Faculty Senate Agenda
3:30 p.m., October 31, 2018 [# Revised 10/30/18]
Faculty Club, Whitten University Center, Coral Gables Campus

Click HERE for a complete package of materials
https://fs.miami.edu/_assets/pdf/facultysenate/Documents/18-19-senate/d-october-18/complete-pkg.pdf

(If you have trouble opening the link within the agenda item, paste the address below each item into your browser to access.)

			Approx. Time
A.		**Introductory Matters**	
	A1.	Faculty Senate Chair Remarks – Tomás Salerno	3:30
	A2.	Chair of the Board of Trustees Remarks – Richard Fain (via video)	3:45
	A3.	President Remarks – Julio Frenk	3:50
	A4.	Student Government representatives remarks	4:05
	A5.	Approval of proposed Faculty Senate Meeting minutes of September 26, 2018 https://fs.miami.edu/_assets/pdf/facultysenate/Documents/18-19-senate/d-october-18/minutes-september.pdf [GWC – Unanimously approved.]	4:10
	A6.	Approval of today's agenda	4:15
	A7.	Other announcements	4:20
B.		**General Matters**	
	B1.	# REVISED Miller School of Medicine in Partnership with Rosenstiel School of Marine and Atmospheric Sciences (RSMAS) Proposal for a Master of Science in Climate and Health (with 4 tracks) – Naresh Kumar (Associate Professor) https://fs.miami.edu/_assets/pdf/facultysenate/Documents/18-19-senate/d-october-18/msom-msch-final-full-packet-for-senate.pdf [GWC – had no objections, and suggested adding more psychology courses to program.]	4:25
	B2.	Business School Request to Increase the Number of EDUCATOR Faculty – John Quelch (Dean, Business School) https://fs.miami.edu/_assets/pdf/facultysenate/Documents/18-19-senate/d-october-18/bus-increase-educator-faculty.pdf [GWC – had no objections.]	4:35
	B3.	College of Arts and Sciences, Create New Educator Faculty Lines – R. Stephen Cantrell (Professor and Chair, Mathematics); Tim Watson (Professor and Chair, English) https://fs.miami.edu/_assets/pdf/facultysenate/Documents/18-19-senate/d-october-18/a-s-educator-faculty-create-new-lines.pdf [GWC – had no objections.]	4:45
	B4.	Proposal to Create the Miami Integrative Metabolomics Research Center (MIMRC) at the Miller School of Medicine – Sanjoy Bhattacharya (Professor) https://fs.miami.edu/_assets/pdf/facultysenate/Documents/18-19-senate/d-october-18/msom-mimrc.pdf	4:55
C.		**Other Business**	5:05
D.		**Adjournment**	5:10

Item A5

UNIVERSITY
OF MIAMI
FACULTY SENATE

The John Knoblock
Faculty Senate Office
Ashe Administration Building, #325
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Coral Gables, FL 33146

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September 26, 2018
Proposed Faculty Senate Minutes

The meeting, held in the Faculty Club of the Whitten University Center, Gables Campus, opened at 3:35 p.m.

CHAIR'S REMARKS

Senate Chair Tomás Salerno explained that he had been asked to write a eulogy for a researcher who has influenced him, Dr. Gerald Buckberg. Dr. Buckberg once stated, that surgeons save one life at a time, but that through his own research, he has had the opportunity to save millions of lives. He will be sorely missed.

The Chair announced that the Faculty Senate is now accepting nominations for the Faculty Senate Awards, and invited Senate members to nominate their colleagues for these prestigious awards and to encourage their fellow faculty to also make nominations. The awards ceremony will be held on Monday, April 8, 2019 at 5:00 p.m. in the Storer Auditorium, Business School.

Several members have requested an online calendar for Faculty Senate meetings, and in an effort to facilitate calendaring for our members, the Senate Office has added a downloadable calendar that allows you to add Senate meeting dates directly into your Outlook calendars. Instructions will be included in next meeting's announcement. Please let the staff know your feedback.

The Senate Officers have been attending School and Council meetings to introduce themselves, as has been done for the past few years, with the goal of attending every single school or college's meetings. Today, the Officers hosted a lunch for the members of the Academic Deans Policy Council, as a gesture to promote comradery and forge relationships. The Senate officers have also been meeting with the Committee chairs to offer guidance and support. As you know, the work of the Senate begins with its committees.

The Chair noted that kudos were in order for Faculty Senate Budget and Compensation committee member Professor Claire Paris-Limouzy from RSMAS, who recently was selected for the Ocean Sciences Rachel Carson Lecture from the American Geophysical Union. This is in recognition of the outstanding contributions she has made to the field of ocean science. Additionally Arts and Sciences Senate member Haim Shaked was honored with an invitation by UNESCO to a special round table in the UN on "The power of education for countering racism and discrimination: The case of anti-Semitism."

On a sad note, the Chair pointed out that School of Communication Dean Gregory Shepherd has announced that he is stepping down. He was a wonderful dean and man, who will be missed. There will be a search for his replacement.

The Chair expressed his hope that everyone was able to attend the President's State of the University Address. Noting that it was an excellent, informative presentation, where the President outlined the strategies for the Roadmap to Our New Century.

PROVOST'S REMARKS

Provost Jeffrey Duerk explained that President Frenk was in Washington, DC, addressing delegates on topics relevant to the University. He also thanked those that attended the State of the University address and for their expression of support. On behalf of President Frenk, he extended his gratitude to Dean Shepherd, who will remain in the position during the transition to the next dean. The Provost explained that the President will be hosting next week's Senate meeting, and that the President will share his remarks at that time.

The Provost entertained questions from the floor.

CHAIR OF THE BOARD OF TRUSTEES ACADEMIC AFFAIRS COMMITTEE'S REMARKS

Board of Trustees member Marilyn Holifield expressed her pleasure at attending the meeting, explaining that it is an opportunity for the Board of Trustees and the Senate members to get to know each other and to learn more about each other's activities. She noted that she would be out of town next week and therefore not able to attend that upcoming Senate meeting.

INTRODUCTION OF NEWLY APPOINTED DEAN OF THE SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT, LAURA KOHN-WOOD

Dean Kohn-Wood explained that she has been at UM for nine years, although she is new to the position of dean. She outlined her education, professional field, field of research and past accomplishments within the School of Education and Human Development. She plans to work on ways to increase interdisciplinary and intergroup dialogue, and with her experience as a residential master on campus, it gives her a perspective on students living on campus. Explaining that the School has three very different disciplines, she noted that it is very eclectic, and her goal is to encourage faculty members to think about how to solve complex problems, and ways to become more intentional to reduce inequities in the community.

STUDENT GOVERNMENT REPRESENTATIVES' REMARKS

The Student Government representatives announced that the Undergraduate Student Government members and the Graduate Student Government members were attending each other's meetings this year. He noted that the Student Government Senate was increasing in number and all was running smoothly.

 # APPROVAL OF TODAY'S AGENDA

A motion was made, seconded, and the agenda was approved unanimously.

OTHER ANNOUNCEMENTS

A Senate member announced that the Women's and Gender Studies Program was presenting Rosa Clemente on Monday, October 1 for a reception at 5:00 p.m. and a talk at 6:00 p.m.

Another Senate member announced that Professor Emeritus David Hertzig was recently hospitalized after being hit while bicycling and asked for members to pray for him.

 # APPROVAL OF MINUTES OF AUGUST 29, 2018
A motion was made, seconded, and the minutes were approved unanimously.

General Matters
 # UNANIMOUS CONSENT AGENDA
The General Welfare Committee had no objections to either item.

1) Proposal to change the name of the *University of Miami Miller School of Medicine Michael S. Gordon Center for Research in Medical Education (GCRME)* to the *University of Miami Miller School of Medicine Michael S. Gordon Center for Simulation and Innovation in Medical Education (GCSIMed)*.

2) Proposal to change the name of the *Women's and Gender Studies undergraduate major and minor* in the College of Arts and Sciences to the *Gender and Sexuality Studies undergraduate major and minor.*

There were no objections to the approval of these two items.

PROPOSAL TO CREATE A 5-YEAR DUAL BACHELOR OF SCIENCE IN MATHEMATICS / MASTER OF SCIENCE IN MATHEMATICAL FINANCE DEGREE PROGRAM, COLLEGE OF ARTS AND SCIENCES
Associate Professor and Program Director Alexander Dvorsky outlined the dual degree that shortens the time to complete both degrees, thereby saving students tuition money. There are no other changes to either degree.

A motion was made, seconded, and the proposal was approved unanimously.

2019 HEALTHCARE UPDATE
Human Resources Associate Vice President of Total Rewards Cristina Elgarresta announced that former Executive Director Jennifer Cohen will be returning to the University in mid-October. Ms. Elgarresta outlined the Healthcare plans for next year noting the changes in premium, deductibles and copays. They are working diligently to keep costs down at UHealth and pointed out that UM healthcare costs to employees is currently 18% below the average for large-scale employers in Florida.

The Human Resources Associate Vice President entertained many questions from the floor.

OTHER BUSINESS
Vice Provost for Faculty Affairs David Birnbach responded to an earlier question on statistics of this year's newly hired faculty members.

A Senate member pointed out that according to the *Faculty Manual*, there must be a petition to the President to grant Emeritus status to Research Faculty, however there is currently no criteria for this.

The Senate Chair announced that next week's Senate meeting will be held on the Miller School of Medicine Campus, and to allow clinicians to attend will begin at 5:00 p.m. instead of the usual start time of 3:30 p.m. This meeting is hosted by the President; there is no set agenda. The Provost generously offered to provide refreshments following that meeting.

ADJOURNMENT
The meeting adjourned at 4:45 p.m.

Respectfully submitted,
Robyn Hardeman
Secretary of the Faculty Senate

Elected Senate officers:
Tomás Salerno, Chair;
Linda Neider, First Vice Chair;
JoNel Newman, Second Vice Chair (not present)

Background materials included with hard-copy minutes.

Item B1

UHealth
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UNIVERSITY OF MIAMI
MILLER SCHOOL
of MEDICINE

Naresh Kumar, PhD
Associate Professor
1063 Clinical Research Building

Date: October 22, 2018
Email: nkumar@med.miami.edu
Tel: (305) 243-4854

Tomás Salerno, Chair
Faculty Senate
University of Miami

Reference: Master of Science in Climate and Health (MSCH) program in partnership between Miller School of Medicine and Rosenstiel School of Marine and Atmospheric Sciences (RSMAS).

Dear Professor Salerno,

Thank you for the opportunity to present the MSCH program, referenced above, to the General Welfare Committee (GWC) on October 17, 2018. I am writing you in response to the committee's suggestion to include psychology courses in the MSCH program. We knowledge that climate and extreme weather are linked to psychological disorders. Some of these issues are covered in two of the core courses of the program: a) CPH 601 – Climate and Health course, and b) CPH 607 – Policies and Management of the Health Effects of Climate.

In addition, we have included the following elective courses in the "Public Health Sciences" tract of the program:

- EPH 611 - Mindfulness in Public Health and Medicine
- PSY 371 - Stress Management

Students, who wish to pursue their dissertation in the area of psychology disorder and climate, can benefit from the above courses. The MSCH leadership will discuss and request the instructors of the above courses to consider the possibility of incorporating topics on psychological disorders that stem from exposure to extreme weathers, such as hurricanes, heatwaves and snowstorms, and their management.

The revised MSCH program reflects upon the above modifications as well as the Graduate Council's recommendations of equal faculty representation from Medical School and RSMAS in the administrative committee of the MSCH Program.

Sincerely yours,

Naresh Kumar

UNIVERSITY OF MIAMI

Proposal Submission Checklist

Proposals are to be submitted to the Office of Assessment and Accreditation (OAA), if applicable, the Graduate Council (for graduate programs excluding Law and Medical), if applicable, and the Faculty Senate. Refer to the Procedures for Program Changes document for information on the approvals and notifications needed for program changes and the Proposal Submissions Specifications document for an explanation of the process and a list of the materials required.

(Please note that change approvals can take 2 semesters to complete.)

