification, Licensure:

1990	Registered Professional Engineer (P.E.) in the State of Florida

13. Instructional (10 years):

1979 - 1980	University of Miami, Coral Gables, Florida. **Teaching Assistant** in the Industrial Engineering Department.
1980 - 1981	University of Minnesota, Minneapolis, Minnesota. **Teaching Assistant** in the Industrial Engineering Department.
1981 - 1982	Polytechnic Institute of New York, Brooklyn, N.Y. **Adjunct Professor**, Department of Management and Industrial Engineering. Courses taught: Work measurement and methods improvement, Productivity management, and Occupational Safety & Health.
1982 - 1986	Polytechnic Institute of New York, Brooklyn, N.Y. **Instructor** in Industrial Engineering. Courses taught: Production planning and control, facilities design and plant layout, Work measurement and methods improvement, Introduction to operations research, Productivity management, and Engineering economy, and Human Factors (Ergonomics).
1986 - 1987	University of Miami, Coral Gables, Florida. **Instructor** in the Department of Industrial Engineering. Courses taught: Work measurement and methods improvement, Introduction to computer programming, facilities design.
1988 -Present	University of Miami, Coral Gables, Florida. **Adjunct Assistant Professor**, Health Administration (MBA) Program, School of Business. Courses taught: Operations Research Applications in Health Care.

1988 - Present	University of Miami, Coral Gables, Florida. **Assistant Professor** in the Department of Industrial Engineering. Courses taught: Work measurement and methods improvement, Introduction to computer programming, facilities design and plant layout, Production planning and control, Productivity management, Cost estimating, Operations Research Advanced Industrial Engineering Total Quality Management.

14. Professional (10 years):

1980	Shelly Manufacturing Company, Miami, Florida. **Industrial Engineering Assistant.** Developed work standards for costing and scheduling of metal working processes. Also developed a new facility layout.
1981 - 1986	Transworld Consulting, Inc. Pittsburgh, Pennsylvania. **Associate Consultant** in Industrial Engineering. Developed productivity management programs for manufacturing companies.
1981 - 1982	Herbrew National Kosher Foods, Inc., Queens, N.Y. **Industrial Engineer.** Developed standards for different products and processes. Plant layout, Materials flow analysis, and Capital Investment Analysis.
1981 -1982	Columbia University, New York, N.Y. **Graduate Research Assistant** on "The Determinants of Productivity", Dept. of Industrial Engineering and Operations Research.
1983 - Present	**Consultant** to industrial and service organizations in the areas of production planning & control, facilities design and plant layout, Health care productivity management, and methods improvement.

1982 - 1986	Polytechnic Institute of New York, Brooklyn, N.Y. **Instructor** in the Department of Industrial Engineering. Developed a course in productivity management.
1986 - 1987	University of Miami, Coral Gables, Florida. **Instructor** in the Department of Industrial Engineering.
1988 - Present	University of Miami, Coral Gables, Florida. **Assistant Professor** of Industrial Engineering.

15. Military:

None

PUBLICATIONS

16. Books, Contribution To Books And Monographs Published:

16a. Books:

Omachonu, V.K., Total *Quality and Productivity Management in Healthcare Organizations,* (to be released in Summer, 1991). Institute of Industrial Engineering (IIE) Press and The American Society for Quality Control (ASQC) Press.

16b. Contribution to Books:

- Omachonu, V.K., "Technology Management in Hospitals; Technology Management II, Publishedby Inderscience Enterprises, Ltd., Khalil et al., Editors, pg. 963, 1989.

- Khalil, T.M., S.S. Asfour, B. Marchette, and V.K. Omachonu, "Lower Back Injuries in Nursing: A Biomechanical Analysis and Case Study," In *Trends in Ergonomics/Human Factors IV*, S.S. Asfour, Editor, Elsevier Science Publishers, pg. 811,1987.

- Omachonu, V.K., and T.M. Khalil, "Conceptual And Policy Framework for the Management of Technology in Developing Economies",Technology Management. I, Published by Inderscience Enterprises, Ltd., Khalil et al., Editors, pg. 59, 1988.

- Omachonu, V.K., and R. Nanda, "Hospital Information and Technology Management Under the Prospective Pricing System,"*Technology Management.* 1. Published by Inderscience Enterprises, Ltd., Khalil et al., Editors, pg. 515, 1988.

- Beruvides, M.G., Omachonu, V.K., and D.J. Sumanth, "A Conceptual Framework of Work: The Measurement of White Collar/Knowledge Work Productivity," *Productivity Management Frontiers II*, published by Inderscience Enterprises, Ltd., Editors: Sumanth, D.J., et al., Switzerland, pg 39, 1989.

- Omachonu, V.K., and R. Nanda, "Measuring Hospital Nursing Unit Productivity Under the New Reimbursement System," *Productivity Management Frontiers II*, published by Inderscience Enterprises, Ltd., Editors: Sumanth, D.J., et al., Switzerland, pg 63, 1989.

- Asfour, S. S. , V.K. Omachonu, A. Moty, and E. Diaz, "Displays and Controls," Published in *Workspace, Equipment and Tool Design.* Elsevier Science Publishers: Editors: W. Karwowski and A. Mital,1990, (An invited contribution) in press.

17. Juried Or Refereed Articles:

17a. Refereed Articles In Journals:

- Omachonu, V.K., and R. Nanda, "Measuring Productivity: Outcome vs. Output," *Nursing Management*, Vol. 20, No. 4, April, 1989.

- Sumanth, D.J., Omachonu, V.K., and M. Beruvides, "State-of-the-Art Research on White Collar/Knowledge Worker Productivity," *International Journal of Technology Management. Vol. 5, No. 3* 1989.

- Omachonu, V.K., and R. Nanda, "Model-Based Hospital Productivity Information Management," *Journal of Computers and Industrial Engineering*, 1990. Accepted paper.

- Omachonu, V.K., E.M. Davis, and P.A. Solo, "Productivity Measurement in Contract-Oriented Service Organizations," *International Journal of Technology Management,* Vol. 5, No. 6, 1990.

- Omachonu, V.K., "Quality of Care and the Patient: New Criteria for Evaluation," *Health Care Management Review,* Vol.15, No.4, 1990 p. 43.

- Florentin, H.E., and V.K. Omachonu, "Machine Center Productivity Measurement Under Conditions of Discrete Production," *International Journal of Technology Management,* 1990. Accepted paper.

- Omachonu, V.K., E.A. Sorrentino, and E. Worley, "Management Implications of DRGs in Hospitals," *Journal Health and Human Resources,* 1990, Accepted paper.

17b. Articles Submitted To Refereed Journals:

- Omachonu, V.K., and R. Nanda, "Profit-Linked Productivity Management of a Hospital Nursing Unit," submitted to *Health Services Research,* 1990.

18. Other Publications:

18a. Thesis and Dissertation:

- Omachonu, V.K., "Productivity Improvement: Conceptual Framework and Implementation Methodology for Manufacturing Companies," *Master's Thesis*, Department of Industrial Engineering, University of Miami, Coral Gables, Florida, August, 1980.

- Omachonu, V.K., "A Methodology for Assessing Hospital Nursing Productivity Using DRG Measures As Output," *Ph.D. Dissertation,* Polytechnic Institute of New York, Brooklyn, 1987.

18b. Articles In Conference Proceedings:

- Omachonu, V.K., Dhamasuputra, A., and Chen, V. "Achieving Service Efficiency In Retail Layout", International Conference on Productivity Research, Miami, Florida, 1991.

- Russell, W. and V. Omachonu. "Manufacturing Competitiveness Through Synchronized Manufacturing", International Conference on Productivity Research, Miami, Florida, 1991.

- Omachonu, V.K., and M. Beruvides, "White Collar/Knowledge Work Productivity Monitoring for Interdependent Functions with No Measurable Output," *IIE International Conference*, Toronto, Canada, 1989.

- Omachonu, V.K., and M. Beruvides, "Improving Hospital Productivity: Patient-, Unit-, and Hospital-Based Measures," Conference Proceedings, *IIE International Conference*, Toronto, Canada, 1989.

- Florentine, H.E., and Omachonu, V.K., "Computer Applications in Machine Productivity Measurement," *Proceedings of the 11th Annual Conference for Computers and Industrial Engineering,* Orlando, Florida, 1989.

- Solo, P.O., Omachonu, V.K., and Davies, E.M., "Computerizing Productivity Measurement for Service Installation Companies," *Proceedings of the 11th Annual Conference for Computers and Industrial Engineers*, Orlando, Florida, 1989.

- Knitowski, A., and Omachonu, V.K., "Technology Management in the Military: The Case for a Dynamic Process," *Conference of International Congress on Technology and Technology Exchange,* New York, 1989.

- Omachonu, V.K., and R. Nanda, "Developing a New Data Base for Productivity Information Management," *Proceedings of 10th Annual Computers and Industrial Engineering Conference*, Dallas, Texas, 1988.

- Omachonu, V.K., and R. Nanda., "Measuring Hospital Nursing Unit Productivity Under the New Reimbursement System," *Conference Proceedings, 2nd International Conference on Productivity Research,* Miami, Florida, 1989.

- Omachonu, V.K., and R. Nanda., "Diagnosis-Based Approach to Hospital Nursing Unit Productivity Measurement," *Proceedings of the 9th Annual Conference, American Society for Engineering Management,* Knoxville, Tennessee, 1988.

- Omachonu, V.K., and R. Nanda, "Developing an Information Base for Measuring Nursing Unit Productivity," *IIE Fall Conference Proceedings*, St. Louis, Missouri, 1988.

18c. Additional Publications:

- Omachonu, V.K., and R. Nanda, "Hospital Nursing Unit Productivity Measurement: A Conceptual Framework," *Industrial Engineering*, Vol. 20, No. 5, pg. 56, 1988.

- Omachonu, V.K., and R. Nanda, "New Client-Centered Roles for Management Engineers in Health Care," *Industrial Engineering*, October, 1988.

19. Other Works Accepted for Publications:

None

20. Editorial Responsibilities:

- Manuscript Reviewers Board, Technology Management I, Published by Inderscience Enterprises, Ltd. Special publication of the *International Conference of Technology Management.* Editors : T.M. Khalil, et al., 1988.

- Reviewer, *Computers & Industrial Engineering*, An International Journal, Editor: H.K. Eldin.

- Reviewer, *Conference Proceedings, Second International Conference on Productivity Research*, Miami, Florida, 1988-89. Chairman: D.J. Sumanth.

- Newsletter Editor, Institute of Industrial Engineering (IIE) Work Measurement and Methods Engineering Division, 1987.