Include this checklist at the beginning of each proposal.
(Complete the information below, save the form as a pdf, and insert it with the background materials that are specified, in the order listed, and send the package electronically as noted above.)

KEY CONTACT PERSONNEL INFORMATION

First Name: Naresh

Last Name: Kumar

Proponent's Title: Associate Professor

Department, if applicable: Public Health Sciences

School/College: Miller School of Medicine

E-mail: nkumar@miami.edu

Phone: 3052434854

Title of Proposal: Master of Science in Climate and Health (MSCH) in partnership between Miller School of Medicine and Rosenstiel School of Marine and Atmospheric Sciences (RSMAS)

(-continue to next page-)

MANDATORY MEMORANDA AND FORMAT

Please check that each item listed below is included in the proposal package of materials, in the ORDER as listed. The applicable title (i.e. Letter of Explanation, Memo from the Dean, etc.) is to precede each section in the materials.

Only proposals conforming to this format will be accepted.

1. This completed checklist.

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2. Letter of explanation. (2-3 pages only, double spaced, 12 pt font)

Yes No

If no, explain why:

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3. A memo from the dean(s) signifying approval of the faculty of the relevant School(s) / Colleges(s).

Yes No

If no, explain why:

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4. A memo that all affected or relevant School / College Council(s) have approved.

Yes No

If no, explain why:

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5. A memo from the department chair(s) signifying approval of the faculty of the relevant department(s).

Yes No

If no, explain why:

6. A memo from the Office of Accreditation and Assessment (OAA) if the proposal involves academic programs (degrees, certificates, majors, minors, concentrations, specializations, tracks, etc.) such as new programs, closing programs, or program changes (such as changes in requirements, program length, modality, name, location).

(*To be submitted by OAA to the Graduate Council or the Faculty Senate, as appropriate.***)**

Applicable Not applicable.

If not, explain why:

7. A memo from the Graduate School Dean signifying approval of the Graduate Council (for graduate programs only).
(To be submitted to the Faculty Senate by the Graduate Council.)

Applicable Not applicable.

If not, explain why:

8. Academic Deans Policy Council (ADPC) approval, for interdisciplinary issues and as appropriate. Please consult with the Dean of the Graduate School or the Secretary of the Faculty Senate to check if this is needed.

Yes No

If no, explain why:

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9. Additional required documents as listed on the "Proposal Submissions Specifications," i.e. market analysis, budget information, assessment of library collections, etc. as specified.

List additional documents included:

The complete proposal, program competencies, list of all faculty members, supporting letter of different stakeholders, business model and career opportunities are also included in the packet.

Please click on the "Save Form" button below to save this form, then e-mail to facsen@miami.edu.
To print the form, click "Print Form."

Save Form Print Form

End form.

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Naresh Kumar, PhD
Director, Master of Science in Climate and Health
Department of Public Health Sciences

September 10, 2018

Guillermo J. Prado, Ph.D.
Dean Graduate School

Reference: Response to Graduate Council's Queries concerning the MSCH program.

Dear Dean Prado,

On behalf of the Miller School of Medicine and RSMAS, I would like to thank the members of the Graduate Council to take time to review the MSCH graduate program proposal and providing us with an opportunity to respond to the council's queries. See below point-by-point responses to each query. The original queries written in verbatim begin with "**GC Query:**" and the response to the query begins with MSCH response:

GC Query: Will there be any startup funding for this program and where the resources would come from? The Council thought that this could really maximize the success of the program.

MSCH response: to be discussed:

- Yes, both schools are committed to invest in this program and will provide substantive support to jump start the program. In the first three years of the program, 50% of the gross tuition revenue will be used to offer 12 half-time fellowships. This will make the program attractive and help in recruitment process (see letter of support from **Deans Ford and Avissar**).
- Moreover, the Department of Public Health Sciences and RMAS have already committed administrative and logistic support, including admission, advertising and marketing, and President Abraham and now Dean Ford have already committed laboratory space and initial investment to set up the "toxicology laboratory" for the program (see attached LOS).

GC Query: There wasn't even representation between RSMAS and Public Health faculty on the leadership committee.

MSCH response: Given this is a joint program, the RSMAS and Public Health faculty ratio is 3:4, which is more balanced than the core competencies ratio (2:5) that both schools will provide. However, if the council members still think it is imbalanced, a 2:2 ratio will be assured in the leadership committee.

GC Query: No effort was budgeted for the co-director.

MSCH response: Dr. Elliot's efforts will be fully covered by RSMAS for the first three year. As the student enrollment increases, his efforts will gradually become part of the program's cost.

GC Query: Timing of course offerings. Courses are offered every other year. What if the students need to take a course in the off year?

MSCH response: All six of the seven courses will be offered every year. However, after the second year all seven core courses will be offered every year. Therefore, there are no gaps in course offerings and it should not affect students who take a year off.

GC Query: Rationale of housing the program at the medical school given that it is an interdisciplinary program.
MSCH response: Given this a joint program between Medical School and RSMAS, the program is jointly housed in both schools to assure interdisciplinary learning experience as well as interaction with the interdisciplinary faculty members across both schools. Both curriculum will be synchronized such that students can spend two days on RSMAS campus and three days on Medical campus during the core course work, and they will have the needed classroom, laboratory, advising and administrative support on both campuses.

Kindly let me know should require any further clarification and/or any additional information and/or supporting documents.

Sincerely yours,

Naresh Kumar

UNIVERSITY OF MIAMI

September 10, 2018

Guillermo Prado
Dean, Graduate School

Reference: Master of Science in Climate and Health (MSCH) program in partnership between Miller School of Medicine and Rosenstiel School of Marine and Atmospheric Sciences (RSMAS).

Dear Dean Prado,

As you already know that the Miller School of Medicine and RSMAS have jointly developed the interdisciplinary MSCH program. Both schools are fully committed to the success of this program and will extend the needed resources and logistic support. Miller School has already committed a laboratory space and an initial investment of $30k for equipment for the lab. In addition, both schools will commit 50% of the tuition revenue to offer 12 half-time scholarships in the first three years of the program. This will make the program attractive and its successful launch. Moreover, both schools have efficient graduate management programs, and will provide administrative and admission support for MSCH program.

Sincerely yours,

Henri R. Ford M.D., M.H.A.
Dean and Chief Academic Officer
University of Miami Leonard M. Miller School of Medicine

Sunil Rao
Chair, Department of Public Health Sciences

Roni Avissar
Dean, RSMAS

UHealth
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MILLER SCHOOL
of MEDICINE

Naresh Kumar, PhD
Associate Professor
1063 Clinical Research Building

Date: July 18, 2018
Email: nkumar@med.miami.edu
Tel: (305) 243-4854

Guillermo Prado,
Dean, Graduate School
University of Miami
Coral Gables, FL 33146

Reference: Master of Science in Climate and Health (MSCH) program in partnership between Miller School of Medicine and Rosenstiel School of Marine and Atmospheric Sciences (RSMAS).

Dear Dean Prado,

Please see attached the full proposal of the interdisciplinary MSCH program that the department of Public Health Sciences has developed in partnership with RSMAS for the consideration of approval by the Graduate Council.

The proposed program has been reviewed and approved by the office Assessment and Accreditation (memo included in the proposal). In addition, the program and its business model have been reviewed and approved by Deans Abraham and Dean Avissar.

The program has already been approved by the Medical School Faculty Council (approval letter attached). Moreover, the program has the university wide support of all stakeholders (see LOS from all Deans and others) and World Meteorological Society.

Sincerely yours,

Naresh Kumar

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MILLER SCHOOL
of MEDICINE

Naresh Kumar, PhD
Director, MSCH Program
Associate Professor
1063 Clinical Research Building

Date: July 18, 2018

Email: nkumar@med.miami.edu
Tel: (305) 243-4854

Tomás Salerno
Chair, Faculty Senate
University of Miami
Coral Gables, FL 33146

Reference: Master of Science in Climate and Health (MSCH) in partnership between Miller School of Medicine and Rosenstiel School of Marine and Atmospheric Sciences (RSMAS).

Dear Professor Salerno,

As you already know that Climate change, weather and weather anomalies (C^2W^2) and their implications for the environment and human health are the most debated and contentious topics of the 21st century not only because they affect us all, but also because their relationships with health are intricate due to differential roles of hierarchical variables including individual, household, neighborhood and regional level variables. Therefore, tremendous uncertainty exists in the disease and disability burden associated with C^2W^2, largely because of the lack of expertise at the intersection of health and climate. A new generation of manpower is needed to address such an uncertainty and guide future policies to manage the health effects of C^2W^2.

Miller School of Medicine and Rosenstiel School of Marine and Atmospheric Sciences have developed a new interdisciplinary graduate program Master of Science in Climate and Health (MSCH) to prepare future generations of *professionals, research analysts*, *planners*, *decision-makers* and *leaders* who will have a deep understanding of the intricate relationship between human health and C^2W^2, and ability to decipher and quantify this relationship at multiple scales ranging from intra- and inter-cellular response to heat stress, to individual's susceptibility to community response to region-wide morbidity and mortality burden of C^2W^2. The MSCH program will has three specific aims:

1. provide students with conceptual, theoretical and applied understanding of the direct and indirect impacts of C^2W^2 on human health. This will also include the impacts of short- and long-term climate and weather changes on health and well-being,
2. train students in understanding, evaluating, and assessing short- and long-term climate and weather changes, and their direct and indirect impact on disease and disability burden across different communities, and
3. prepare students to develop adaptation, mitigation, healthcare and communication strategies in the light of adaptation and infrastructure capacity of different communities to manage the health effects of C^2W^2.

We have already developed several of the core courses, and our faculty members are already working in several areas related to climate and health including: a) shifting burden of vector-borne disease and climate, b) health effects of heatwaves, c) climate change and building design, d) extreme weather and unintentional injury in occupational and non-occupational settings, e) climate-mediated health effects of air pollution and f) increasing burden of infectious, allergic and immunological disorders and climate changes. This will offer research opportunities to our students in various application areas of climate and health.

We have state of the art laboratories for measurement, modeling, analysis and surveillance of climate, environment and health, and toxicological analyses. Given ***Miami is a live laboratory*** to learn, understand and examine the health effects of C^2W^2, including the recent Zika outbreak and changing patterns of allergy and infectious disease, the MSCH program at the University of Miami will provide students with a unique learning experience by first-hand witnessing the intricate relationship between C^2W^2 and various health outcomes. The program has potential to bring the University of Miami to the forefront of climate and health training and research, and to partner with the local, national, and international agencies focusing on this area, including the National Institute of Environmental Health Sciences, Environmental Protection Agency, International Panel on Climate Change, the Florida Department of Health and Florida Institute for Health Innovation.

The MSCH graduates will have tremendous career opportunities in the both public and private sectors and academia. The proposed interdisciplinary MSCH that builds on the interdisciplinary expertise of faculty members across colleagues aligns with the University of Miami's mission to "educate and nurture students, to create knowledge, and to provide service to our community and beyond" by training and preparing the future generation of analytics, leaders and decision-makers needed to understand, assess and manage the burden of disease and disability in response to C^2W^2. Moreover, this program also aligns with the mission of the University of Miami Department of Public Health Sciences, which is "to enhance the health of the public, reduce the burden of disease, and create health equity among various segments of the population".

The program has the university wide support of all stakeholders (see LOS from all Deans and others) and World Meteorological Society. I sincerely hope that the program draws enthusiastic support of the faculty senate.

Sincerely yours,

Naresh Kumar

UNIVERSITY OF MIAMI
ROSENSTIEL SCHOOL of MARINE & ATMOSPHERIC SCIENCE

Office of the Dean
Science and Administrative Building 107
4600 Rickenbacker Causeway
Miami, FL 33149-1031
Phone: 1 305 421-4000
Fax: 1 305 421-4711
Web Site: http://www.rsmas.miami.edu

15 December 2017

Naresh Kumar, PhD
Director, MSCH Program
Department of Public Health Sciences
Miller School of Medicine
University of Miami, Miami FL 33136

Reference: Master of Science in Climate and Health (MSCH) graduate program at the University of Miami (U-MSCH).