- Reviewer, *Engineering Management Journal*, Official Journal of the American Society for Engineering Management. Editor: Ted Eschenbach

21. Professional And Honorary Organizations:

21a. Memberships:

- American Society for Quality Control - Member
- Institute of Industrial Engineers (IIE) - Senior Member
- Health Systems Society of IIE - Member
- American Hospital Association
- Industrial Engineering Honor Society (Alpha Pi Mu) - Member and student chapter president, 1978. Advisor to University of Miami Student Chapter (1978-88)

- Engineering Honor Society (Tau Beta Pi) - Member and student chapter secretary, 1978
- National Leadership and Scholarship Honor Society (Omicron Delta Kappa) - Member
- The Scientific Research Society of America (Sigma Xi) - Member
- The Human Factors Society - Member
- National Scholastic Honor Society (Golden Key) - Member and student chapter president, 1978; Faculty Advisor, 1989
- The Institute of Management Services, London (IMS) - Member (MMS)
- American Production Inventory Control Society (APICS) - Member
- The Honor Society of Phi Kappa Phi - Member
- The Association for Health Services Research - Member

21b.
Positions Held:

- Director, Institute of Industrial Engineering (IIE), Miami chapter, 1989
- President, Institute of Industrial Engineering (IIE), Miami chapter, 1988
- Chapter Development Chairman and President-Elect, IIE, Miami chapter, 1987
- Newsletter Editor, Institute of Industrial Engineering (IIE) Work Measurement and Methods Engineering Division, 1987
- Faculty Advisor, IIE, Student Chapter
- Faculty Advisor, IE Honor Society, Alpha Pi Mu (1987)
- Faculty Advisor, National Society of Black Engineers (NSBE)
- Faculty Advisor, African Students' Union (ASU)
- Deputy Faculty Advisor, Golden Key Honor Society, University of Miami
- Editor-in-Chief, The Industrial Engineering Voice, University of Miami, 1978
- President, Council of International Students Organization (COISO), University of Miami, 1978-79

22. Honors And Awards:

- University of Miami, Freshman Teaching Award, 1990
- Professor of the Year, Dept. of Industrial Engineering, 1990
- Who's who in America, 1990
- International Who's Who of Intellectuals, IBC, England, 1988
- Outstanding Young Men of America, 1988
- International Directory of Distinguished Leadership, ABI, 1988
- Personalities of America, ABI, 1988
- Who's Who in the South and Southwest, Marquis Who's Who, 1988
- Cited in the 14th Edition of Men of Achievement, IBC, England, 1989
- Joy - Landry Finston Award - Outstanding International Student of the Year, 1979
- Central National Bank of Miami Award - Outstanding International Student of the Year, 1979
- Brownell Award - Honorable Mention - Outstanding Achievement, School of Engineering, University of Miami, 1978
- Iron Arrow, Member, Highest honor awarded by the University of Miami, 1978
- Who's Who Among Students in American Universities and Colleges, 1978

23. Post-Doctoral Fellowships:

None

24. Teaching Specialization:

- Production and Inventory Control (Undergraduate, Graduate & MBA)
- Work Measurement and Methods Improvement (Undergraduate)
- Facilities Location and Plant Layout (Undergraduate)

- o Productivity Management (Undergraduate and Graduate)
- o Introduction to Computer Programming (Undergraduate)
- o Human Factors in Design (Undergraduate and Graduate)
- o Management Science Applications in Health Care (MBA)
- o Engineering Economy (Graduate)
- o Cost Estimating (undergraduate)
- o Operations Research Applications in Health Care (graduate)
- o Total Quality Management Concepts and tools

25. Research Performed:

- o Principal Investigator for $5,000 grant entitled, "Acute Care Nursing Unit Productivity Measurement: Conceptual Framework and Empirical Models for Hospitals." Funded by The Research Council and the Natural Sciences and Engineering, University of Miami, Summer, 1987.
- o Research Grant for $6,000 for the development of Quality Modules for Industrial Engineering Courses, University of Miami Institute for the Study of Quality (UMISQ), 1989.
- o Research Travel Grant for $1640 -- Deming Quality Seminar, University of Miami Institute for the Study of Quality (UMISQ), 1989.

26. Thesis and Dissertation Advising:

26a. Master's Theses Supervised (Member):

- o B. Adya, "Analysis of Modified Total Productivity In U.S. Bus Transit", Department of Industrial Engineering, University of Miami, August 1989.
- o D. Nag, "An analytical Approach for the Measurement of White-collar/Knowledge Worker Productivity In Organizations", Department of Industrial Engineering, University of Miami, August 1989.

- J. Flynn, "Methodology for Just-In-Time Implementation", Department of Industrial Engineering, University of Miami, July 1989.

27. University Committees And Administrative Responsibilities:

- Developed an Advising Brochure for the IE Department, 1987
- Member of College of Engineering Honor Council Selections Committee
- University of Miami Faculty Representative for the Southeastern Consortium on Minorities in Engineering (SECME)
- Acting Chairman for the Department of Industrial Engineering for one occasion.

28. Community Activities:

- Faculty Advisor for IIE, University of Miami
- Faculty Advisor for National Society of Black Engineers
- Faculty Advisor for Golden Key National Honor Society
- Faculty Advisor for African Students' Union
- President, Institute of Industrial Engineering, Miami Chapter, 1988.
- Director, Institute of Industrial Engineering, Miami Chapter, 1989.

29. Other Professional Information:

29a. Presentations:

- Omachonu, V.K., F. Quinless, S.S. Asfour, and S. Waly, "Job Stress in Nursing: Implications for Job Redesign,"International Conference on Ergonomics, Miami, Florida, 1987.
- Omachonu, V.K., "Industrialization in Developing Countries," Florida International University, ASU, 1987.

- Omachonu, V.K., "Measuring Nursing Unit Productivity in Hospitals," University of Miami Department Seminar, 1987.

- Omachonu, V.K., "Surviving As An Engineer in a Competitive Work Environment," Meeting of National Technical Society, (NTA), Miami, Florida, 1988.

- Omachonu, V.K., and R. Nanda, "Implementing Productivity Measurement Programs for Hospital Nursing Units," Second International Conference on Productivity Research, Miami, Florida, 1989.

- Omachonu, V.K., and M.Beruvides, "White Collar Productivity : Effect of Office Technology on Secretarial Work Quality," International Conference on Technology Management, Miami, Florida, 1990.

- Omachonu, V.K. "Quality Considerations in Starting a New Business" Miami Dade Chamber of Commerce Seminar, 1990.

- Omachonu, V.K. "Total Quality Management in Higher Education", University of Miami Industrial Engineering Seminar, 1991.

29b. Professional and Development Activities:

- Attended an IIE Just-in-Time training Seminar session, Miami, Florida, 1986

- University of Miami Quality Institute Seminar (9 weeks) by Dr. Noriaki Kano. Subject: Total Quality Control (TQC), Fall 1988.

- Engineer-In-Training Certificate (EIT), State of Florida, Department of Professional Regulation

- Taguchi Methods Workshop on Quality Engineering, American Supplier's Institute, Miami, Florida, 1988

- Seminar on Deming Philosophy on Total Quality Control, University of Miami Quality Institute, Fall 1988/Spring 1989

- Dr. W. Edward Deming Seminar, Cin. Ohio, Instructor: Dr. Deming, April, 1990.

CURRICULUM VITAE

NAME

Milton Rhodes 4-26-22

ACADEMIC RANK

Adjunct Professor (part time)

EDUCATION

Rensselaer Polytechnic Institute

Doctor of Engineering (Environmental)	1976
MS Management	1957
MS Environmental Engineering	1974

University of Pittsburgh

BS Chemical Engineering	1950

Southeastern Massachusetts University

Diploma Textile Chemistry	1941

Years on faculty 4 1/2 original appointment Fall 1985

EXPERIENCE

Industrial

General Electric Co. (33 years)

Development Engineer	Chemical Materials
Pilot Plant Supervisor	Chemical Materials
Process Engineer	Insul. Materials
Manpower Planning and Development	LST-G
Environmental Engineer	Schen. Util. Oper.
Mgr. Environmental Control and Safety	LST-G

Military (11 years)

USAAF

Navigator Air Transport Command
Head of Electronics Navig. Train. School

USAFR

Group Staff Navigation Officer

Teaching (avocation 37 years)

USAAF

Meteorology
Navigation
Electronics Navig. Training

General Electric

Effective Presentation
Calculus
Physics
Trigonometry
Industrial Safety
Human Relations in Manufacturing

Community College

Effective Presentation
Chemistry

University

OSHA
Industrial Safety Engineering (Undergraduate level)
Accident Prevention Systems (Graduate level)

PROFESSIONAL SOCIETIES

American Institute of Chemical Engineers
American Chemical Society
ASSE (Professional Member)

Editorial Board Professional Safety (ASSE)

Region XI Assistant VP
Awards and Honors Chairman

E. NY Chapter President (two terms)
Treasurer
Program Chairman

So. FL Chapter Membership Chairman
Secretary
President Elect

AWARDS AND HONORS

Region XI (ASSE) Safety Professional of the Year
GE Management Awards (three)
GE ELFUN Society Awards (two)
City of Schenectady, NY "Patroon" Award
USAAF Letter of Commendation
Tau Beta Pi and Sigma Tau Honorary Engineering Societies
Adjunct Professor of the Year (Dept. Ind. Eng.) 1989-90

OTHER FACULTY CONTRIBUTIONS

Faculty advisor Tau Beta Pi (no compensation)

DR. DAVID J. SUMANTH

Professor of Industrial Engineering
Director of Productivity Research Group
COE Coordinator, MBA/MSIE Program
College of Engineering
UNIVERSITY of MIAMI

Office Address:

Department of Industrial Engineering
College of Engineering
P.O.Box 248294
University of Miami
Coral Gables, Fl. 33124
Telephone: (305) 284-2344

Home Address:

8501 SW 151 Street
Miami, Fl. 33158
Telephone: (305) 252-0988

1. **DATE** : May 11, 1990

PERSONAL

2. NAME:	**DR. DAVID J. SUMANTH**
3a. HOME PHONE :	(305) 252-0988
3b. OFFICE PHONE :	(305) 284-2344
4. HOME ADDRESS :	8501 SW 151 Street Miami, Florida 33158
5. EMPLOYMENT STATUS :	Full-time (Tenured)
6. CURRENT ACADEMIC RANK :	Professor of Industrial Engineering
7. PRIMARY DEPARTMENT :	Industrial Engineering
8. CITIZENSHIP :	U.S.A.
9. VISA TYPE :	- - - -

1987 (MAY 18-20)	*World Productivity Forum*, Washington, D.C.
1988 (Feb. 17-19)	*First International Conference on Technology Mgt.*
1988 (Nov-Dec.)	*Total Quality Control:* Dr. Kano's Post-Graduate Seminar Series (9 weeks)
1988 (Oct.)	*Taguchi Methods: Quality Engineering*, 1-day Seminar
1988 (Dec.)	*Fourth International Cairo Conference on Mechanical Design and Production* (3 days)
1989 (Nov.)	*National Conference on Communication and Productivity in the Public Sector*, New Delhi, India (3 days)
1989 (July)	*National Seminar on Productivity Measurement and Analysis, NPC, Malaysia* (3 days)