Dear Dr. Kumar,

We enthusiastically support the Master of Science in Climate and Health program at the University of Miami (U-MSCH) in joint partnership between the Rosenstiel School of Marine and Atmospheric Science (RSMAS) and the Miller School of Medicine. This program builds on strong existing interdisciplinary partnerships and will foster new and dynamic collaboration across all schools here at the University of Miami. The MSCH program presents a unique and exciting opportunity for our students and faculty to assume a strong leadership role in addressing health and climate challenges within our global community. The introduction of the MSCH program will place the University of Miami at the forefront of scientific advancement as climate change and its implications for the environment and human health continue to be one of the most debated and contentious issues of our time. The MSCH program will prepare future generations of professional research analysts, planners, decision-makes, and leaders who will all have a deep understanding of the intrinsic relationship between climate and human health, and the ability to decipher this relationship.

The RMAS and Miller Schools have both agreed on a viable business model to share costs and revenues between the Department of Public Health Sciences and RSMAS with 5:7 and 2:7 ratios, respectively. With this agreement, both schools highly recommend the launch of the MSCH program.

Roni Avissar, Ph.D.
Dean, RMAS
University of Miami

Edward Abraham, M.D.
Dean, Miller School of Medicine
University of Miami

Sunil Rao, PhD
Chair Department of Public Health Sciences

UNIVERSITY OF MIAMI
ROSENSTIEL SCHOOL of MARINE & ATMOSPHERIC SCIENCE

Department of Atmospheric Sciences
Rosenstiel School of Marine and Atmospheric Science
University of Miami
4600 Rickenbacker Causeway
Miami, FL 33149, USA

Phone: 305-421-4930 Email: dnolan@rsmas.miami.edu

December 15, 2017

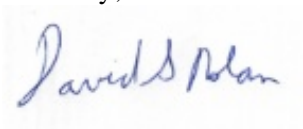
Prof. Naresh Kumar
Director, MSCH Program
Department of Public Health Services
Miller School of Medicine
University of Miami

Dear Dr. Kumar:

I am happy to report that at the faculty meeting in October, our department voted unanimously in support of the MS degree program in Climate and Health. This program builds on strong existing interdisciplinary partnerships across both department and schools. Given interdisciplinary nature of the program, it will likely foster new and dynamic research collaborations across all schools at the University of Miami.

The RSMAS and Miller Schools have both agreed on a viable business model to share costs and revenues between the Department of Public Health Sciences and RSMAS. Our department strongly supports the launch of the MSCH program.

Sincerely,



David S. Nolan
Professor and Chair
Department of Atmospheric Sciences
Rosenstiel School of Marine and Atmospheric Science
University of Miami

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MILLER SCHOOL
of MEDICINE

April 18, 2018

Tomas Salerno, M.D.
Chair, Faculty Senate
University of Miami
Ashe Building. Suite #325
252 Memorial Drive
Coral Gables, FL 33146

Re: Council Approved a Proposal for Master of Science in Climate and Health (MSCH) program.

Dear Dr. Tomas Salerno,

This is to inform the Faculty Senate that the Medical School Faculty Council met on April 10, 2018 to review the Proposal for Master of Science in Climate and Health (MSCH) program.

The council members voted to *approve* the proposal.

Respectfully submitted,

Sanjoy K. Bhattacharya, M. Tech, Ph.D.
Speaker, Medical Faculty Council

Office of Senior Associate Dean for Faculty Affairs
1600 NW 10th Avenue, Room RMSB 1124 (D2-6) | Miami, FL 33136
Phone: 305-243-6551 | Fax: 305-243-5574

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OF MIAMI

Assessment and Accreditation
Gables One Tower 1320 S. Dixie Hwy.
Coral Gables, Florida 33146

Phone: 305-284-5120
Fax: 305-284-4929
oaa.miami.edu

MEMORANDUM

DATE: July 17, 2018

TO: Naresh Kumar, Associate Professor
Miller School of Medicine

FROM: Patty Murphy, Executive Director PBM
Office of Assessment and Accreditation

RE: **New MS in Climate and Health Program with 4 Tracks**

On June 27, 2018, the Miller School of Medicine (MSOM) notified my office of its intent to offer a new Master of Science (MS) degree program in Climate and Health in partnership with the Rosenstiel School of Marine and Atmospheric Science (RSMAS). The proposed MS in Climate and Health program will require successful completion of 36 credit hours which include 21 credit hours of core courses, 9 credit hours of electives, and 6 credit hours of a required master's thesis. Students will be required to choose one of four tracks: 1) Public Health Sciences track; 2) Marine and Atmospheric Science track; 3) Climate and Health--Analytical track; or 4) Toxicology track.

The curriculum will include existing courses on this topic from a variety of disciplines such as Epidemiology and Public Health, Marine and Atmospheric Science, Biostatistics, Microbiology and Immunology, Economics, and Law. New courses will also be developed including three content courses and two courses related to the required thesis.

Program Curriculum

- Required Courses for All Tracks (9 graduate courses, 27 credit hours)
  - CPH 601 An Introduction to Climate and Health (existing course: EPH 646)
  - CPH 602 Toxicology and Climate (new interdisciplinary course to be developed from existing disciplines at the University)
  - CPH 603 Introduction to Weather and Climate (existing course: ATM 614)
  - CPH 604 Climate Change (existing course: ATM 653)
  - CPH 605 Climate, Environment and Health: Data Integration and Management (existing course: EPH 727)
  - CPH 606 Analysis of Health Effects of Climate (new interdisciplinary course to be developed from existing disciplines at the University)
  - CPH 607 Policies and Management of the Health Effects of Climate (new interdisciplinary course to be developed from existing disciplines at the University)
  - CPH 680 Thesis Proposal (new course to be developed but not a content-based course)
  - CHP 681 (new course to be developed but not a content-based course)
- Electives (3 graduate courses or 9 credit hours selected from the courses below or others with permission of advisor)

- *Public Health Sciences Track:*
  - ATM 634 Atmospheric Chemistry (existing course)
  - ATM 637/MPO 637/OCE 637 Natural Hazards: Atmosphere and Ocean (existing crosslisted course)
  - BST 630 Longitudinal and Multilevel Data Analysis (existing course)
  - CPH (Number TBD) Independent Climate and Health Topics (new independent study course to be developed in the future per student demand)
  - ECO 645 Regulation Economics (existing course)
  - EPH 612 Global Health (existing course)
  - EPH 639 Ecology and Control of Vector-Borne Diseases (existing course)
  - EPH 640 Urban Environment (existing course)
  - EPH 641 Environmental Health (existing course)
  - EPH 643 Introduction to Occupational Health (existing course)
  - EPH 724 Molecular and Genetic Epidemiology (existing course)
  - Law 213 Environmental Law (existing course)
  - Law 555 Climate Change (existing course)
  - Law 854 Environmental Justice Clinic Practicum (existing course)
- *Marine and Atmospheric Science Track:*
  - ATM 615 Numerical Weather Prediction (existing course)
  - ATM 624 Applied Data Analysis (existing course)
  - ATM 634 Atmospheric Chemistry (existing course)
  - ATM 636 Hurricanes (existing course)
  - ATM 637/MPO 637/OCE 637 Natural Hazards: Atmosphere and Ocean (existing crosslisted course)
  - ATM 654 Climate Variability (existing course)
  - ATM 661 Tropical Atmosphere and Ocean (existing course)
  - ATM 662 Advanced Weather Forecasting (existing course)
  - ATM 731 Air-Sea Interaction (existing course)
  - ATM 732 Climate Dynamics (existing course)
  - ATM 765 General Circulation of the Atmosphere (existing course)
  - CPH (Number TBD) Independent Climate and Health Topics (new independent study course to be developed in the future per student demand)
- *Climate and Health--Analytical Track:*
  - BST 605 Statistical Principles of Clinical Trials (existing course)
  - BST 630 Longitudinal and Multilevel Data Analysis (existing course)
  - BST 650 Topics in Biostatistical Research (existing course)
  - CPH (Number TBD) Independent Climate and Health Topics (new independent study course to be developed in the future per student demand)
  - EPH 703 Advanced Statistical Methods I (existing course)
  - EPH 705 Advanced Statistical Methods II (existing course)
  - EPH 724 Molecular and Genetic Epidemiology (existing course)
  - Law 555 Climate Change (existing course)
- *Toxicology Track:*
  - CPH (Number TBD) Independent Climate and Health Topics (new independent study course to be developed in the future per student demand)
  - HGG 631 Genes in Populations (existing course)
  - MBS 601 Biochemistry for the Biosciences (existing course)
  - MBS 603 Gross Anatomy and Histology (existing course)
  - MBS 604 Advanced Molecular and Cell Biology (existing course)
  - MBS 605 Cell Physiology (existing course)

- MBS 608 Basic Pathobiology (existing course)
- MIC 728 Principles of Immunology (existing course)
- MIC 751 Advanced Topics in Microbiology and Virology (existing course)
- MIC 755 Microbiology and Immunology Research: Career Skills and Proficiencies (existing course)
- MIC 775 Advanced Microbiology and Immunology (existing course)
- PIB 702 Scientific Reasoning (existing course)

Since this is an interdisciplinary program, it is difficult to find a perfect fit in terms of CIP code but in our discussions we determined that the CIP code for the **Public Health Sciences** track will be **51.2202: Environmental Health:**

> Definition: A program that focuses on the application of environmental sciences, public health, the biomedical sciences, and environmental toxicology to the study of environmental factors affecting human health, safety, and related ecological issues, and prepares individuals to function as professional environmental health specialists. Includes instruction in epidemiology, biostatistics, toxicology, public policy analysis, public management, risk assessment, communications, environmental law, occupational health and safety emergency response, and applications such as air quality, food protection, radiation protection, solid and hazardous waste management, water quality, soil quality, noise abatement, housing quality, and environmental control of recreational areas.

The **Marine and Atmospheric Science** track will have a different CIP code, **40.0402: Atmospheric Chemistry and Climatology**:

> Definition: A program that focuses on the scientific study of atmospheric constituents, reactions, measurement techniques, and processes in predictive, current, and historical contexts. Includes instruction in climate modeling, gases and aerosols, trace gases, aqueous phase chemistry, sinks, transport mechanisms, computer measurement, climate variability, paleoclimatology, climate diagnosis, numerical modeling and data analysis, ionization, recombination, photoemission, and plasma chemistry.

The **Climate and Health--Analytical and Toxicology** tracks will have a different CIP code, **26.1309: Epidemiology**:

> Definition: A program that focuses on the scientific study of disease, disability, and trauma patterns within and across populations and the development of health management mechanisms to prevent and control disease outbreaks and injurious behaviors. Includes instruction in biostatistics, biochemistry, molecular biology, immunology, disease and injury determinants, genetic disease and disability factors, behavioral studies, health services research, environmental disease and injury factors, and population studies.

All of these CIP codes are considered STEM areas by the Department of Homeland Security.

The interdisciplinary and cross-school program will be administered by the Department of Public Health Sciences in the MSOM but will be co-directed by faculty from that department and the Department of Atmospheric Science in RSMAS. Faculty from both departments will teach and advise students in the program. Dr. Naresh Kumar will serve as the program director. He is an Associate Professor of Environmental Health and Biostatistics in the Department of Public Health Sciences at MSOM. He has a PhD in Geography from the University of Durham (England). He has fifteen years of research and teaching experience in environmental health. His research focus includes air pollution toxicity, climate mediated health effects of air pollution, and time-space modeling. Dr. Elliot Atlas will serve as the co-director of the program. He is a Professor in Atmospheric Science at RSMAS. He has a PhD in Chemical Oceanography from Oregon State University His research focuses on the sources, transport and transformation of atmospheric trace gases.