12. CERTIFICATION, LICENSURE : None

EXPERIENCE (contd)

14. PROFESSIONAL (23 Years) : Industrial and Consulting

May 1967 - Aug 1969	Usha Industries Ltd.	*Engr. Trainee (Part-time)*
Sept. 1969 - July 1975	Jay Engineering Works Ltd., Industrial Engineering Dept.	*Process Engineer Production Engineer Industrial Engineer*
May 1973 - Aug 1973	Maurey Manufacturing Co., Chicago.	*Manager, Quality Control*
Sept. 1969 - Dec 1972	Shriram Refrigeration Industries, Usha Works, and AEI, India.	*Productivity Consultant*
Nov. 1973 - May 1974	Servomation Corporation, Elk Grove Village, Illinois.	*Productivity Consultant*
Aug. 1976 - Sept. 1976	Ashland Cold Storage Co., Chicago.	*Productivity Consultant*
Jan. 1977 - Jun 1979	Edelman-Jankow Co., Inc., Chicago.	*Productivity Consultant*
Oct. 1977 - Nov. 1978	Man Talk-Man II Co., Cleveland.	*Productivity Consultant*
Feb. 1980 - May 1980	University of Miami, RUIP Program.	*Internal Consultant*
Aug. 1981 - May 1982	American Bankers Insurance Group, Miami	*Productivity Consultant*
Oct. 1983 - Dec. 1983	Warren Manufacturing Co., Miami.	*Facility Design Consultant*
July 1985 -	Kodela Co., Curacao, Netherlands Antilles	*Productivity Consultant*
Jan. 1985	January First, Inc.	*Consulting Advisor*

PUBLICATIONS

16. BOOKS AND MONOGRAPHS PUBLISHED

1. Sumanth,D.J., **How to Set Up a Productivity Program in Companies**, June 1981 (46 pages).

2. Hassan, M.Z., ShanthaKumar, P., and Sumanth, D.J., **A User's Manual for the Total Productivity Model**, A & M Printing , Inc., Chicago, July 1981 (77 pages).

3. Sumanth, D.J., **PQ Teams : Team Member Manual**, Aug.1981 (102 pgs).

4. Sumanth, D.J., **"PQ Teams : Facilitator Manual"**, Aug.1981 (115 pgs).

5. Sumanth, D.J., **Productivity Engineering and Management**, McGraw-Hill, New York, 1984 (567 pgs). (first book on the subject; has been accepted well in more than 25 countries, and has helped in initiating new courses on Productivity Engineering, and Productivity Management, at a number of universities and companies).

6. Sumanth, D.J., **Instructor's Manual for Productivity Engineering and Management**, McGraw-Hill, Inc., New York, N.Y, 1984 (252 pgs).

7. Sumanth, D.J., **The 3P Formula**, Copyright 1985.

8. Sumanth, D.J., **The MTC Formula**, Copyright 1985.

9. Sumanth, D.J., **Total Productivity Management** (Script and Audio cassette, 1985; video cassette, 1989).

10. Sumanth, D.J., **Productivity Engineering and Management**, International Student Edition, McGraw-Hill Book Co., Singapore,1985.

11. Sumanth, D.J. (editor), **Productivity Management Frontiers-I**, Elsevier Science Publishers, The Netherlands, 1987 (491 pages).

12. Sumanth, D.J., and Edosomwan, J.A., **Productivity Measurement Guide (PMG)**, 1988 (350 pages)(in negotiation with a publisher).

22. Sumanth, D.J., and Rao, V., **"A Correlation Study of Productivity and Some Social and Economic Indicators in the U.S."**, *Academy of Management Journal* (Submitted, Dec. 23, 1988).

23. Sumanth, D.J., and Nag, D., **"White-collar/Knowledge Worker Productivity Measurement: A Review Based on Organizational Levels"**, *IEEE Transactions on Engineering Management* (submitted: Aug. 18, 1989).

24. Sumanth, D.J., and Nag, D., **" An Analytical Approach for the Measurement of White-collar/Knowledge Worker Productivity in Organizations"**, *IEEE Transactions on Engineering Management* (submitted: Aug. 11, 1989).

25. Sumanth, D.J., and Adya, B., **"Application of the 'Productivity Cycle' to U.S. Bus Transit"**, *ASCE Journal of Management in Engineering* (submitted: Aug. 21, 1989).

26. Sumanth, D.J., and Adya, B., **"State-of-the-Art Review in Bus Transportation Productivity"**, *ASCE Journal of Management in Engineering* (submitted: Aug. 7, 1989).

34. Beruvides, M., Omachonu, V.K., and Sumanth, D.J., **"A Conceptual Framework of Work: The Measurement of White-Colar/Knowledge Productivity"**, in Sumanth, D.J., Edosomwan, J.E., Sink, D., and Werther, W. (editors), *Productivity Management Frontiers - II*, Inderscience Enterprises Ltd., Geneva, Switzerland, 1988, pp. 39-46.

35. Sumanth, D.J., and Genie, I., **"Total Productivity Management for Competitive Decision-Making in the Electronic Industry"**, in Edosomwan, J.E., and Ballakur, A. (editors), *Productivity and Quality Imrovement in Electronic Assembly*, IIE Press/McGraw-Hill, 1989, pp. 107-120.

36. Sumanth, D.J., **"An Understanding of the Technology - Total Productivity Connection"**, in Khalil, T.M., and Bayraktar, B., (editors), *Management of Technology II*, IIE Press, pp. 1079-1087.

18. NON-REFEREED PUBLICATIONS

18 (a) Papers in Non-refereed Journals :

37. Sumanth, D.J., Hassan, M.Z., and Block, S.M., **"Productivity in Manufacturing Companies"**, *Manufacturing Productivity Frontiers Journal*, Oct. 1979, pp. 1-5.

38. Sumanth, D.J., and Hassan, M.Z., **"Productivity Measurement in Manufacturing Companies"**, *Manufacturing Productivity Frontiers Journal*, Sept. 1980, pp. 12 - 18.

39. Sumanth, D.J., and Einspruch, N.G., **"Productivity Awareness in the U.S:A survey of some Major Corporations"**, *Industrial Engineering*, October 1980, pp. 84 -90.

40. Sumanth, D.J., **"Productivity Indicators used by Major U.S. Manufacturing Companies : The Results of a Survey"**, *Industrial Engineering*, May 1981, pp.70-73.

41. Sumanth,D.J., **"Survey Results: How Major Non-Industrial Corporations Measure their Productivity"**, *Industrial Engineering*, Sept.1981, pp. 33 - 34.

51. Sumanth, D.J. and Del Pino, L., **"Equipment Selection and Justification through Total Productivity Analysis**, *Proceedings of the 8 th Annual Conference on Computers & Industrial Engineering,* 1986, pp. 91-94.

52. Sumanth, D.J., and Soi, J.C., **"A Micro Computer Decision Support System for the Total Productivity Model (TPM)"**, *Proceedings of the 8th Annual Conference on Computers & Industrial Engineering,* 1986, pp. 32-35.

53. Sumanth, D.J., Weiss, H.J., and Labaraque, J.A., **"A Case Study in the Application of the Total Productivity Model (TPM) to an Urban Transit Agency"**, *IIE Proceedings*, Fall Conference, Boston, 1986, pp. 276-284.

54. Sumanth, D.J., Carrillo, M.A., and Koganti, S.P.,**"Economic Analysis in Constructing a Secondary Road with Phosphogypsum using Total Productivity Modeling"**, *Condensed Papers of the Second International Symposium on Phosphogypsum*, Dec. 1986, pp. 228-234.

55. Sumanth, D.J., **"Total Productivity Management – An Alternative for the 80's and Beyond"**, *Proceedings of the TIMS/ORSA Conference*, Oct. 1986.

56. Sumanth, D.J., **"Some Principles of Total Productivity Management"**, *Proceedings of XXVII National Convention, IIIE,* 1986, pp.161-172.

57. Sumanth, D.J., and Dedeoglu, M., **" An Expert System Approach to Productivity Measurement"**, *Proceedings of the 9 th Annual Conference on Computers & Industrial Engineering*, Atlanta, March, 1987, pp. 21-25.

58. Sumanth, D.J. and Gonzalez, C. **" A 'Productivity Engineering' Approach to Selecting and Running a Business Profitably"**, *IIE Proceedings*, International Spring Conference, Orlando, 1988, pp. 333-338..

59. Sumanth, D.J., **"The Experiences of Productivity Measurement in the U.S.A. "**, *Proceedings of the National Conference on Productivity Measurement & Analysis,* NPC, Malaysia, July 4 - 5, 1989.

69. Sumanth, D.J., **"People-oriented Productivity Management"**, *Productivity Improvement Excerpts*, Vol. 4, No. 1, 1985, pp. 3-5.

70. Sumanth, D.J., **"It's Time for Total Productivity Thinking (TPT)"**, *Productivity Improvement Excerpts*, Vol. 7, No. 2, April 1988, pp. 3-5.

71. Sumanth, D.J., Weiss, H.J., and Adya, B., **A Study of the Impact of Automation on Total Productivity in Bus Maintenance Facilities**, Final Report to the Urban Mass Transit Administration, Department of Transportation, Washington, D.C., Dec. 1988.

72. Sumanth, D.J., **"Managing Technological Changes and Discontinuties,"** in Edosomwan, J.E., *Integrating Innovation and Technology Management*, John Wiley & Sons, 1989, pp.16-20; 187-192.

19. OTHER WORKS ACCEPTED FOR PUBLICATION/ WORKING PAPERS

73. Sumanth, D.J., and Saca, F., **"A Quantitative Model for Productivity Improvement Award"**, December, 1983.

74. Sumanth, D.J., and Meleau, L., **"A Productivity Oriented Approach to Robotic Investment Analysis"**, Jan. 1984.

75. Sumanth, D.J., and Uzcategui, R., **"Impact of Robotics : An Industrial Engineering Perspective"**, Jan. 1984.

76. Sumanth, D.J., and Yavuz, F.P., **"Short-run Productivity Planning in Companies"**, July 1984.

77. Sumanth, D.J., and Lakhani, S., **"The Total Productivity-Quality Connection"**, Dec.1984.

78. Sumanth, D.J., and Wongsaroj, B., **"An Application of the Total Productivity Model in Restaurant Business"**, Jan. 1985.

79. Sumanth, D.J., and Jarp, G., **"Application of the Total Productivity Model to an Architectural Engineering Firm"**, May1986.

80. Sumanth, D.J., and Alonso, A., **"A Unique, Inter-City, Productivity**

20. EDITORIAL RESPONSIBILITIES :

- *Editor* (of *refereed* papers) for the *First International Conference on Productivity Research,* February 4-6, 1987.
- *Editor* (of refereed papers) for the *Second International conference on Productivity Research*, to be held February 22-24, 1989.
- *Elected Member of the Editorial Advisory Board, Journal of the Indian Institute of Industrial Engineering (refereed)*, April 1986 - Present.

21. PROFESSIONAL AND HONORARY ORGANIZATIONS

MEMBERSHIPS :

- American Institute of Industrial Engineers (AIIE) - *Senior Member*
- Operations Research Society of America (ORSA) - *Past Member*
- American Association for the Advancement of Science - *Past Member*
- Society for Technical Communication - *Past Member*
- American Society for Engineering Management (ASEM) - *Charter Member*
- Alpha Pi Mu - *Member*
- Sigma Xi - *Member*
- South Florida Manufacturers Productivity Council - *Advisory Member*
- International Biographical Association - *Fellow*
- World Academy for Productivity Science - *Fellow*

POSITIONS HELD :

- *Treasurer*, Alpha Pi Mu National Honor Society, IIT Chapter, September - December 1976.

22. HONORS AND AWARDS

1961	**First Prize Awardee**, High School Certificate.
1967	**"High Distinction" in B.E.** (Mechanical Engineering), Osmania University.
1969	**"High Distinction" in M.E.** (Production Engineering), Osmania University.
1969	**YMCA Gold Medalist** for standing first in the Osmania University in M.E. Program.
1973 - 1974 **1975 - 1978**	**Teaching Assistantship,** Dept. of Industrial and Systems Engineering Illinois Institute of Technology, Chicago.
1978	**Research Assistantship,** Dept. of Management Sciences Illinois Institute of Technology, Chicago.
1978 - 1979	**Teaching Assistantship,** Dept. of Management Sciences Illinois Institute of Technology.
1979	**"Outstanding Graduate Student of the Year",** Dept. of Industrial and Systems Engineering Illinois Institute of Technology
1980 -	Listed in the **"Directory of World Researchers of 1980's"**, The International Technical Information Institute, Tokyo, Japan.
1980	**Diploma of Recognition,** La Universidad Regiomontana, Mexico.
1980	**Certificate of Recognition,** University of Miami Energy Task Force, Miami.
1981	**Certificate of Service,** American Institute of Industrial Engineers, Miami.

22. HONORS AND AWARDS (contd.)

1986	**Fellow**, Eaton Honors College, Univ. of Miami.
1986, 1989	**Nominee**, Alexander Orr, Jr. Excellence in Teaching Award
1987	**George Washington Honor Medal for Excellence in Economic Education** (for "outstanding contributions to Productivity Education"), The Freedoms Foundation at Valley Forge, Pa. (April).
1987	**Membership** given in Dade County's **Science-Technology Alliance to Upgrade Services** (STATUS) (June)
1987	**"Award of Appreciation"** Dade County School Board: South Center for Excellence R.R. Moton Elementary School (August).
1987	**Nominee for Leavey Award for Excellence in Private Enterprise Education** The Freedoms Foundation at Valley Forge, Pa. (July).
1988	**Nominee for Leavey Award for Excellence in Private Enterprise Education** The Freedoms Foundation at Valley Forge, Pa. (March).
1988	**Diploma of Recognition for initiating "Productivity Engineering" Education,** La Universidad Francisco Marroquin, Guatemala (May).
1988/89	**Who's Who in the South and South West** MARQUIS Who's Who, USA (21st Edition).
1988	**Who's Who in Finance and Industry** (26th Edition) MARQUIS Who's Who, USA.
1989	**Men of Achievement** (14th Edition), International Biographical Centre,Cambridge, England.

23. POST - DOCTORAL FELLOWSHIPS:

1. **Invited Scientific Committee Member and Keynote Speaker**, Fourth Cairo International Conference on Mechanical Design and Production, Cairo, Egypt, Dec. 27 -29, 1988 (*Travel & Accommodation Grant from USAID*).

2. **Invited Keynote Speaker,** National Conference on Productivity Measurement & Analysis, Malaysia, July 4-5, 1989 (*Travel & Accomodation Grant from NPC, Malaysia*)

3. **Invited Keynote Speaker**, Third Conference of the Productivity of the Americas, April 16-18, 1989 (*Travel & Accomodation Grant from INTECAP, Guatemala*)

4. **Invited Speaker**, Seminar on Total Productivity Management, Guatemala, March 26-27, 1990 (*Travel & Accomodation Grant from IESC, Guatemala*).

Funding Amount : **$ 1,400**
Topic : Assessing the need for a Productivity Center at Francisco Marroquin University
Report Submitted : August, 1988

8. Atarraya Project:

Principal Investigator : Dr. D.J. Sumanth
Graduate Research Assistants : Bakulesh Adya
Vishwanatha Rao
Funding Period : Nov. 1988 - May 1989
Funding Amount : **$ 12,000**
Topic : Training in the "Total Productivity Management Process"

9. UM Quality Institute Project # 1:

Principal Investigator : Dr. D.J. Sumanth
Graduate Research Assistants : Vishwanatha Rao
Debraj Nag
Funding Period : May 1989 - August 1989
Funding Amount : **$ 3,000**
Topic : Researcch/Teaching Module on "Explicit Relationships between Quality and Total Productivity"

10. UM Quality Institute Project # 2:

Principal Investigator : Dr. D.J. Sumanth
Graduate Research Assistants : Vishwanatha Rao
Funding Period : Dec. 1989 - August 1990
Funding Amount : **$ 6,000**
Topic : The Concept of Quality in Value Analysis/Value Engineering.

Total *Sponsored* Research Funding to-date: $ 227,572

Other Grants Received todate: $ 11,050

25(a). SPONSORED AND FUNDED RESEARCH (contd.):

4. The Allen Morris Company Project

Sponsorer	: The Allen Morris Construction Co.
Principal Investigator	: Dr. D.J. Sumanth
Student Assistant	: Zulaima Karcomez
Funding Period	: Jan. 1 - Sept. 30, 1987
Funding Amount	: **$ 6,000**
Research Objective	: Develop a Productivity Monitoring System.

5. UMTA Productivity Project :

Principal Investigator	: Dr. D.J. Sumanth
Graduate Research Assistants	: Henry J. Weiss Bakulesh Adya
Funding Period	: March 1987-Aug.1988
Funding Amount (UMTA+UM)	: **$ 84,725**
Research Topic	: A Study of the Impact of Automation on the Productivity of Bus Maintenance Facilities
First Progress Report submitted	: June, 1987
Final Report submitted	: December, 1988

6. Dade County School Project:

Principal Investigator	: Dr. D.J. Sumanth
Graduate Research Assistants	: Bakulesh Adya Vishwanatha Rao
Funding Period	: Aug. 1987 - Dec. 1988
Funding Amount	: **$ 1,000**
Research Topic	: Mission Statement and Strategic Planning for R.R. Moton South Center for Excellence

7. Francisco Marroquin Foundation Project:

Principal Investigator	: Dr. D.J. Sumanth
Funding Period	: May 1988 - Aug. 1988

13. Productivity Evaluation of U.S. Auto Companies

Principal Investigator	: Dr. D.J. Sumanth
Student Assistant (from CLR Program)	: Sherry Shievitz
Research Period	: September '84 - January '85
Research Objective	: Study the four major US auto companies (G.M., Ford, Chrysler, and American Motors) from productivity point of view
Results to date	: Some unexpected findings so far. More research is under way for further investigation
Application Potential	: The U.S. auto makers' policies of management may be directed in a different framework.

14. Space Manufacturing for higher Quality and Productivity

Principal Investigator	: Dr. D.J. Sumanth
Student Assistant (CLR Pgm.) (Sept. '84 - June '85)	: Terrence Harcharik
Research Period	: January 1984 onwards
Research Objective	: Study the potential for and advantages of producing certain products and materials in the outer space.
Results to date	: Three (3) particular items have been identified from a productivity, quality, and cost advantage point of view.
Application Potential	: Very high (for electronics and pharmaceutical companies)

26. THESES AND DISSERTATION ADVISING

26a. Master's Theses

1. **"Implementation of the Total Productivity Model (TPM) in a Manufacturing Company"**, J.Edosomwan, Dept. of Industrial Engineering, University of Miami, Aug. 1979 - July 1980. (*Chairman* - Thesis Committee).

2. **"Productivity Improvement: Conceptual Framework and Models for Manufacturing Companies"**, V.K. Omachonu, Dept. of Industrial Engineering, University of Miami, Aug. 1979 - July 1980. (*Chairman* - Thesis Committee).

3. **"Company-level Investigation of Performance Measures**, Filiz P. Yavuz, Dept. of Industrial Engineering, University of Miami, Aug. 1981 - Aug. 1982. (*Chairman* - Thesis Committee).

4. **"Analysis of Modified Total Productivity in U.S. Bus Transit"**, Bakulesh Adya, Dept. of Industrial Engineering, University of Miami, May 1988 - Aug. 1989 (*Chairman* - Thesis Committee).

5. **"An Expert System for the 'Productivity Cycle'"**, Vishwanatha Rao, Dept. of IE, University of Miami, May 1988 - Present (*Chairman* - Thesis Committee).

6. **"An Analytical Model to Measure White-Collar and Knowledge Work"**, Debraj Nag, Dept. of IE, University of Miami, Sept. 1988 - Aug. 1989 (*Chairman* - Thesis Committee).

7. **"Load and Resistance Factor Design of Steel Frames Using An Expert Systems Approach,"** Vishwanatha Rao, M.S. in Civil Engineering, Dept. of Civil Engineering, University of Miami, Aug. 1987 - Aug. 1989. *(External Committee Member).*

8. **"An Analytical Approach to Understanding the relationships between Quality and Productivity,"** Davinder Arora, Dept. of IE, University of Miami, May 1989-Present (*Chairman* - Thesis Committee).

9. **"A Comparative Analysis of French and American Approaches to Productivity Management,"** Anne Mesrouze, Dept. of IE, University of Miami, Jan - Dec. 1989 (*Chairman* - Thesis Committee)

26b. DOCTORAL DISSERTATIONS

1. **"Controversy in Time Studies"**, Joel K. Feldman, Interdepartmental Ph.D., September 1982 - April, 1984. (Chairman of Thesis Committee: Dr. Harold Berkman; *Committee Members*: Dr. Edward Deming, Dr. Paul Hertz, Dr. Howard Gitlow, *Dr. David Sumanth*, Dr. Carol Truss).

2. **"A Unified Approach to Measuring Technology and Productivity in Manufacturing Industry"**, Mohamed, A., Ph.D. Program, Dept. of Industrial Engineerung, University of Manitoba, Canada (1983 - '86). *(External Advisor).*

3. **"Analysis and Synthesis of Multi-valued Logic Networks"**, Tayeb Guima, Ph.D. in Computer Engineering, Dept.of Electrical & Computer Engineering, Univ. of Miami, 1986 - 1987. *(Committee Member).*

4. **"An Analytical Study for Evaluating Operational Effectiveness Using Aggregate Production Planning Models"**, R.S. Shah, Ph.D. in Mechanical Engineering Dept., Indian Institute of Technology, Bombay. (*Invited External Reader*, Sept. 1987 - Aug. 1988).