The proposed new program does not "represent a significant departure, either in content or method of delivery" from what we are currently approved by SACSCOC to offer due to the following:

- The proposed program meets the SACSCOC requirement of a minimum of 30 credit hours for a graduate program.
- The proposed program will develop new courses and integrate existing courses from a variety of disciplines (public health, atmospheric sciences, environmental law, biostatistics, etc.). Although some new courses will be developed, they will be derived from existing disciplines at the University, so the content area is not new.
- The proposed program will be supported by current qualified faculty.
- The proposed program will be coordinated by qualified faculty: Dr. Naresh Kumar and Dr. Elliot Atlas.
- The University is already approved by SACSCOC to award a Master of Science degree; this is a proposal for a new major within an existing degree.
- The University is currently approved to offer the following graduate programs in related areas:
    - MA in Environmental Science and Policy
    - Master of Professional Science in Climate and Society
    - Master of Public Health
    - MS in Atmospheric Sciences
    - MS in Biochemistry and Molecular Biology
    - MS in Biomedical Sciences
    - MS in Biostatistics
    - MS in Environmental Health and Safety
    - MS in Public Health
    - PhD in Atmospheric Sciences
    - PhD in Biochemistry and Molecular Biology
    - PhD in Biostatistics
    - PhD in Environmental Science and Policy
    - PhD in Epidemiology
    - PhD in Microbiology and Immunology
    - PhD in Prevention Science and Community Health
- The majority of the program will not be offered via distance education and, in any case, the University is approved to offer 100% distance education programs.
- The program will be offered on the University's Coral Gables, Marine and Medical campuses.
- The graduate program covers the literature in the field through its required core coursework.
- The graduate program ensures ongoing student engagement in research and/or appropriate professional practice and training experiences through a required master's thesis.

SACSCOC only requires notification of program changes that represent a significant departure from our current programs. Therefore, no notification or approval is required for this change.

Please contact me if you have any questions at pattymurphy@miami.edu or (305) 284-3276.

CC: Faculty Senate
Guillermo Prado, Dean of the Graduate School
Edward Abraham, Dean of the Miller School of Medicine
Sunil Rao, Chair, Department of Public Health Sciences
Roni Avissar, Dean of the Rosenstiel School of Marine and Atmospheric Science
Karen Beckett, University Registrar
Carrie Glass, Executive Director of Student Financial Assistance and Employment

Kumar, Naresh

From: Rundek, Tatjana
Sent: Thursday, March 1, 2018 8:40 AM
To: Kumar, Naresh
Cc: Bhattacharya, Sanjoy K
Subject: Re: Recommendation for approval to the Medical School Council: MSCH Proposal

Dear Dr. Kumar,

Our Legislative Oversight Committee (LOC) Members has carefully reviewed your responses and budget scenarios for your proposal for the Master of Science in Climate and Health (MSCH) graduate program. You have addressed and clarified all of our comments in details. Your budget projections are reasonable and well planned.

I am please to inform you that our LOC enthusiastically recommends this new MS degree in Climate and Health (MSCH) to the Medical School Council for approval.

Your budget analyses present a model for other MS programs that we would like to follow. Would you mind sharing a spreadsheet of an average model (without program name) for us to recommend to other MS program evaluations.

Thank you so very much.

With best wishes,
Tatjana Rundek, for the Medical School Legislative Oversight Committee

--
Tatjana Rundek, MD PhD
Professor of Neurology
Executive Vice Chair of Research and Faculty Affairs in Neurology
Director, Clinical Translational Research Division
Director, MS CTI Program
Evelyn F. McKnight Brain Institute
Department of Neurology, Miller School of Medicine
1120 NW 12th Street, CRB- 1348, Miami, FL 33136
Tel 305-243-7847
Trundek@med.miami.edu

From: "Kumar, Naresh" <NKumar@med.miami.edu>
Date: Wednesday, February 28, 2018 at 8:42 AM
To: UM <trundek@med.miami.edu>

UNIVERSITY OF MIAMI
SCHOOL of LAW

Telephone: (305)284-2394
Fax: (305) 284-3210

Patricia D. White
Dean and Professor of Law
pwhite@law.miami.edu

January 9, 2018

Naresh Kumar, PhD
Director, Master of Science in Climate and Health
Department of Public Health Sciences
University of Miami, Miami, FL

Reference: Letter of support for MSCH program.

Dear Naresh,

Thank you for sharing with me the new proposal of Master of Science in Climate and Health that your department is developing in partnership with the Rosenstiel School of Marine and Atmospheric Science. Given that environmental law and health policy are critically important for managing health effects at all levels of governance, I am delighted to see the involvement of several of my colleagues in the proposal, including Tony Alfieri and Natalie Barefoot who run our Environmental Justice clinic and Ileana Porras who teaches International Sustainable Development.

I enthusiastically support this interdisciplinary MSCH program, and look forward to the opportunity of developing a joint degree program in the near future.

Sincerely yours,

Patricia D. White
Dean and Professor of Law

1311 Miller Drive, C-223
Coral Gables, FL 33146

UNIVERSITY OF MIAMI
COLLEGE of
ARTS & SCIENCES

Office of the Dean
1252 Memorial Drive, Suite 227
Coral Gables, Florida 33146

Phone: 305-284-4117
Fax: 305-284-5637
as.miami.edu

March 1, 2018

Naresh Kumar, PhD
Director, Master of Science in Climate and Health
Department of Public Health Sciences

Reference: Letter of support for Master of Science in Climate and Health Graduate Program.

Dear Naresh,

I am delighted to learn that the University of Miami is launching a much-needed interdisciplinary Master of Science in Climate and Health (MSCH) graduate program. I have reviewed the proposal whose objective is to train the future generations of leaders and researchers in climate and health. This MS program will address one of the most challenging issues that our society face today. Given that several of our faculty members in the College of Arts and Sciences work on climate and health-related areas, I am certain that they can mentor students in the program. I am pleased that this graduate program will not only support cross-campus collaboration, but it will also promote interdisciplinary research at UM.

I very enthusiastically support this MSCH program. Let me know if we can assist you to strengthen further this program.

Sincerely yours,

Leonidas Bachas

UHealth
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MILLER SCHOOL
of MEDICINE

Dushyantha Jayaweera, M.D.
Professor of Medicine
Sr. Associate Dean for Research

October 20th 2017

Naresh Kumar, PhD
Director
Master of Science in Climate and Health
Department of Public Health Sciences

Reference: Letter of support for MSCH program.

Dear Naresh,

I am extremely pleased to learn that the University of Miami is finally launching a new Master of Science in Climate and Health. I have reviewed the proposal that will train the future generations of leaders and researchers in climate and health, needed to address one of the most challenging issues that our society face today.

I am delighted to know that you have assembled and outstanding group of faculty from all disciplines to enrich this Master's program and provide a well-balanced, innovative science mixed with law, business and social sciences. This program is a testament to your leadership and the interdisciplinary teamwork that exists at the University of Miami where students are the focus. I do believe that over time this Master's Program will attract the best of the best from across the world, especially from Latin America.

As we enter a new era with our new President, Dr. Julio Frenk, who envisions the University of Miami becoming "The Hemispheric University", this Master's Program appears as a most timely and significant research opportunity that expands our horizon in research collaboration and scientific education to the far comers of Latin America. I hereby pledge my strongest commitment to the success of this program. As the Senior Associate Dean for Research and Research Education, I look forward to working with you and your team in the years to come.

Wishing you best success for this important work,

Sincerely yours,,

Dushyantha T. Jayaweera, MD, MRCOG (UK), FACP, CIP
Senior Associate Dean for Research
Miller School of Medicine at the University of Miami

University of Miami
Leonard M. Miller School of Medicine
Don Soffer Clinical Research Center
Suite 723
Miami, Florida 33136
Tel: 305 243 0810
Fax: 305 243 1976

UNIVERSITY OF MIAMI
SCHOOL of BUSINESS ADMINISTRATION

MEMORANDUM

TO: Naresh Kumar
Associate Professor of Environmental Health
Miller School of Medicine

FROM: Anuj Mehrotra, Sr. Vice Dean, School of Business Administration

CC: Patricia Abril, Vice Dean, Graduate Business Programs
John Quelch, Dean, School of Business Administration

Subject: MS in Climate & Health

Date: January 4, 2018

I am writing in support of the proposal for the Master of Science in in Climate and Health in the Department of Public Health Sciences. Management of climate and associated health effects and cost-benefit analysis of legislations aimed at reducing adverse health effects will be increasingly significant. Consequently, this Masters degree is a very attractive interdisciplinary proposal.

I understand that you have reached out to some Business School faculty to get their input on developing a few interdisciplinary courses that will be cross-listed once finalized.

I am hopeful that our faculty will collaborate with MSOM faculty to develop attractive classes for the program. I also appreciate that you are open to partnership models that include partial salary support and overload teaching payments for the participating faculty. We look forward to discussing the details when the program is finalized.

UNIVERSITY OF MIAMI
COLLEGE of ENGINEERING

Jean-Pierre Bardet, Ph.D.
Dean and Professor

1251 Memorial Drive
MEB Room 255
Coral Gables, Fl 33146

Ph: 305-284-6035
Fax: 305-284-2885
bardet@miami.edu

To: Dr. Naresh Kumar
MSCH Program Director
Dept. of Public Health Sciences
Miller School of Medicine, Miami, FL

From: Jean Pierre Bardet
Dean, College of Engineering

Re: Support of new Master of Science in Climate Health

Date: October 25, 2017

As Dean of the College of Engineering, I enthusiastically support Dr. Naresh Kumar's proposal for a new Master of Science in Climate and Health. The program is in an important interdisciplinary topic area, which will enhance the academic programs available at the University of Miami. The College of Engineering offers courses relevant to the program. We welcome MSCH students into these courses assuming that they meet the pre-requisite requirements. We also look forward to the possibility of MSCH students and faculty to collaborate on interdisciplinary research in the topic area.

UNIVERSITY OF MIAMI
SCHOOL of
COMMUNICATION

Graduate Studies Office
5100 Brunson Drive
Coral Gables, FL 33146

Phone: 305-284-5236
Fax: 305-284-8701
www.com.miami.edu/graduate-programs

October 19, 2017

Dr. Naresh Kumar
1063 Clinical Research Building
Department of Public Health Sciences

Dear Dr. Kumar:

This letter is in support of the proposed Master of Science in Climate and Health (MSCH) program. I believe this program will quickly prove successful. Recent events have made us well aware of the devastating effects of climate change, including how those changes threaten human health (e.g., the lack of potable water in Puerto Rico following hurricane Maria). And, unfortunately, we know things are likely to get worse, with warming oceans.

The University of Miami should be a leader in climate change study and the proposed program will help move us in that direction. I am particularly excited by this proposal, because I think it offers the opportunity to promote interdisciplinary collaboration. I strongly believe that faculty and students in the School of Communication will want to be affiliated with this program and I support it without reservation.

Sincerely,

Gregory Shepherd, Ph.D.
Dean
School of Communication

UNIVERSITY OF MIAMI
ABESS CENTER
for ECOSYSTEM
SCIENCE & POLICY

Kenneth Broad, PhD
Professor, Marine Ecosystems & Society
Director, Abess Center for Ecosystem Science and Policy
University of Miami, Miami FL 33146

December 18, 2017

Naresh Kumar, PhD
Director
Master of Science in Climate and Health
Department of Public Health Sciences

Reference: Letter of support for the MSCH program.

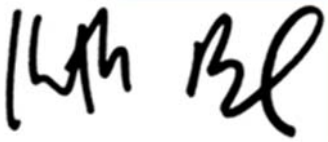
Dear Naresh,

I am delighted to learn that the University of Miami is finally launching a new Master of Science in Climate and Health (MSCH). This highly interdisciplinary program in the Department of Public Health Sciences in partnership with the Atmospheric Sciences offers an exciting opportunity to train the future generations of leaders and researchers in climate and health. This training is critical for some of the most challenging issues that our society faces.

Not only is this program highly relevant to the teaching and research mission of the Abess Center for Ecosystem Science and Policy but also offers a tremendous opportunity for our students to engage in teaching and research experiences concerning the health effects of climate. I am also happy to be personally involved in this program and which may include (co)advising graduate students who are interested in studying the policy aspects of climate and health.