26c. UNDERGRADUATE PROJECTS SUPERVISED at the University of Miami

Because of the very large number of projects, and to preserve space here, only a summary is given. Detailed list is given upon request.

Year	No. of Projects Supervised
1979	25
1980	52
1981	31
1982	32
1983	47
1984	35
1985	30
1986	20
1987	24
1988	18
1989	38
1990 (Spring)	17

	351

27. UNIVERSITY COMMITTEE AND ADMINISTRATIVE RESPONSIBILITIES

A. COMMITTEE WORK :

1979 - 1983; 1984 - 1988	**Affirmative Action Committee**	Member
1979 - 1983	**Space Committee**	Member
1980 - 1983	**Ethics Committee**	Member
1982	**ASEE Research Award Selection Committee**	Member
1982 - 1983	**Honors Program Committee**	Member
1984	**Chairman-Search Committee**	Member
1983 - 1984	**Teaching Improvement Comm.**	Member
1984 - Present	**University Women and Minorities Committee**	Member
1981,'83 and '84	**Telephone Campaign for New Students**	Participant
1984 (May)	**Consultative Committee for New Chairman**	Member
1984 - Present	**University Library Committee**	Member
1984 - Present	**Scholastic Standards and Advising Committee**	Member
1984 - 1986	**Distinguished Alumnus Award Committee**	Member
1984 - 1987	**Tenure and Promotion Review (COE) Committee**	Member
1985 (Sept.)	**Architect Selection Committee**	Member

11-13,1985; May 12-15, May 28-June 2, Dec. 1-5, 1986; Feb. 24-27, Apr. 16-18, Apr. 23-24, Aug. 3-10, Sept. 21-22,1987; a few times in 1988, June 5-8, 1989; etc.)

ADMINISTRATIVE WORK (contd.)

1982 - 1983	**President**, Miami Chapter, American Institute of Industrial Engineers.
1982 - 1983	**Co-Chairman**, Region IV Conference on Productivity Engineering and Management.
1983 - 1985	**Principal Research Coordinator**, IBM Robotics Project.
1984	**Interim Chairman** (at Dean's request), IE Department, Univ. of Miami (June 1 - August 20).
1984 - Present	**MBA/MSIE Program Coordinator**, College of Engineering, Univ. of Miami
1985 - 1987	**Chairman**, First International Conference on Productivity Research, Feb. 4-7, 1987, Miami.
1988	**Session Chairman**, International Conference on Technology Management, Feb. 19, 1988.
1988	**Session Chairman**, Fourth International Cairo Conference on Mechanical Design and Production, Dec. Dec 27 - 29, Cairo, Egypt.
1987 - 1989	**Chairman**, Second International Conference on Productivity Research, Feb. 22-24, 1989, Miami.
1988	**Session Chairman**, Second International Conference on Technology Management, Feb. 27 - March 2, 1990.
1989 - 1991	**Chairman**, Third International Conference on Productivity & Quality Research, to be held in Miami, Feb. 22-24, 1991.

28. COMMUNITY ACTIVITIES (contd.)

1986	Quality Circle Trainer for the Physical Therapy Staff, **South Miami Hospital**
1987	Productivity Advisor, **Development Division, Univ. of Miami**
1987 -	Chairperson for Research, in the Management Division at the National level, **American Institute of Industrial Engineers**
1987 -	Productivity Management Advisor, South Center for Excellence, R.R. Moton Elementary School, **Dade County School System.**
1988 -	Member, Special Productivity Projects Committee, **American Institute of Industrial Engineers.**
1989	Special Advisor, Academic Advisory Committee, **Jawaharlal Nehru Technological University, India**
1989	Member, Study Committee on Women Deacons, **University Baptist Church**
1990	Participant, Career day Educational Activities, **Coral Reef Elementary School**

10. Aug. 11- 12, 1983: "Management of Productivity for Higher Profits", 2-day workshop for the **Hyderabad Management Association**, India.

11. Mar. 6- 7, 1984: "Productivity Measurement, Improvement Strategies and Techniques", 2-day workshop for the **Christian College of Business and Entrepreneurial Management,** in Hotel Banjara, Hyderabad, India.

12. Feb. 13, 1985: "PQ Team Approach to Productivity Management", A Half-Day Seminar for the Departmental Supervisors of Rehab. Services, **South Miami Hospital.**

13. July 18 - 19, 1985: "Total Productivity Management" and "Quality Circles Management", 2-day seminars for **Kodela Co., Curacao, Netherland Antilles.**

14. Jan. 15-17, 1986: "TPMP Process" - a short course for **Kodela Co., Curacao, Netherlands Antilles.**

15. Jan. 23, 1986: "Productivity Measurement and Improvement",1-day seminar and Panel Discussion, for the **Jamaican Institute of Management and Production/ Jamaican Manufacturers Association.**

16. Feb. 13, 1986: Invited Panelist on "Productivity Measurement" at the **IIE Pacific Rim Productivity Conference**, Maui, Hawaii.

17. March 17-18, 1986: "Total Productivity Measurement and Improvement" 2-day Seminar for Business Executives, conducted at the **University of California, Berkeley.**

18. April 30 - May 1, 1986: "Total Productivity Management Concepts" - half-day seminars for Executives and Middle Managers, organized by the **International Institute of Management (Switzerland)** in cooperation with Alcan Company, Jamaica.

19. June 27, 1987: " Total Productivity and Quality Management Process", 7-hour Seminar for **GELCO** supervisors & staff at Holiday Inn, NW 36th St., Miami.

29b. TECHNICAL LECTURES/PAPERS PRESENTED

1. March 15, 1979: "Productivity Measurement Models for Manufacturing Companies", 1-hour presentation, **University of Miami.**

2. March 16, 1979: "Investment Casting," 1-hour presentation, IE Dept., **Univ. of Miami.**

3. April 4, 1979: "Productivity Measurement in Manufacturing Systems", 1- hour presentation, **Univ. of California, Berkeley.**

4. May 13, 1980: "Productivity Measurement in Manufacturing Companies by using a Product-oriented Total Productivity Model", presentation (with Dr. M. Z. Hassan), **AIIE Spring Annual Conference**, Detroit.

5. Sept. 28, 1980: "Productivity Measurement in Companies Using the Total Productivity Model (TPM)", Paper at the III Symposium of Industrial and Sustems Engineering, **Universidad Regiomontana, Monterrey, Mexico.**

6. Oct. 3, 1980: "Productivity Measurement in Manufacturing Companies", 1-hour Graduate Seminar, **Mechanical Engineering Dept., Univ. of Miami.**

7. Oct. 6, 1980: "Productivity Management: A Challenge for the 80's", Paper at the **First Annual Conference of the American Society for Engineering Management, St. Louis.**

8. Feb, 10, 1981: "Productivity Measurement in Companies", a 1-hour presentation, **South Florida Manufacturers Association Productivity Council** (SFMAPC), at the Palmaire Country Club, Pompano Beach.

9. Feb. 11, 1981: "Productivity Management for Organizations", presentation in a seminar conducted by **The Productivity Center** (TPC), at the Faculty Club, University of Miami.

10. Feb. 17, 1981: "How to Set Up a Productivity Measurement Program in a Company", a talk at the **Miami Chapter of American Institute of Industrial Engineers**, at Tony Roma's, Miami.

23. March 21, 1986: "Equipment Selection and Justification through Total Productivity Analysis", **8th Annual Conference on Computers and Industrial Engineering**, Orlando. (Co-author: Lourdes Del Pino).

24. March 21, 1986: "A Micro Computer Decision Support System for the Total Productivity Model (TPM)", **8th Annual Conference on Computers and Industrial Engineering**, Orlando. (Co-author: Juan C. Sol).

25. Oct. 28,1986: "Total Productivity Management - An Alternative for the 80's and Beyond", **TIMS/ORSA Conference**, Miami.

26. Nov. 1986: "A Case Study in the Application of the Total Productivity Model (TPM) to an Urban Transit Agency" (Co-authors: Henry Weiss, and J.A. Labaraque), **IIE Fall Conference**, Boston.

27. Dec. 12,1986: " Economic Analysis in Constructing a Secondary Road with Phosphogypsum using Total Productivity Modeling" (Co-authors: Manuel Carrillo, and Siva Koganti), **2nd International Symposium on Phosphogypsum**, Miami.

28. Jan 5, 1987: " Benefits of Productivity Management for Construction Companies", **Allen Morris Construction Co.**, Miami.

29. Feb. 4, 1987: " Knowledge Work: A Conceptual Analysis and Structure" (Co-presentor: Mario Beruvides), **First International Conference on Productivity Research**, Int. Conf. Center, Miami.

30. Feb. 5, 1987: "Company-level Investigation of Performance Measures as related to Total Productivity" (Co-presentor: Filiz P. Yavuz), **First International Conference on Productivity Research**, Miami.

31. Feb. 6, 1987: " The Comprehensive Total Productivity Model -- A Step Beyond the 'TPM'", **First International Conference on Productivity Research**, Miami.

32. March 1987: " Productivity Measurement Using an Expert System " (Co-author: Mehmet Dedeoglu), **9 th Annual Conference on Computers & Industrial Engineering**; Atlanta.

33. May 6, 1987: "Are You Total Productive ..... Lately?", 1-hour presentation to the **Development Staff of the University of Miami** at the University Faculty Club.

45. Dec. 29, 1988: " The Power of Total Productivity Management for Competitiveness in the 1990's and Beyond", **Invited Keynote Paper presented at the Fourth Cairo University International Confernce on Mechanical Design and Production, Cairo, Egypt.**

46. Feb. 22, 1989 : "Productivity: How to Measure It, Improve It and Recognize It," James L. Knight Center, **Hyatt Regency Hotel, Miami.**

47. March 5, 1989 : ""Productivity," A talk on the Rong King Show, **WLFY-FM, 101.5, Radio.**

48. March 22, 1989 : "Construction Productivity," Presentation at **Florida International University, Miami.**

49. April 18-21, 1989, "The PQT Approach to Management" (Keynote paper), Third Productivity Conference of the Americas, organized by the **INTECAP** at Camino Real Hotel, Guatemala city.

50. July 4, 1989 : "The Experiences of Productivity Measurement in USA", National Conference on Productivity Measurement and Analysis at **NPC, Malaysia.**

51. July 21, 1989: "Management By Love" Speech for the **Hyderabad Management Association, Hyderabad, India.**

52. July 22, 1989: "Challenges & Opportunities in Modern-Day Teaching", a 1- hour lecture to 140 lecturers & teachers, at the **David Memorial Junior College, Hyderabad, India.**

11. "Productivity Improvement through Employee Participation at Mt. Sinai Medical Center" (Sept. 1986).

12. "Gainsharing: A Financial Incentive to Motivate Employees" (Sept. 1986).

13. "Motivating Employees to Motivate" (Sept. 1986).

14. "A Model for Measuring R & D Productivity" (Sept. 1986).