In summary, I enthusiastically support the proposed MSCH program.

Sincerely yours,



Kenneth Broad

Professor, Rosenstiel School of Marine and Atmospheric Science, University of Miami
Director, Abess Center for Ecosystem Science and Policy, University of Miami
Co-Director, Center for Research on Environmental Decisions, Columbia University

Naresh Kumar, PhD
Director, Master of Science in Climate and Health
Department of Public Health Sciences
Reference: Letter of support for MSCH program.

November 8, 2017

Dear Naresh,

I am very delighted to learn that the University of Miami is launching the much needed Masters of Science in Climate and Health. I have carefully reviewed the proposal that will train the future generations of leaders and researchers in climate and health, needed to address one of the most challenging issues that our society face today.

As you as Division Chief of two large primary care Divisions at UM (General Internal Medicine and Geriatrics), I oversee a clinical, teaching and research enterprise of 66 full time faculty including clinical operations that involve over 130,000 annual patient visits. I also have several other clinical leadership roles including serving as an Executive Member of the UM Medical Group's Executive Committee and on the Board of Directors of the South Florida Health Council which is the state designated body for regional health planning.

As a researcher, my interests have long been in minority health and health disparities with a focus on community based research among vulnerable populations. I have over twenty years of experience leading NIH funded clinical and community based research projects and to date I have been awarded over $60 million of external support for my research projects as PI, Multiple PI and Core lead of program project or center grants. At present most of my work involves community based RCTs in various disease areas including diabetes, heart disease, stroke, HIV, and cancer.

In addition, I am also involved in several regional research consortia including the One Florida Clinical Research Consortia partially sponsored by PCORNet (all Florida academic health centers), Center on Precision Medicine and Disparities (Vanderbilt, Morehouse, UM, I direct the consortium Core), the Florida-Puerto Rico Stroke Collaboration, and most recently the South East Enrollment Center for the Precision Medicine Health Provider Organization (UM, UF, Emory, Morehouse). I serve as Medical Director of the Jay Weiss Institute for Health Equity, sit on the Board of various Community Based Organizations, and frequently appear on mainstream & ethnic media to explain general health topics and my research to national & regional audiences.

I believe these are all important strengths I bring to your program and enthusiastically look forward to advising/co-advising students whose research interests interfaces with my research related to health disparities concerning climate and the environment. I very enthusiastically support and looking forward to making an active teaching contribution to the MSCH program.

Sincerely yours,

Olveen Carrasquillo

Olveen Carrasquillo, MD MPH
Professor of Medicine and Public Health Sciences
Chief, Divisions of General Internal Medicine and Geriatrics/ Palliative Care
University of Miami, Miller School of Medicine

Department of Medicine / Division of General Internal Medicine
Clinical Research Building room 962 Locater code C223
1120 NW 14th Street, Miami, FL 33136, Miami, FL 33101
Phone: Phone: (305) 243-5505 Fax: 305-243-7096

UHealth
UNIVERSITY OF MIAMI HEALTH SYSTEM

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MILLER SCHOOL
of MEDICINE

Erin N. Kobetz, PhD, MPH
Senior Associate Dean for Health Disparities
Sylvester Cancer Center

Naresh Kumar, PhD
Director
Master of Science in Climate and Health
Department of Public Health Sciences

Reference: Letter of support for MSCH program.

Dear Naresh,

I am very delighted to learn that the University of Miami is finally launching a new Master of Science in Climate and Health. I have carefully reviewed the proposal that will train the future generations of leaders and researchers in climate and health, needed to address one of the most challenging issues that our society face today.

I will be happy to advise and co-advise students whose research interests' interface with my research related to health disparities. Through my extensive research in the Miami metropolitan area. I have encountered a significant correlation between health disparities and the effects of climate and the environment. These marked changes are shown to contribute to an increased burden of disease thus widening the gap of health disparities.

I very enthusiastically support and looking forward to making an active teaching contribution to the MSCH program.

Sincerely yours,

Erin Kobetz, PhD, MPH.
Professor, Department of Medicine
University of Miami Miller School of Medicine

UHealth
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MILLER SCHOOL
of MEDICINE

January 12, 2018

Naresh Kumar, PhD
Director
Master of Science in Climate and Health
Department of Public Health Sciences

Reference: Letter of support for MSCH program.

Dear Naresh,

I am very delighted to learn that the University of Miami is finally launching a new Master of Science in Climate and Health. I have carefully reviewed the proposal that will train the future generations of leaders and researchers in climate and health, which is needed to address one of the most challenging issues that our society faces today.

I will be happy to contribute (or co-teach) toxicology and health courses and advise and co-advise students whose research interests interfaces with my research.

The MSCH students will benefit from our current collaborative project on seasonality and cellular responses to air pollution, which are greatly affected by changing weather conditions. The students will learn cutting-edge methodologies that we are using in this project, and will develop substantial expertise in the field, which will help them in their future careers.

We would welcome trainees to become involved with our research projects and will grant them access to the laboratory and clinical facilities for their thesis work.

I very enthusiastically support the MSCH program and am looking forward to making an active teaching contribution to the program.

Sincerely,

Abigail Hackam, PhD
Associate Professor of Ophthalmology
Bascom Palmer Eye Institute, University of Miami
Tel: (305) 547-3723 ahackam@med.miami.edu

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of MEDICINE

October 23, 2017

Naresh Kumar, PhD
Director
Master of Science in Climate and Health
Department of Public Health Sciences
Reference: Letter of support for MSCH program.

Dear Naresh,

I am very delighted and pleased to learn that the University of Miami is finally launching a new Master of Science in Climate and Health. This is a much needed platform to train the future generations of leaders and researchers in climate and health, in order to address one of the most challenging issues that our society face today.

I have carefully reviewed the proposal and I will be happy to advise and co-advise students whose research interests interfaces with my research. My primarily focus is in airway diseases, mostly COPD and asthma, conditions directly affected by environmental factors. Your students will also have access to my laboratory and clinical facilities for their thesis work.

I very enthusiastically support and looking forward to making an active teaching contribution to the MSCH program.

Sincerely,

Michael A. Campos
Associate Professor of Medicine

Division of Pulmonary, Critical Care, and Sleep Medicine
1600 NW 10th AVE | RMSB 7056 | Miami, FL 33136
Phone: 305-243-6388 | Fax: 305-243-6992

UHealth
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MILLER SCHOOL
of MEDICINE

Mehdi Mirsaeidi MD, MPH
Division of Pulmonary, Critical Care,
Sleep and Allergy
Director of Sarcoidosis Program
Department of Medicine

Date: October 19, 2017

Naresh Kumar, PhD
Director
Master of Science in Climate and Health
Department of Public Health Sciences

Reference: Letter of support for MSCH program.

Dear Naresh,

I am very delighted to learn that the University of Miami is finally launching a new Master of Science in Climate and Health. I have carefully reviewed the proposal that will train the future generations of leaders and researchers in climate and health, needed to address one of the most challenging issues that our society face today.

I will be happy to advise and co-advise students whose research interests interfaces with my research. My current research interests are focused on climate change effects on pathogenesis of non-tuberculous mycobacteria, and effects of environmental bioaerosols and other pollutants on macrophages and bronchial epithelial cells. Of course, they will also have access to my laboratory and clinical facilities for their thesis work.

I very enthusiastically support and looking forward to making an active teaching contribution to the MSCH program.

Sincerely yours,

Mehdi mirsaeidi

Mehdi Mirsaeidi MD, MPH
Division of Pulmonary, Critical Care,
Sleep and Allergy
Director of Sarcoidosis Program
Miami VA Medical Center
Department of Medicine
University of Miami, Miller School of Medicine
1600 NW 10th Ave # 7072A
Miami, FL 33136
(305) 243-9227
Email: msm249@miami.edu

UHealth
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MILLER SCHOOL
of MEDICINE

Anat Galor MD MSPH
Associate Professor of Clinical Ophthalmology
Bascom Palmer Eye Institute
900 NW 17th Street
Miami, FL 33136

October 17, 2017

Naresh Kumar, PhD
Director
Master of Science in Climate and Health
Department of Public Health Sciences

Reference: Letter of support for MSCH program.

Dear Naresh,

I am very delighted to learn that the University of Miami is finally launching a new Master of Science in Climate and Health. I have carefully reviewed the proposal that will train the future generations of leaders and researchers in climate and health, needed to address one of the most challenging issues that our society face today.

I will be happy to advise and co-advise students whose research interests interfaces with my research. As you know, we have been focused on understanding the role of the personal microenvironment on ocular surface health. Our previous work has utilized large national datasets to study this question and we have found that exposures such as air pollution and low humidity increase the risk of a dry eye diagnosis. We are currently working on profiling the personal microenvironment on a local level and correlating our findings with dry eye symptoms and signs. In addition, we are setting up in vitro cell culture experiments to study these questions in a more focused manner. We would welcome trainees to become involved with our work and will grant them access to the laboratory and clinical facilities for their thesis work.

I very enthusiastically support and looking forward to making an active teaching contribution to the MSCH program.

Sincerely yours,

Anat Galor, MD, MSPH

UHealth
UNIVERSITY OF MIAMI HEALTH SYSTEM

UNIVERSITY OF MIAMI
MILLER SCHOOL
of MEDICINE

Ami P. Raval, Ph.D., MSPH
Research Assistant Professor
Department of Neurology

November 11, 2017

Naresh Kumar, PhD
Director
Master of Science in Climate and Health
Department of Public Health Sciences

Reference: Letter of support for MSCH program.

Dear Naresh,

I am very delighted to learn that the University of Miami is finally launching a new Master of Science in Climate and Health. I have carefully reviewed the proposal that will train the future generations of leaders and researchers in climate and health, needed to address one of the most challenging issues that our society face today.

I will be happy advise and co-advise students whose research interests interfaces with my research. I have unique training and experience in the fields of Zoology, Reproductive Physiology and Neuroscience that allowed me to investigate the impact of sex hormones on the healthy and diseased brain. My main research expertise is in the area of cerebral ischemia, which results from cardiac arrest or stroke. My research focuses on the areas of synaptic, vascular and mitochondrial dysfunction that ensue following cerebral ischemia. Since cardiac arrest or stroke disproportionately kills more women than men, the emphasis of my research is to identify risk factors and possible cellular mechanism specific for female brains that makes them more susceptible for cerebral ischemia. I am dedicated to develop this translational research topic and to conduct a future population-based study supported by our laboratory findings. My Master of Science in Public Health from the University of Miami will allow me to succeed in the aforementioned endeavors. Additionally, Public Health knowledge and background allows me to advise and co-advise students whose research interests targets understanding the effects of climate and extreme weather conditions on brain health in animals and humans. I will be happy to share my knowledge and MSCH students will have access to my laboratory for their thesis work. I will also participate in didactic and laboratory teachings.

I very enthusiastically support and looking forward to making an active teaching contribution to the MSCH program.

Sincerely yours,

Ami Raval

Ami P. Raval, Ph.D., MSPH

WMO OMM

World Meteorological Organization
President of Technical Commission
Organisation météorologique mondiale
Président de la Commission technique
Organización Meteorológica Mundial
Presidente de la Comisión Técnica

Всемирная метеорологическая организация
Президент технической комиссии
المنظمة العالمية للأرصاد الجوية
رئيس اللجنة الفنية
世界气象组织
技术委员会主席

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

December 26, 2017

Naresh Kumar, PhD
Director, Master of Science in Climate and Health
Department of Public Health Sciences
University of Miami, Miami, FL

Subject: Letter of support for MSCH program

Dear Dr. Kumar,

Late on October 17th of this year, after two days in Geneva discussing potential reorganization of the World Meteorological Organization, which is part of the United Nations system, I flew to the UK for a three-day meeting on the future of the Global Framework for Climate Services (GFCS). The meeting was hosted by the ECMWF. Many times during this past year the evening news described how the US weather model predicted that a storm would take a particular path while the European model predicted as somewhat different path. The ECMWF (European Centre for Medium-Range Weather Forecasts) in Reading, England is the home of the European model. ECMWF offered to host the meeting of the Management Committee of the Intergovernmental Board for Climate Services, the governing body of the GFCS, because it recognized the important role that the GFCS is serving around the world.

The GFCS in turn recognizes the important role that understanding the link between climate and health plays in providing the climate services that people all over the world will need. Indeed, if you go to the GFCS website, http://www.wmo.int/gfcs/, there is a clear statement of five priority areas for climate services with one of them being health.

Some people tend to think of climate and health issues as third world problems. But in reality, the entire world has climate related health issues. There are just different issues for different regions and different socio-economic conditions. The GFCS describes their climate and health concerns this way:

"Weather and climate are inextricably linked to some of the most fundamental determinants of human health such as clean air and water, adequate food and shelter, and the distribution and occurrence of disease. Heat and cold waves, tropical cyclones, floods and droughts claim many lives and heighten the transmission of diseases each year. Factors indirectly related to weather and climate – food security and non-communicable diseases, such as cardiovascular and respiratory diseases resulting from exposure to poor air quality – also cause the death and illness of many people. Furthermore, the proliferation of communicable water-borne and vector-borne diseases, due to favourable conditions particularly triggered by climate variability, result in a huge cost to society and the economy.

"Understanding the relationship between climate and health is fundamental when taking preventative action against climate related health risks. It is a challenge for the health community to access, recognize, understand, interpret and apply available climate information. Likewise, the climate services community often does not fully appreciate all public health concerns and needs, and the role climate services can play to support public health.

UCLA FIELDING SCHOOL OF PUBLIC HEALTH

Naresh Kumar, PhD
Director, Master of Science in Climate and Health
Department of Public Health Sciences
University of Miami, Miami, FL

December 21, 2017

Re: Letter of support for MSCH program

Dear Naresh,

I am very delighted to learn that the University of Miami is finally launching a new Master of Science in Climate and Health (MSCH). This highly interdisciplinary program in the Department of Public Health Sciences in partnership with the Department of Atmospheric Sciences offers an exciting opportunity to train the future generations of leaders and researchers in climate and health, needed to address one of the most challenging issues that our society faces today.

Generally most climatologists and health professionals are not trained to tease out the health effects of climate. The proposed MSCH program hosts tremendous potential to address this major gap in the labor force. The graduate program is one of a kind in the world. Our UCLA Center for Health Advancement in the Fielding School of Public Health is very interested in your pioneering academic program and expect that many public health practice and academic institutions will be looking for graduates with this background.

I very enthusiastically support the proposed MSCH program.

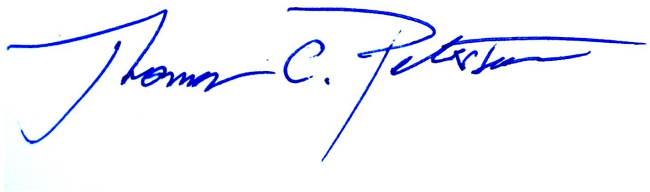
Sincerely yours,

Jonathan Fielding, MD, MBA, MPH
Distinguished Professor, Health Policy and Management
Founder, Center for Health Advancement

"The Global Framework for Climate Services aims to help bridge these gaps. It will foster collaboration to develop reliable health and climate-related tools and services for various time scales – from months to seasons, decades and longer. These services will support health priorities such as improving disease surveillance, and extending the lead-time to prevent and prepare for climate related outbreaks and emergencies."

As it is important to prepare scientists and practitioners to provide the services that the Global Framework for Climate Services knows are needed throughout the world, I would like to voice my strong support for your institution leading the way by providing a Masters of Science degree in Climate and Health.

Yours truly,



Thomas C. Peterson, Ph.D.
President, WMO Commission for Climatology

Response to the Legislative Oversight Committee, Feb 28, 2018

From: Rundek, Tatjana
Sent: Tuesday, February 27, 2018 8:12 PM
To: Kumar, Naresh <NKumar@med.miami.edu>
Cc: Bhattacharya, Sanjoy K <SBhattacharya@med.miami.edu>
Subject: Re: MSCH Proposal

Dear Dr. Kumar,

Our Legislative Oversight Committee (LOC) Members has received your proposal for the Master of Science in Climate and Health (MSCH) graduate program developed by the Department of Public Health Sciences in partnership with Rosenstiel School of Marine and Atmospheric Sciences (RSMAS).

The LOC members have carefully and favorably reviewed your proposal. It is well prepared and presented. We believe this is a valuable interdisciplinary proposal for a degree that scientifically addresses the influence of climate change on health. The proposal is strongly supported by Dean Edward Abraham and Dean Roni Avissar as well as by other UM schools and President of the World Meteorological Organization (as evidenced by the attached letters of support).

We also believe that the multidisciplinary approach to an emerging health and environmental consequence of climate change will have a high impact on attracting a substantial pool of motivated students. This type of training is not broadly available and will place the UM at the leading edge of graduate teaching in this field. The curriculum is terrific, interesting and thoughtful. Overall LOC members are very enthusiastic for this new program.
NKR: Thank you.
The LOC members would like to suggest the following:

1. The detailed budget is not provided. Considering the number of prestigious instructors, a more detailed budget that estimates of EVU-equivalents should be provided. In the letter signed by both Deans, Abraham and Avissar, both schools agreed on the split 2:7 and 5:7 of cost and revenue between RSMAS and UMMSOM. In the current UMMSOM environment and our new compensation plan, program faculty will need to be compensated for their time (currently they need to provide income equivalents for their compensation). We do not know if the faculty compensation plan is similar at RSMAS. It is important however that these faculty compensation estimates are provided in the budget, especially for "the worst case scenario" of student enrollment. Given current stringent reality of budgets, there is a need for a detailed plan to prevent potential deficits that may jeopardize this terrific program.
NKR: We did not include detailed budget, as detailed budget was presented to both deans and both are ok even with the worst scenario. Nonetheless, it is important that your committee has access to these scenarios, I am attaching detailed budgets for your consideration. As you will see in the budget that faculty compensation is adequately included in the budget.

2. The GRE requirements represent a pretty low bar. That is fine, as long as they are expressed in percentiles, and not in raw score numbers. Likewise, the program may consider also accepting MCAT, and to provide a percentile threshold for acceptance with this exam. This may attract applicants interested in human health, who are not yet ready for medical schools.
NKR: We have included MCAT. As you suggested, these scores may be subject to change. Generally, we will like to keep 60th percentile cut off. In addition, physics and calculus background are requisite of this program.

With these changes, we would be very supportive for this proposal and recommend it to the Medical School Council for approval.
Thank you.

Sincerely,
Tatjana Rundek, for the Medical School Legislative Oversight Committee

The University of Miami - MASTER OF SCIENCE IN CLIMATE & HEALTH (U-MSCH) – EXECUTIVE SUMMARY

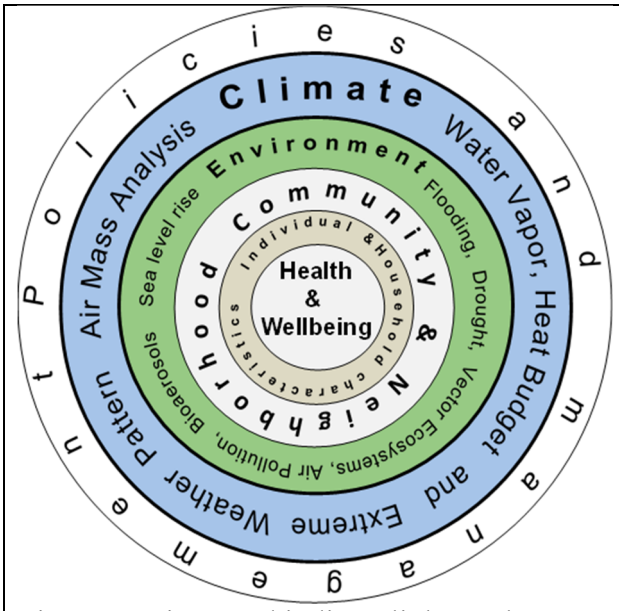


Figure 1. Direct and indirect linkages between climate and health – a conceptual framework.

Climate change, weather and weather anomalies (C^2W^2) and their implications for the environment and human health are the most debated and contentious topics of the 21st century not only because they affect us all, but also because their relationships with health are intricate due to differential roles of hierarchical variables including individual, household, neighborhood and regional level variables. Tremendous uncertainty exists in the disease and disability burden associated with C^2W^2. Therefore, C^2W^2 related legislation(s) often triggers political and public debates. While there has been an increasing interest in the health effects of C^2W^2, a new generation of manpower with a unique set of interdisciplinary skills is needed to understand, investigate and manage the burden of disease and disability associated with C^2W^2. Master of Science in Climate and Health (MSCH) program in the Department of Public Health Sciences, Miller School of Medicine in partnership[1] with the Department of Atmospheric Sciences, Rosenstiel School of Marine and Atmospheric Sciences (RSMAS) will prepare future generations of *professionals, research analysts*, *planners*, *decision-makers* and *leaders* who will have a deep understanding of the intricate relationship between human health and C^2W^2, and ability to decipher and quantify this relationship at multiple scales ranging from gene-expression, to individual's susceptibility to community response to region-wide morbidity and mortality burden. The MSCH program will have three specific aims:

1. Provide students with conceptual, theoretical and applied understanding of the direct and indirect impacts of C^2W^2 on human health. This will also include the impacts of short- and long-term climate and weather changes on health and well-being,
2. Train students in understanding, evaluating, and assessing short- and long-term climate and weather changes, and their direct and indirect impact on disease and disability burden across different communities, and

[1] Partnership in the context of this proposal refers to the following:

- Joint venture between Department of Public Health Sciences and Atmospheric Sciences at the University of Miami.
- The program will be administratively housed and managed by the Department of Public Health Sciences, and the department will oversee CEPH (Council on Education for Public Health) requirements of the MSCH program (see CEPH competencies that MSCH will meet towards the end).
- The Program will be Directed and Co-Directed by the Department of Public Health Sciences and Atmospheric Sciences, respectively.
- Graduate faculty members from both departments will actively participate in the instruction and advising of the students.

3. Prepare students to develop adaptation, mitigation, healthcare and communication strategies in the light of adaptation and infrastructure capacity of different communities to manage the health effects of $C^2W^{2.}$

We have already developed several of the core courses, and our faculty members are already working in several areas related to climate and health including: a) shifting burden of vector-borne disease and climate, b) health effects of heatwaves, c) climate change and building design, d) extreme weather and unintentional injury in occupational and non-occupational settings, e) climate-mediated health effects of air pollution and f) increasing burden of infectious, allergic and immunological disorders and climate changes. This will offer research opportunities to our students in various application areas of climate and health. Moreover, we have state of the art laboratories for measurement, modeling, analysis and surveillance of climate, environment and health, and toxicological analysis. Given Miami is a live laboratory to learn, understand and examine the health effects of C^2W^2, including the recent Zika outbreak and changing patterns of allergy and infectious disease, the MSCH program at the University of Miami will provide students with a unique learning experience by first-hand witnessing the intricate relationship between C^2W^2 and various health outcomes. Therefore, the program has potential to bring the University of Miami to the forefront of climate and health training and research, and to partner with the local, national, and international agencies focusing on this area, including the National Institute of Environmental Health Sciences, Environmental Protection Agency, International Panel on Climate Change, the Florida Department of Health and Florida Institute for Health Innovation. Given climate and health is a new area of training and research, the climate and health occupation category does not exist in the Department of Labor database. But job outlook between 2014-2024 in the related fields of atmospheric science, environmental science and healthcare management ranges from 9 to 17% (more than average), and median annual average pay ranges from $65,000 to $94,000. The MSCH graduates will have tremendous career opportunities in the both public and private sectors and academia (see letters of support [LOS]). The proposed interdisciplinary MSCH aligns with the University of Miami's mission to "educate and nurture students, to create knowledge, and to provide service to our community and beyond" by training and preparing the future generation of analytics, leaders and decision-makers needed to understand, assess and manage the burden of disease and disability in response to C^2W^2. Moreover, this program also aligns with the mission of the University of Miami Department of Public Health Sciences, which is "to enhance the health of the public, reduce the burden of disease, and create health equity among various segments of the population".