15. "Strategic Productivity, A Marketing Advantage" Aug. 1986).

16. "A Case Study: Using a DSS Model as a Productivity Measure" (Sept. 1986).

17. "Quality Circles and Productivity Improvement in a New Factory" (Aug. 1986).

18. "Productivity Evaluation for Modern Manufacturing Technology" (Aug. 1986).

19. "Goal Setting, Need for Achievement and the Hard Impossible Threshold: Contradiction or Productivity Opportunity?" (Sept. 1986).

20. "The Impact of Product Quality on Productivity Improvement" (Aug. 1986).

21. "Performance Action Teams: A Case Study" (Sept. 1986).

22. "Productivity Management Training" (Sept. 1986).

23. "White-Collar Productivity" (Sept. 1986).

24. "Productivity Management: An In-depth Study of Selected U.K. Organizations" (Aug. 1986).

25. "System for Integrated Measurement and Analysis of Productivity (SIMAP)". Paper reviewed (June 1987) for the refereed journal: **IIE TRANSACTIONS**.

26. "Technological Innovation in Canada: A Comparison of Independent Entrepreneurs and Corporate Innovators". Paper refereed, Oct.1, 1987, for the **First International Conference on Technology Management**

CURRICULUM VITAE

1. Date: April 1990

PERSONAL

2.	Name:	Jill Anne Swift
3a.	Home Phone:	(305) 221-3994
3b.	Office Phone:	(305) 284-2393
4.	Home Address:	3415 S.W. 108 Ct. Miami, FL 33165
5.	Employment Status:	Full-time
6.	Current Academic Rank:	Assistant Professor
7.	Primary Department:	Industrial Engineering
8.	Citizenship:	United States
9.	Visa Type:	None

12. Certification, Licensure:

1981	Engineer-In-Training National Society of Professional Engineers
1988	Quality Engineer American Society for Quality Control

EXPERIENCE

13. Instructional:

1980-1981	Memphis State University Memphis, Tennessee Mechanic of Materials Lab Instructor
1983-1984	College of Boca Raton Boca Raton, Florida Instructor Courses Taught: Statistics I Statistics II, Physics, Advance Physics, Trigonometry, and Algebra
1984-1985	Oklahoma State University Stillwater, Oklahoma Computer Programming Lab Coordinator
1986-1987	Oklahoma State University Stillwater, Oklahoma Teaching Assistant in School of Industrial Engineering and Management Courses Taught: Engineering Economics
1987-present	University of Miami Coral Gables, Florida Assistant Professor of Industrial Engineering Courses Taught: Quality Control and Reliability, Manufacturing Information Systems, Engineering Economics

14. Professional:

1979-1980	Principal Investigator on "Inexpensive and Accurate Measurement of Residential Gas Flow for Remote Computer Monitoring" Funded by National Science Foundation Contract No. SPI-8005193 Memphis State University Memphis, Tennessee

17. Juried or Refereed Journal Articles:

1. Swift, Jill A. and Timothy Flynn, "Methodology for Developing a Quality Plan Within a Manufacturing Company". Quality Engineering, Volume 1, Number 4, 1989.

2. Swift, Jill A., "An Interactive Program for Applying the AT&T Run Rules on a X Bar and R Chart". Journal of Quality Technology, submitted April, 1990.

18. Other Publications:

18a. Thesis and Dissertation:

1. Green, Jill A., "Degree of Robot Versatility". Unpublished Master's Thesis, Memphis State University Memphis, Tennessee, 1982.

2. Swift, Jill A., "Development of a Knowledge Based Expert System for Control Chart Pattern Recognition and Analysis". Ph.D. Dissertation, Oklahoma State University, Stillwater, Oklahoma, 1987.

18b. Grant Reports:

1. Green, Jill A. and et al. "Inexpensive and Accurate Measurement of Residential Gas Flow For Remote Computer Monitoring". Final Report, NSF Grant No. SPI-8005193, Washington D.C., 1980.

2. Swift, Jill A. "Development of an Expert System/Quality Control Model for the Enhancement of American Industries". Final Report, NSF Grant No. ENG-8808560, Washington D.C., 1989.

18c. Articles in Conference Proceedings:

1. Green, Jill A., "Management for Research Projects: A Synergistic Model". Proceedings of the Project Management Institute Annual Conference. Toronto, Canada, 1982.

2. Green, Jill A., "Quality Control and Artificial Intelligence and Its Relationship to Computer Integrated Manufacturing". Proceedings of the Engineering and Industrial Software/Computing Conference and Exhibition. Chicago, Illinois, 1987.

21b. Positions Held:

* NCEE Questions Committee Chairperson
  IIE Quality Control & Reliability Division
  IIE National Chapter
  1988-1989

* Director of the Institute of Industrial Engineers
  Miami Chapter
  1988-1990

* Faculty Advisor for Alpha Pi Mu, University of Miami
  Student Chapter, 1988 - present

* Research Chairperson
  IIE Quality Control & Reliability Division
  IIE National Chapter
  1989-1990

* Review and Development Team Member
  IIE Career Guidance Film
  IIE National Chapter
  1990

22. Honors And Awards:

* Undergraduate Scholarship
  Memphis State University, 1977-1981

* First Place, Student Research Award
  Project Management Institute, 1981

* Third Place, National Paper Competition for "Computer-Aided Energy Conservation Techniques"
  Society of Women Engineers

* Honorable Mention, Regional Paper Competition for "Design and Development of a Low Flow Gas Monitoring System"
  American Society of Mechanical Engineers

* Who's Who Among Students in American Universities and Colleges, 1981

* Outstanding Senior
  Mechanical Engineering Department
  Memphis State University, 1981

* Graduate Fellowship
  Memphis State University, 1982

3. "Development of an Expert System/Quality Control Model for the Enhancement of American Industries".
   National Science Foundation Grant
   Miami, Florida
   1988-1989
   Principal Investigator, $10,000

4. "Expert System Workshop for Engineering Faculty Enhancement".
   National Science Foundation
   Miami, Florida
   1988-1989
   Co-Principal Investigator, $61,544

5. "Development of Quality Manual for Trio-Diode Line".
   Renard Manufacturing Co.
   Miami, Florida
   1989
   Principal Investigator, $5,000

6. "Faculty Development for Quality".
   University of Miami Quality Institute
   Miami, Florida
   1989-1990
   Principal Investigator, $17,157

7. "Workshop in Expert Systems and Applications for Engineering and Science Faculty Professional Development"
   National Science Foundation
   Miami, Florida
   1989-1990
   Co-Principal Investigator, $71,107 (Pending)

TOTAL RESEARCH FUNDS RECEIVED: $110,957

TOTAL RESEARCH FUNDS PENDING: $71,107

26. Thesis And Dissertation Advising:

26a. Master's Theses Supervised (Chairman):

1. E. J. Alvarez, "Evaluation of Scheduling Rules in Automatic Storage and Retrieval Systems".
   Department of Industrial Engineering
   University of Miami
   December, 1988

2. Jeffery T. Flynn, "Methodology for JIT Implementation".
   Department of Industrial Engineering
   University of Miami
   August, 1989

3. ABET Review Committee
   Department of Industrial Engineering
   University of Miami, 1988

4. Development Chairman for University of Miami Quality Program's Master's Degree Program
   University of Miami, 1988

5. Liaison to University of Miami Institute for the Study of Quality in Manufacturing and Service
   Department of Industrial Engineering
   University of Miami, 1988 - present

6. Computer Lab Co-ordinator
   Department of Industrial Engineering
   University of Miami, 1988 - 1989

7. Chairman of Faculty Search Committee
   Department of Industrial Engineering
   University of Miami, 1989

8. Development Co-ordinator & Chairman of Honors Committee
   Department of Industrial Engineering
   University of Miami, 1988 - 1989

9. Member of Honors Committee
   Department of Industrial Engineering
   University of Miami, 1989 - present

28. Community Activities:

* Director of Institute of Industrial Engineers
  Miami Chapter
  1988-1990

* Faculty Advisor to Alpha Pi Mu
  1988 - present

29. Other Professional Information:

29a. Technical Presentations:

1. "Inexpensive and Accurate Measurement of Residential Gas Flow for Remote Computer Monitoring".
   National Science Foundation
   Washington, D.C., 1980

2. "Design and Development of a Low Flow Gas Monitoring System".
   Regional Conference
   American Society of Mechanical Engineers
   Gulfport, Mississippi, 1981

VITA

EARL L. WIENER

Dept. of Management Science
Box 248237
University of Miami
Coral Gables, FL 33124

Phone: (305) 284-6595
FAX: 284-6526
Home: 661-3187
E-mail: EWIENER@UMIAMI.MIAMI.EDU

Born: Shreveport, LA, 1933
Marital status: married

EDUCATION

BA Duke University (Psychology) 1955
MA Ohio State University (Psychology) 1959
PhD Ohio State University (Psych. and Indust. Engineering) 1961

Woodrow Wilson Foundation Fellow, 1958-59
Post-doctoral Fellow, Univ. of Calif. (Berkeley), 1968-69

MILITARY EXPERIENCE

1955-57 USAF multi-engine pilot, Military Air Transport Service
1959-63 US Army National Guard and Reserve, pilot
1960 US Army Primary Helicopter School

CIVIL AIRMAN RATINGS

Commercial pilot, single and multi-engine landplane, instrument, helicopter, North American B-25, Convair 240-340-440

EMPLOYMENT

University of Miami, Coral Gables, FL, 1962-present. Professor, Department of Management Science; Adjunct Professor of Industrial Engineering. Adjunct Professor of Psychology.

Research Associate, Systems Research Group, Ohio State University, 1959-1961.

Research Assistant, Laboratory of Aviation Psychology, Ohio State University, 1958-1959.

PROFESSIONAL ACTIVITIES

Editorial Board, Transactions of Industrial Engineering (1970-75)
Editorial Board, Journal of Safety Research (1971-1987)
National Research Council, Transportation Research Board, Committee on Pedestrians. (ret. 1982)
Editorial Board, Accident Analysis and Prevention (1971-1987)
Editorial Board, Human Factors, 1974-76; Associate Editor, 1976-1987
Committee on Privacy Legislation (Chairman), Human Factors Society
Editorial Board, Traffic Safety Evaluation Research Review (1982-1984).
Chairman of Publications Committee and Managing Editor, Human Factors Society, 1983-86.
Executive Council, Human Factors Society, 1986-88.
President of Human Factors Society, 1988-89.
Immediate Past-President, 1989-1990.
NASA Aeronautics Advisory Committee 1989-
Editorial Board, International Journal of Aviation Psychology, 1990-

RESEARCH GRANTS

The Effect of Time-Sharing on Monitoring Performance, 1963-64, USPHS.
Exploratory Studies of Pedestrian Behavior, 1965-67, USPHS.
Training for Monitoring Tasks, 1965-68, USPHS.
Special Post-Doctoral Fellowship, 1968-69 academic year at University of California at Berkeley, USPHS.
Computer-Based Training for Watchkeeping Tasks, 1971-74, USPHS.
Studies of Flight-deck Automation, 1981-85. NASA.
Error Analysis and Prevention in Automated Transport Aircraft, 1985-1988. NASA.
Social Processes and Cockpit Automation: Their Joint Effect on Performance and Safety, 1988-1991. NASA.
Intervention strategies for human error in transport aircraft, 1989-1990. NASA.