Naresh Kumar, PhD
Director
Associate Professor of Environmental Health
University of Miami, FL 33136
Email: nkumar@miami.edu
Tel: (305) 243-4854

Elliot Atlas, PhD
Program Co-Director
Professor of Atmospheric Sciences
RSMAS, Miami FL 33149
Email: eatlas@rsmas.miami.edu

1. RATIONALE

1.a Climate change – an emerging challenge of the 21st century. Climate change is one of the most debated and contentious issues of the 21st century because it has unprecedented implications for anthropogenic and natural resources[1-3], sustainability of our planet[4], and world economy and world order[5, 6]. Although changing climate was perceived to be a distant threat to health until recently, the Lancet Commission on Health and Climate concluded that "climate change is the biggest global health threat of the 21st century[7]". Moreover, focusing on health puts a human face on the issue of climate change.[8] The 2015 Lancet Commission proposes the formation of an independent, international Countdown to 2030: Global Health and Climate Action coalition to monitor progress and action on the health dimensions of the climate crisis[9]. While the Commission calls on health professionals to lead the response to the health threats of climate change, it will require a highly interdisciplinary approach to tease out the health effects of climate change. The 2015 Lancet Commission on Health and Climate suggests that "tackling climate change could be the greatest global health opportunity of the 21st century". The proposed Master of Science and Climate and Health (MSCH) program capitalizes on this greatest opportunity by training a new generation of professionals to: a) study intricate relationship between climate and health and b) assess and evaluate policies needed to manage health effects of C^2W^2 across different communities and populations.

1b. Mission Statement. As global warming intensifies, not only will it result in a shifting burden of disease and disability, but it will also result in unprecedented changes in the physical and biochemical characteristics of the environment. The MSCH graduate program will prepare future generations of *research analysts*, *planners*, *decision-makers* and *leaders* who will have deep understanding of the intricate relationship between climate and health, and ability to decipher this relationship. The MSCH program will have three specific aims:

- Provide students conceptual and theoretical understanding of the direct and indirect impacts of short- and long-term climate changes on health and well-being,
- Train students in evaluating and assessing short- and long-term climate changes and their direct impact, in turn, on the burden of disease and disability, and indirect impact on burden of disease and disability through the physical and biochemical changes in the environmental characteristics due to climate changes, and
- Prepare students to evaluate (existing) and develop adaptation, mitigation, communication and healthcare strategies to manage the health effect of C^2W^2 across different populations with respect to their differential health risks, infrastructure and adaptation capacity.

1c. Climate and health – an intricate relationship. Climate and health builds at the interface of interaction among climate, health and the environment (Figure 1). As shown in Figure 1, short- and long-term climate changes and weather anomalies affect health and well-being (in)directly. Changes in climate and weather directly affect disease etiology[10-12]. For example, heat waves trigger heatstroke, cold air masses trigger asthma exacerbation by airway constriction, and increase in surface temperature and atmospheric pressure directly affect the circulatory system by affecting blood pressure and perspiration. Climate and weather changes also indirectly affect disease etiology by altering physical and biochemical characteristics of the environment. For example, increases in temperature and humidity prolong blooming seasons and viability of mycobacteria and mosquitoes, which are shown to be associated with an increase in the prevalence of allergic, airway and other infectious diseases, respectively[13].

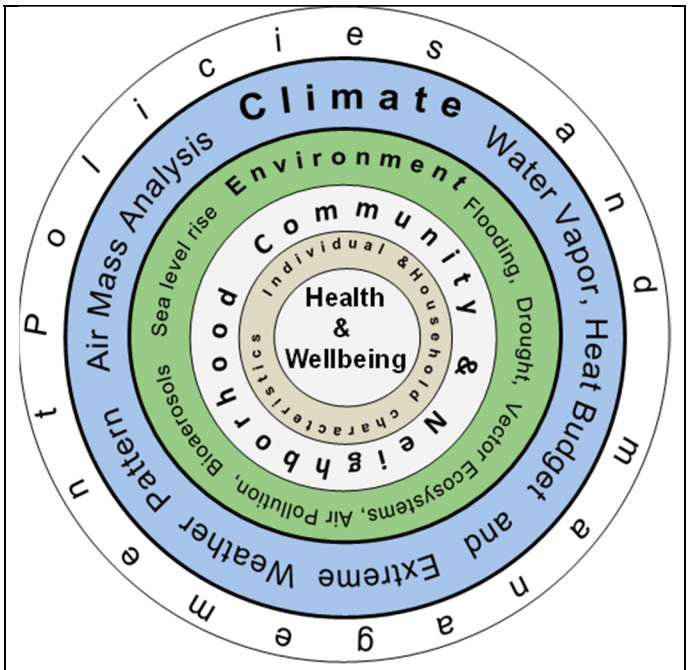


Figure 1. Direct and indirect linkages between climate and health – a conceptual framework.

1d. UM an emerging research and training center in Climate and Health. Our faculty members in the Division of Environment and Public Health and other departments have begun working on different areas of climate, including health and climate research projects. Faculty members within the division have been working on research projects that include: climate change and shifting burden of vector-borne diseases, unintentional climate effects on occupational health, heat waves and heat stroke, climate mediated health effects of air pollution, including asthma, allergies, and lung disease, and lastly the linkages between health, climate and the urban environment. The research within the division has recruited other faculty and research associates from other departments of UM to assist in this particular area of expertise. Such projects include: climate driven marine and atmospheric changes at RSMAS, policy-related issues concerning climate change in Ecological Sciences and Policy, novel translation and communication strategies in novel instrument sensing for the surveillance of climate and associated environmental characteristics in both the College of Engineering and the School of Communication. Tremendous expertise in different areas and different schools offers a wide range of research opportunities within the greater Miami area and throughout the nation.

The climatic and environmental conditions that Miami witnesses at present will shift to the northern parts of the US as global warming intensifies. Miami being a live laboratory offers an unprecedented opportunity to witness the intricate relationship between climate, climate change, weather and weather anomalies (C^2W^2) and health, including the effects of climate on vector-borne disease, water-borne disease, asthma, allergies, skin cancers and unintentional injuries, and understanding of the efficacy of different adaptation and mitigation strategies. Therefore, understanding the health effects of C^2W^2 in Miami at present is the key to understanding the potential health effects of C^2W^2 in the future in the northern parts of the US. Training future generations of students in Miami with field based learning holds

the potential for UM to emerge as the pioneer research and training center of climate and health, and increase UM's visibility on the world Map.

Proposing this new program will ensure a leading research and training center in the heart of a climatic and environmental hot spot. This training center will not only make groundbreaking research in the field of climate and health, but also train students to be the leaders of their specific fields, conducting research throughout the nation and the world on how C^2W^2 (in)directly affects health and wellbeing.

1e. Career in Climate and Health. Careers in climate and health range through many fields of environmental and public health, both in the public and private sectors, as well as academia. The Department of Labor does not have a specific sector for climate and health jobs. However, with an expertise in this field, students will be able to seek positions within atmospheric sciences, environmental sciences, healthcare and sciences, and public health. The job outlook between 2014-2024 in the related fields of atmospheric science, environmental science and healthcare management ranges from 9 to 17% (more than average) (see Appendix 1 for details). The median annual average pay in these sectors ranges from $65,000 to $94,000.

1f. Relationship to other fields and interaction among different colleges at UM. The proposed MSCH program will have the opportunity to enlist other specialties, academic focuses, and schools throughout the University of Miami to help solidify a strong foundation for future students. There is no graduate program in the nation that trains students with specific focus on the health effects of C^2W^2 (see Appendix 2 for the comparison MSCH with the existing and relevant four programs). Therefore, the MSCH program will have an unprecedented advantage and help UM emerge as a pioneer institution in the area of climate and health. This program builds on the interdisciplinary and inter-department collaboration across two different colleges at UM: Miller School of Medicine and Rosenstiel School of Marine and Atmospheric Sciences (RSMAS). Moreover, colleagues from other colleges, including Law, Engineering, Arts and Sciences and Business will participate in the instruction and supervision of the students. The MSCH program will prepare students in interdisciplinary, international, and synergistic collaboration to understand health effects of C^2W^2. While students will be trained in (in)direct etiology of disease associated with C^2W^2 and healthcare delivery at the Miller School of Medicine, they will have the opportunity to work with colleagues in other departments at UM concerning different application areas: extreme weather conditions and health effects in RSMAS; building design and climate related health effects in the School of Architecture; issues concerning effective translation and communication strategies to manage health effects of climate in the School of Communication and Abess Center for Ecosystem Science and Policy (ESP); issues concerning socio-physical environment in the College of Arts and Science; issues concerning the modern system of climate and weather surveillance in the College of Engineering (see section 3 for details). Students will also have the opportunity to take specialized elective courses in these colleges to develop deep understanding in different areas including atmospheric sciences, marine ecosystems and society, meteorology and physical oceanography. This inter-college collaboration will provide students with field experience and research opportunities as well.

2. RESOURCES

The program will be a collaborative effort between the Miller School of Medicine Department of Public Health Sciences and the Rosenstiel School of Marine & Atmospheric Science (RSMAS) Atmospheric Science Department. Both departments have state of the art instructional and laboratory facilities needed

to successfully conduct the program. Moreover, an interdisciplinary team of colleagues from five different colleges will be available to advise students (see section "**C**" for details).

B1. Library
Students enrolled in the program will have access to the necessary collections and other learning resources that support the educational programs of UM at all degree levels. The University of Miami libraries include extensive print and electronic resources and offer facilities for study, research and discovery, as well as integrated systems to provide access and services on each campus, and off-campus, at all times.

B2. Laboratory
Core course instructors, including Drs. Mirsaeidi, Campos, Raval and Kumar have state of the art wet laboratory facilities as well as computing laboratory facilities to support instruction. In addition, the Department of Public Health Sciences has a computer laboratory, needed for two of the seven courses (see Appendix 1 for details; letters of support (LOS) from all collaborators).

RSMAS has archived climate model simulations from the Coupled Model Intercomparison Project 5 (CMIP5) that were performed in support of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5). These consist of both historical climate simulations for the 19th and 20th Century as well as a set of 21st Century climate change simulations that are based on a range of future emission scenarios. These are complimented by a set of unforced climate change simulations that are used to document the internal climate variability of the models. The model simulations were performed by climate modeling centers around the world using a coordinated experimental framework and data output. These data will be available to our students for their laboratory work and thesis.

3. CURRICULUM

C3.1 Program objectives
This program will train future generations of researchers, research analysts, decision-makers and leaders to: **a**) understand the intricate relationship between C^2W^2 and health, **b**) assess anticipated disease and disability burden (across different populations) of short- and long-term climate and weather changes, and **c**) evaluate and prepare healthcare, adaptation, mitigation and communication strategies to manage disease and disability burdens of C^2W^2 for communities in the light of their infrastructure and adaptation capacity and healthcare needs.

C3.1 MSCH - Core competencies

Core competencies of the MSCH programs were developed to meet the program objectives. This program will train students in:

- understanding the basic physical processes that control global and regional climate, and global and regional weather patterns and extreme weather patterns,
- understanding the interplay between health and C^2W^2, the burden of disease/disability different communities and populations associated with weather and climate, and weather and climate-mediated changes in the environment,
- understanding the biophysiological responses with respect to short- and long-term climate changes and weather patterns,
- developing skills in collecting, managing and analyzing health, climate and associated data sets to quantify the health effects of climate incorporating hierarchical (including individual, community and region-specific) socio-physical environmental characteristics, and
- understanding the structure and administration of public health organizations and the policies that impact health programs and health services for different communities, and identifying direct and indirect roles of different stakeholders in the surveillance and management of the health effects of climate, and develop skills in evaluating the role strategies to reduce greenhouse gas emissions and associated health effects,
- understanding disparities in the health outcomes in communities and the attribution of climate change effects on vulnerable populations, and individual responses (from various socio-economic backgrounds) to different warning and surveillance of weather conditions that pose threat to health and wellbeing.