VISITING APPOINTMENTS

Department of Industrial Engineering and Operations Research, University of California, 1968-69.
Thurstone Psychometric Lab, University of North Carolina at Chapel Hill, Fall 1974.
Ethel Percy Andrus Gerontology Center, University of Southern California, spring and summer, 1975.
Man-Vehicle Systems Research Division, NASA-Ames Research Center, 1979-81, and 1984-85. Presently Aerospace Human Factors Research Division.

ORGANIZATIONS

Phi Beta Kappa
Sigma Xi
Human Factors Society (Fellow, 1978)
American Psychological Association (Fellow, 1976)
American Institute of Industrial Engineers (Senior Member, 1976)

AWARDS

Outstanding Teacher - School of Business, 1978
Outstanding Researcher - School of Business, 1978

TESTIMONY AND PUBLIC AFFAIRS

Participation in Congressional Office of Technical Assessment panel on flight safety. Washington, May 1987.

Testimony before the National Transportation Safety Board public hearing on the accident occurring to Northwest Airlines Flight 255. Detroit, September 1987.

Testimony before House Subcommittee on Transportation, Aviation, and Materials, in consideration of two bills on aviation safety research. Washington, May 1988.

PAPERS PRESENTED AT NATIONAL AND INTERNATIONAL MEETINGS

Death by Automobile: Pedestrian Accidents. National Association of Coroners, Miami Beach, August 1966.

Can Vigilance Be Taught? Institute of Electrical and Electronic Engineers, Human Factors Division, Palo Alto, California, May 1967.

Automated Self-Instruction for the Monitor. Human Factors Society, Chicago, October 1968 (with D.A. Attwood).

The Older Pedestrian. International Congress on Traffic Medicine, New York City, May 1969.

Elderly Pedestrians and Drivers - The Problem That Refuses to Go Away. University of North Carolina Symposium on Traffic Safety, Chapel Hill, October 1972.

A Computer-Based System for Licensing Elderly Drivers and Possibly Others. Highway Research Board - National Research Council Meeting, Washington, D.C., January 1973.

Individual and Group Differences in Inspection. International Symposium on Human Factors in Quality Control, Buffalo, May 1974.

Loss of Mobility: Elderly Drivers and Ex-Drivers. A.M.A. - A.A.M.V.A Conference on the Aging Driver, Washington, May 1974.

Task Analysis of Anesthesiologists in Coronary Artery Bypass Surgery: Can Computers Help? Human Factors Society, Huntsville, Ala., October 1974 (with P. Kennedy* and A. Feingold).

Controlled Flight Into Terrain (CFIT) Accidents: System-Induced Errors. Human Factors Society, Dallas, October 1975.

Engineering Psychology. Symposium on Applied Psychology, Chapel Hill, N.C., August 1976.

Computer-Based Experimental Methods (half-day workshop). Human Factors Society, Detroit, October 1977.

Multiple Comparisons in Nonparametric Tests (half-day workshop). Human Factors Society, Detroit, October 1978.

Aircraft Collisions. Fellows Lecture, Human Factors Society, Boston, October 1979.

Automation in Air Traffic Control and on the Flight Deck. Aerospace Medical Association, Anaheim, May 1980.

Automation in the Cockpit: Some generalizations. Human Factors Society, Los Angeles, October 1980 (with R. E. Curry).

Some human factors aspects of cockpit automation. Conference on The Human-Machine Interface in Airborne Systems. IEEE Aerospace and Electronic Systems Society, Wright-Patterson AFB, December 1980 (with R. E. Curry).

Complacency: Is the term useful for air safety. Flight Safety Foundation Seminar on Human Factors in Corporate Aviation. Denver, March 1981.

Automation and human error. Lectures in short course Human Factors for the Nuclear Industry, University of Tennessee, Knoxville, March 1981.

Automation effects. Airline Pilots Association annual Safety Seminar, Washington, July 1982.

Human factors and automation. Instrument Society of America, Annual Meeting, St. Petersburg, Fla., May 1983.

Cockpit automation - implications for helicopter design. NASA/Army Helicopter Symposium, Moffett Field, Cal., July 1983.

Computers in the cockpit: But what about the pilots? SAE Aerospace Technology Symposium, Long Beach, October 1983.

The role of the human in the age of the microprocessor. Princeton Conference on Air Traffic Control, Princeton, N.J., October 1983.

Automation and human error. Air Line Pilots Association Symposium, "Beyond Pilot Error," Washington, December 1983.

Cockpit automation. Air Line Pilots Association annual Safety Seminar, Washington, July 1984.

Cockpit automation and human error. Scandinavian Airlines System seminar. Stockholm, March 1985.

Automation and air safety. Air Safety Seminar, Keystone, CO. March, 1985.

What ever happened to vigilance? Human Factors Society annual meeting, Baltimore, September 1985.

Cockpit automation: In need of a philosophy. SAE Aerotech 85, Long Beach, October 1985.

Avionics in the year 2010. SAE Aerospace Vehicle Technical Conference. Washington, May 1986. (Paper won award for outstanding presentation)

Fallible humans and vulnerable systems: Lessons learned from aviation. NATO workshop on Failures of Information Systems, Bad Windsheim, W. Germany, August 1986. Proceedings published by Springer-Verlag.

Human error in complex systems. The Institute of Management Science/Operations Research Society joint annual meeting, Miami Beach, October 1986.

The march of automation in human-machine systems: Implications for safety. Lectures in short course for National Transportation Safety Board. Washington, June 1987.

Training for high-technology aircraft: the challenge of automation. Conference on ab initio pilot training. University of North Dakota, Great Falls, Sept. 1987.

Field studies of cockpit automation: Lessons learned. Human Factors Society annual meeting, New York, October 1987.

The march of cockpit automation: Will humans ever replace computers? Dinner speaker at annual dinner of Aerospace Systems Technical Group, Human Factors Society, New York, October 1987.

Management of human error by design. Presented at joint meeting on human error, Society of Automotive Engineers and Air Line Pilots Association, Washington, December 1987.

Training for the high-technology cockpit. Conference on airline pilot training. International Air Transport Association. New Orleans, February 1988.

Automation and human error. Lectures to American Airlines bi-annual conference of check airmen, instructors, and management pilot. Dallas-Ft. Worth, February 1988.

Pilot training for high technology aircraft. Annual safety symposium of Air Line Pilots Association. Washington, August 1988.

Error exposure and control in high technology aircraft. International Symposium on Human-Machine Interaction and Artificial Intelligence in Aeronautics and Space. Toulouse, France, September 1988.

Lectures on cockpit automation and human error. Annual meeting of Allied Pilots Association. Raleigh, NC, September 1988.

Human factors of cockpit automation. Symposium on Aviation Law. Washington, October 1988.

Inspection and vigilance. FAA symposium on maintenance of aging aircraft. Alexandria, VA. October 1988.

Communication errors: Human to human, human to machine, machine to human. International meeting of Flight Safety Foundation, Sydney, Australia. December 1988.

Errors and error management in high technology aircraft. 7th meeting on Aeronautic and Space Medicine, Paris Air Show, June 1989.

Cockpit automation issues in CRM and LOFT training. Workshop on emerging issues for the second decade of line oriented flight training (LOFT). Miami, July 1989.

Intervention strategies for human error in highly automated transport aircraft. SAE/AREF Symposium on Human Error, Washington. September 1989.

Human factors in difficult inspection tasks. Second FAA Symposium on ageing aircraft. Baltimore, October 1989.

Reflections on human error: Matters of life and death. Presidential address, Human Factors Society annual meeting. Denver, October 1989.

The march of cockpit automation. Keynote address, ICAO Symposium on Human Factors. Leningrad, April 1990

Human factors of the high technology cockpit. ICAO Symposium on Human Factors. Leningrad, April 1990.

The march of cockpit automation. Keynote address, Psychology in the Department of Defense Symposium. U.S. Air Force Academy, April 1990.

The impact of modern technologies in the cockpit. Embry-Riddle Aeronautical University annual flight safety symposium. Daytona, May 1990.

Human factors in cockpit automation. Annual USAir ALPA Safety Meeting, Pittsburgh. July 1990.

Workshop on human factors and flight safety. Aerolineas Argentinas and Asociacion de Pilotos Lineas Aereas. Buenos Aires, September 1990.

Barriers to situational awareness and possible intervention strategies. Paper presented at annual meeting of Human Factors Society, Orlando, October 1990.

Moderator, President's Forum, annual meeting of Human Factors Society, Orlando, October 1990.

The potential benefits and hazards of increased reliance on automation in the air. Paper presented at Royal Aeronautical Society symposium, "Safety at sea and in the air - taking stock together." London, November 1990.

Future research in automation and other areas. Third annual Society of Automotive Engineers symposium on human error in aviation. Dallas, December 1990.

LOFT, CRM, and the glass cockpit. American Institute of Aeronautics and Astronautics symposium on human factors. Washington, January 1991.

PUBLICATIONS

Fidelity of simulation: 1. Time sharing requirements and control loading as factors in transfer of training. USN Training Device Center, Tech. Report NAVTRADEVCEN 508-4, 26 October 1959 (with G. E. Briggs*).

Task stress as a factor in group formation. In G. Finch (Ed.). Air Force Human Engineering, Personnel, and Training Research. Washington: National Academy of Sciences-National Research Council, 1960 (with J. S. Kidd* and R. G. Kinkade).

Motion Prediction as a Function of Target Speed, Duration of Presentation and Tracking vs. Monitoring. MA thesis, Ohio State University, 1959.

The monitor: a systems view. In D. Buckner and J. McGrath (Eds.). Vigilance: A Symposium. New York: McGraw-Hill, 1963 (with D. Howland*).

Knowledge of Results and Monitoring Problem. Doctoral Dissertation, Ohio State University, 1961.

Motion prediction as a function of target speed and duration of presentation. Journal of Applied Psychology, 1962, 46: 420-424.

Knowledge of results in a monitoring task. AMRL-Tech. Documentary Report No. ARML-TDR-62-82, Wright-Patterson AFB, Ohio, August 1962.

Knowledge of results and signal rate in monitoring: a transfer of training approach. Journal of Applied Psychology, 1963, 43: 214-222.

On the probability of detection of a signal by multiple monitors. Psychological Record, 1963, 13: 79-81.

Transfer of training in monitoring: Signal amplitude. Perceptual and Motor Skills, 1964, 18: 104.

The performance of multi-man monitoring teams. Human Factors, 1964, 6: 179-184.

Multiple channel monitoring. Ergonomics, 1964, 7: 453-460.

Effect of time-sharing on monitoring performance: Simple mental arithmetic as a loading task. Perceptual and Motor Skills, 1964, 19: 435-440 (with G. K. Poock and M. Steele).

Tables of the function $1-(1-p)^{N}$. Perceptual and Motor Skills, 1965, 21: 887-891.

Music and other auditory backgrounds during visual monitoring. Journal of Industrial Engineering, 1966, 17: 319-323 (with G. K. Poock*).

Influence of time-sharing and control loading on transfer of training. Journal of Applied Psychology, 1966, 50: 201-203 (with G. E. Briggs*).

Transfer of training from one monitoring task to another. Ergonomics, 1967, 10: 649-658.

Why does a pedestrian cross the street? Medicine, Science and the Law, 1967, 10: 649-658.

Training for vigilance: Combined cueing and knowledge of results. Journal of Applied Psychology, 1968, 52: 474-79 (with D. A. Attwood).

The elderly pedestrian: Response to an enforcement campaign. Traffic Safety Review, 1968, 12: 100-110.

Time lapse cinematography. Industrial Photography, September, 1968, 17: 28-30, 78-84.

The working diver: Performance in cold water. Transactions of the Fourth Annual Conference of Marine Technical Society, July 1968: 289-309 (with P. R. Stang*).

Training for vigilance: Repeated sessions with knowledge of results. Ergonomics, 1968, 11: 547-556.

Automated instruction for vigilance training. Journal of Applied Psychology, 1969, 53: 218-223 (with D. A. Attwood).

Money and the monitor. Perceptual and Motor Skills, 1969, 29: 627-634.

Danger afoot: the pedestrian in traffic. Documenta Geigy, April 1970, 7-8.

Diver performance in cold water. Human Factors, 1970, 12: 381-399 (with P. R. Stang*).

Adaptive measurement of vigilance decrement. Ergonomics, 1973, 16: 353-363.

Licensing the elderly driver: Legal and scientific problems. Traffic Safety, 1973, 73(May), 8-11: 36-37.

Elderly pedestrians and drivers: the problem that refuses to go away. In Waller, P. (Ed.). Aging and Highway Safety: The Elderly in a Mobile Society. North Carolina Symposium on Highway Safety, Vol. 7, Fall 1972, Chapel Hill, N.C. Published 1973.

Task analysis of anesthesiology for coronary bypass surgery: can computers help? Proceedings of the Annual Meeting of the Human Factors Society, October 1974 (with P. Kennedy* and A. Feingold).

An adaptive vigilance task with knowledge of results. Human Factors, 1974, 16: 333-338.

Loss of mobility: Elderly drivers and ex-drivers. Proceedings of National Conference on the Aging Driver, American Medical Association, 1974. Health and Safety Associates, Morton Grove, Illinois.

A computer based system for licensing elderly drivers and possibly others. In Future Role of Driver Licensing in Highway Safety, Transportation Research Board Special Report No. 151, Washington, 1974.

On simultaneous tracking and monitoring. Journal of Applied Psychology, 1975, 60: 100-105.

Let the computer teach it. American Journal of Nursing, 1975, 75: 1300-1303 (with D. Levine*).

Controlled flight into terrain (CFIT) accidents: system-induced errors. Proceedings of the Annual Meeting of the Human Factors Society, October 1975.

Adaptive strategies for vigilance research. Ergonomics, 1975, 18: 403-414 (with F. L. Keeler).

Alcohol effect on vigilance performance. Society of Automotive Engineers, Detroit, October 1975. (with C. W. Erwin*, Hartwell, Truscott and Linnoila).

Individual and group differences in inspection. In Drury, C. and Fox (Eds.). Human Reliability in Quality Control. Taylor and Francis, London, 1975.

Analysis of tasks and human factors in anesthesia for coronary-artery bypass. Anesthesia and Analgesia, 1976, 55: 374-377 (with P. J. Kennedy*, Feingold and Hosek).

Controlled flight into terrain accidents: System-induced errors. Human Factors, 1977, 19: 171-181.

> Also published in R. Hurst and L. Hurst (Eds.), Pilot Error: The Human Factors. New York: Jason Aronson, 1982.

Stimulus presentation rate in vigilance. Human Factors, 1977, 19: 301-303.

Alcohol induced drowsiness and vigilance performance. Journal of Alcohol Studies, 1978, 39: 505-516 (with C. W. Erwin,* Truscott, and Linnoila).

Aircraft collisions. Proceedings of the Annual Meeting of the Human Factors Society, October 1979.

Midair collisions: The accidents, the systems, and the realpolitik. Human Factors, 1980, 22, 521-533.

Also published in R. Hurst and L. Hurst (Eds.), Pilot Error: The Human Factors. New York: Jason Aronson, 1982.

Flight-deck automation: Promises and problems. Ergonomics, 1980, 23: 995-1011. (with R. E. Curry)

Also published as NASA Technical Memorandum 81206, NASA-Ames Research Center, Moffett Field, Calif., June 1980.

Also published in R. Hurst and L. Hurst (Eds.), Pilot Error: The Human Factors. New York: Jason Aronson, 1982.

Automation in the cockpit: Some generalizations. Proceedings of the annual Meeting of the Human Factors Society, October 1980. (with R. E. Curry)

Human factors of flight-deck automation - NASA/Industry Workshop. Ergonomics, 1983, 26: 953-961. (with D. A. Boehm-Davis, Curry, and Harrison).

Also published as NASA Tech. Memo. 81260, NASA-Ames Research Center, Moffett Field, CA., Jan. 1981.

Complacency: Is the term useful for air safety? Proceedings of the Flight Safety Foundation, Seminar on Human Factors in Corporate Aviation, Denver, 1981.

Computers in the cockpit: But what about the pilots? Proceedings of SAE Aerospace Technology Symposium, October 1983. Warrendale, PA: Society of Automotive Engineers.

Vigilance and task load: In search of the inverted 'U'. Human Factors, 1984, 26, 215-222. (with R .E. Curry and M. L. Faustina).

Vigilance and Inspection. Chapter in J. Warm (Ed.) Sustained Attention in Human Performance. London: Wiley, 1984.

The role of the human in the world of the microprocessor. Proceedings of the Princeton symposium on air traffic control, Dept. of Civil Engineering, Princeton, NJ, 1985.

Beyond the sterile cockpit. Human Factors, special issue on automation, 1985, 27, 75-90.

Human factors of cockpit automation: A field study of flight crew transition. NASA Contractor Report No. CR-177333, Moffett Field, CA. July 1985.

Cockpit automation: In need of a philosophy. Proceedings of SAE Aerotech 85 symposium, October 1985. Warrendale, PA: Society of Automotive Engineers.

Book review of Zagreb One-Four: Cleared to Collide? by Weston and Hurst. Human Factors Society Bulletin, March 1985. Reprinted in Journal of Air Traffic Control, July-September 1985.

Fallible humans and vulnerable systems: Lessons learned from aviation. Chapter in Wise, J. and Debons, A. Information systems: Failure analysis. Berlin: Springer Verlag, 1987.

Application of vigilance research: Rare, medium, or well done? Human Factors, special issue on vigilance, 1987, 29, 725-736.

Management of human error by design. In C. O. Miller (Ed.), Human error avoidance techniques, Proceedings of SAE/ALPA conference on human error, Washington, DC. pp. 7-11. Commonwealth, PA: Society of Automotive Engineers. 1988.

Training for high technology aircraft. Proceedings of IATA conference on pilot training, New Orleans, 1988. To be published by International Air Transport Association.

Error exposure and control in high technology aircraft. In Proceedings of International Symposium on Human-Machine Interaction in Aeronautics and Space. Toulouse, France, September 1988.

Human Factors in Aviation. Wiener, E. L. and Nagel, D. C. (Eds.). San Diego: Academic Press. 1988.

Cockpit automation. Chapter 13 in Wiener and Nagel (Eds), Human Factors in Aviation. San Diego: Academic Press. 1988.

Human factors of advanced technology ("glass cockpit") transport aircraft. NASA Contractor Report No. 177528, NASA-Ames Research Center, Moffett Field, CA. May, 1989.

Reflections on human error: Matters of life and death. Presidential address to Human Factors Society. Proceedings of the annual meeting of the Human Factors Society, Denver, October 1989.

Errors and error management in high technology aircraft. Proceedings of the 7th meeting on Aeronautic and Space Medicine, Paris, June 1989.

The vigilance phenomenon. Proceedings of Second International Conference on Aging Aircraft. Baltimore, October 1989.

Human factors of flight-deck checklists: the normal checklist. NASA Contractor Report No. 177549. NASA Ames Research Center, Moffett Field, CA. May 1990. (With A. S. Degani*)

Cockpit automation issues in CRM and LOFT. (in press). In S. Gregorich (Ed.), Proceedings of workshop, Emerging Issues for the Second Decade of Line Oriented Flight Training. Miami, July 1989. (To be published as NASA report).

Implications of automation technology for aircrew coordination and performance. (In press). Morgan, B. B., Herschler, D. A., Wiener, E. L., and Salas, E. Advances in Man-Machine Systems Research.

* First author if not ELW

rev. 1/07/91

UNIVERSITY OF Miami

MEMO

To: Dr. Paul K. Sugrue, Sr. Vice Provost
and Interim Dean of Graduate School

From: Dr. Tarek M. Khalil
Chairman, Department of Industrial Engineering

Subject: Ph.D. Proposal in Industrial Engineering

Date: November 4, 1991

I received your memorandum dated October 29, 1991 together with the external reviewers' report. I am pleased with the positive findings of the report. In response to the reviewers' suggestions the following course of action will be followed:

Reviewers' Comments:	It is suggested that a course in Computer Aided Process Planning be substituted for Productivity Planning and Improvement which could then be moved to the approved elective list.
Course of Action:	A course in Computer Aided Process Planning will be developed by Professor E. Iakovou upon his arrival to campus this January. Dr. Iakovou is a graduate of Cornell University and his area of expertise fits well into this subject. The Productivity Planning and Improvement Course will be included in the list of approved electives.
Reviewers' Comments:	A course in Inventory Control, forecasting, scheduling and MRP should be considered.
Course of Action:	The contents suggested are included in the course IEN 665 which is already required in the program.
Reviewers' Comments:	Advanced Manufacturing Processes course should also be considered.
Course of Action:	Dr. Boubekri is already in the process of preparing this course for future offering. Dr. Boubekri's area of expertise is in manufacturing engineering.

Industrial Engineering Department
P.O. Box 248294
Coral Gables, Florida 33124-0623
FAX: 305-284-4040 • Phone: 305-284-2344 • Telex: UM 519308

Reviewers' Comments:	It is suggested that the requirement of a B.S. degree in engineering be removed as a general requirement for admission. (Page 35).
Course of Action:	We concur with this and the word B.S. is removed from the Proposal.

Enclosed: Updated copy of Ph.D. Proposal