Table 1: Core courses, associated competencies and elective courses (**Total credits: 36**).

Course	Competencies
Core (required courses) (3 X 7 = 21 credits)	
CPH601 – An Introduction to Climate & Health (John Beier) [existing course EPH 646]	• Develop an understanding of the public health history, philosophy and value, and its importance for climate and health. • Understand short- and long-term impacts of climate, weather & weather anomalies on health and associated cost across different communities and regions. • Identify emerging research gaps concerning the health effects of climate and the role adaptation and infrastructure capacity at individual, household, community and regional level.
CPH602 – Toxicology and Climate (Abigail S. Hackam; Mehdi Mirsaeidi MD, MPH; Ami P. Raval, Ph.D.) [New interdisciplinary course to be developed from the existing disciplines at UM]	• Understand general principles of toxicology • Developing an understanding of the mechanism of the effects of climate, weather and climate and weather mediated effects of environment on biophysiological responses. • Develop skills in *in-vitro* and *in-vivo* experimental designs to assess direct and indirect toxicity of climate, weather and climate and weather mediated effects of environment on biophysiological responses.

	• Characterize and quantify biophysiological responses in response to the trends and anomalies of weather and climate.
CPH603/ATM614 – Introduction to Weather and Climate (RSMAS Brian Soden, Ph.D.) [existing course: ATM614]	• Understand weather patterns and processes that shape these patterns. • Assess the trends of short- and long-term changes in weather patterns across space and time. • Identify potential sources of weather and climate data sets. • Develop skills in quantifying micro-macro scale weather and climate data sets • Understand the composition of the atmosphere, energy and radiation, moist processes, weather systems, and global weather patterns.
CPH 604/ATM653 – Climate change (RSMAS – Amy Clement, Ph.D.) [existing course: ATM653]	• Understand the physical processes that regulate earth's climate • Understand climate feedbacks and sensitivity • Model projections of past and future climate • Develop an understanding of climate patterns and the role of natural (including extraterrestrial) and anthropogenic factors that affect short- and long-term climate changes • Evaluate potential climate prediction models • Types and sources of historical data and model based projections
CPH605/EPH727 – Climate, Environment and Health: Data Integration and Management (Naresh Kumar, Ph.D.) . [existing course: EPH 727]	• Develop an understanding of different research design. • Identify potential sources and types of data needed to pursue research on health and climate using different research designs. • Develop skills in integration (or colocation) of climate/weather, environment and health data sets. • Develop skill in characterizing time-space covariance structure. • Develop skills in quantifying error and uncertainty in the health and climate/weather data.

CPH 606 – Analysis of the Health Effects of Climate (Yongtao Guan, Ph.D. & Naresh Kumar) [New interdisciplinary course to be developed from the existing disciplines at UM]	• Develop skills in quantifying exposure uncertainty. • Develop skills in qualitative and quantitative exploration and visualization of the association between health and climate/weather conditions. • Develop skills in conducting ANOVA and MANOVA • Develop skills in quantifying time-space lagged exposure to climate/weather and environmental exposures. • Develop skills in examining (time-space varying) health risks associated with time-space varying climate/weather exposure.
CPH 607 – Policies and Management of the Health Effects of Climate [New interdisciplinary course to be developed from the existing disciplines at UM]	• Developing an understanding of the existing policies and role of different stakeholders in managing health effects of climate/weather. • Identify potential gaps in policies and management strategies aimed at improving and protecting health effects of short- and long-term trends of climate and weather patterns for different populations and communities. • Develop skills in defining and assessing "vulnerability" depending different aspects of climate change and extreme weather (e.g. urban heat waves, sea level rise etc.), and Assess healthcare needs of different communities and populations in the light of their vulnerability to C2W2 and their infrastructure and adaptation capacity. • Discuss disease-specific management in response to short- and long-term trends of climate and extreme weather, including clinical, such as healthcare delivery (pre-, during and post-extreme weather events), and preventive strategies, such as disease-specific real-time risk surveillance, adaptations (or preventive strategies), emergency healthcare delivery and preparation. • Develop skills in cost-benefit analysis of various policies and/or interventions, and • Develop skill in evaluating (evidence-based) policies to manage health effects of environment.
Dissertation work (3 x 2 = 6 credits)	
CPH 680 – Thesis Proposal	• Develop conceptual and theoretical understanding of a “selected health outcome(s)” and linkages with a “selected” climate/weather condition(s). • Conduct a meta-analysis of the selected research areas.
CPH 681 – Thesis	• Develop skills in conducting research on the (selected) health effect(s) of the selected climate/weather condition(s).

	• Develop skills in presenting/publishing research at professional platforms/media.

Elective courses (3 x 3 = 9 credits)
MSCH program will offer specialty in four areas: public health, atmospheric and marine science, analytical and toxicology. Elective courses (9 credits) and dissertation work (6 credits) will offer opportunity to specialize in one of the above four tracks. Curriculum requirements of each of these tracks are outlined below:

MSCH TRACKS.
Students can choose one of the following four tracks. Each student needs to declare his/her track by the end of first year of their program. Students are encouraged to consult their faculty advisor in the selection of their tracks. If a track is not declared by the end of the first year in the MSCH program, students will automatically be assigned to the Public Health Sciences Track.

Public Health Sciences Track

Core – Required Courses		**21**
CHM 601	An Introduction to Climate & Health (existing course - EPH 646)	3
CPH 602	Toxicology and Climate	3
CPH 603	Introduction to Weather and Climate (existing course ATM 614)	3
CPH 604	Climate Change	3
CPH 605	Climate, Environment and Health: Data Integration and Management	3
CPH 606	Analysis of the Health Effects of Climate	3
CPH 607	Policies and Management of the Health Effects of Climate	3
Electives – 3 courses selected from the following:		**9**
NOTE: With the permission of their advisor, students may take any elective courses on any of the UM campuses, including the following. The elective courses should be chosen such that these courses can provide skills and/or advanced understanding of the areas related to the dissertation topic. In addition, students can pursue "independent climate and health topic(s) (ICHT)". Students will need to develop one page proposal for ICHT, describing the topics covered and competencies to be achieved through ICHT. These competencies must be relevant for the dissertation topic. The proposal will need to be approved by their faculty advisor.		
BST 630	Longitudinal and Multilevel Data Analysis	3
ECO 645	Regulation Economics	3
EPH 612	Global Health	3
EPH 639	Ecology and Control of Vector-Borne Diseases	3
EPH 640	Urban Environment	3
EPH 643	Introduction to Occupational Health	3
EPH 724	Molecular and genetic epidemiology	3
ATM 634	Atmospheric Chemistry	3
ATM 637	Natural Hazards: Atmosphere and Ocean	3
LAW 213	Environmental Law	3
LAW 854	Environmental Justice Clinic Practicum	3
EHP 641	Environmental Health	3
LAW 555	Climate Change	3

EPH 611	Mindfulness in Public Health and Medicine	3
PSY 371	Stress Management	3
CPH (TBD)	Independent Climate and Health Topics	3
Dissertation Work - Required		**6**
CPH 680	Thesis Proposal	3
CPH 681	Thesis	3
TOTAL CREDITS		**36**

Marine and Atmospheric Science Track

Core – Required Courses		**21**
CHM 601/EPH 646	An Introduction to Climate & Health	3
CPH 602	Toxicology and Climate	3
CPH 603/ATM 614	Introduction to Weather and Climate	3
CPH 604/ATM 653	Climate Change	3
CPH 605/EPH 727	Climate, Environment and Health: Data Integration and Management	3
CPH 606	Analysis of the Health Effects of Climate	3
CPH 607	Policies and Management of the Health Effects of Climate	3
Electives – 3 courses. With the permission of their faculty advisor, students may take any elective courses offered on RSMAS and/or medical campuses, including the following. The elective courses should be chosen such that these courses can provide skills and/or advanced understanding of the dissertation topic. In addition, students can pursue "independent climate and health topic (ICHT)". Students will need to develop one page proposal for ICHT, describing the topics covered and competencies to be achieved through ICHT. These competencies must be relevant for the dissertation topic. The proposal will need to be approved by their faculty advisor.		**9**
ATM 624	Numerical Weather Prediction	
ATM 634	Applied Data Analysis	
ATM 636	Atmospheric Chemistry	
ATM 637	Hurricanes	
ATM 654	Natural Hazards: Atmosphere and Ocean	
ATM 661	Climate Variability	
ATM 662	Tropical Atmosphere and Ocean	
ATM 731	Advanced Weather Forecasting	
ATM 732	Air-Sea Interaction	
ATM 765	Climate Dynamics	
ATM 768	General Circulation of the Atmosphere	
CPH (TBD)	Independent Climate and Health Topics	3
Dissertation Work - Required		**6**
CPH 680	Thesis Proposal	3

CPH 681	Thesis	3
TOTAL CREDITS		**36**

Climate and Health – Analytical Track

Core – Required Courses		**21**
CHM 601/EPH 646	An Introduction to Climate & Health	3
CPH 602	Toxicology and Climate	3
CPH 603/ATM 614	Introduction to Weather and Climate	3
CPH 604/ATM 653	Climate Change	3
CPH 605/EPH 727	Climate, Environment and Health: Data Integration and Management	3
CPH 606	Analysis of the Health Effects of Climate	3
CPH 607	Policies and Management of the Health Effects of Climate	3
Electives – 3 courses. With the permission of their faculty advisor, students may take any elective courses offered from any department on medical campus, including the following. The elective courses should be chosen such that these courses can provide skills and/or advanced understanding of the areas related to their dissertation topic. In addition, students can pursue "independent climate and health topic (ICHT)". Students will need to develop one page proposal for ICHT, describing the topics covered and competencies to be achieved through ICHT. These competencies must be relevant for the dissertation topic. The proposal will need to be approved by their faculty advisor.		**9**
BST 630	Longitudinal and Multilevel Data Analysis	3
EPH 705	Statistical Methods in Epidemiology II	3
BST 650	Topics in Biostatistics Research	3
BST 605	Statistical Principles in Clinical Trials	3
LAW 555	Climate Change	3
CPH (TBD)	Independent Climate and Health Topics	3
EPH 703	Advanced Statistical Methods I	3
EPH 705	Advanced Statistical Methods II	3
Dissertation Work - Required		**6**
CPH 680	Thesis Proposal	3
CPH 681	Thesis	3
TOTAL CREDITS		**36**

Toxicology track

Core – Required Courses		**21**
CHM 601	An Introduction to Climate & Health	3
CPH 602	Toxicology and Climate	3
CPH 603	Introduction to Weather and Climate	3

CPH 604	Climate Change	3
CPH 605	Climate, Environment and Health: Data Integration and Management	3
CPH 606	Analysis of the Health Effects of Climate	3
CPH 607	Policies and Management of the Health Effects of Climate	3
Electives – 3 courses. With the permission of their faculty advisor, students may take any elective courses offered from any department on medical campus, including the following. The elective courses should be chosen such that these courses can provide skills and/or advanced understanding of the areas related to their dissertation topic. In addition, students can pursue "independent climate and health topic (ICHT)". Students will need to develop one page proposal for ICHT, describing the topics covered and competencies to be achieved through ICHT. This may include competencies in in-vitro and in-vivo experiments. These competencies must be relevant for the dissertation topic. The proposal will need to be approved by their faculty advisor.		**9**
PIBS 702	Scientific Reasoning	3
MBS 601	Biochemistry for the Biosciences	3
MBS 603	Gross Anatomy & Histology	3
MBS 604	Advanced Molecular and Cell Biology	3
MBS 605	Cell Physiology	3
MBS 608	Basic Pathobiology	3
MIC 728	Principles of Immunology	3
MIC 775	Advance Microbiology and Immunology	3
MIC 755	Microbiology and Immunology Research – Career Skills and Proficiencies	3
MIC 751	Advanced Topics in Immunology	3
HGG 621	Genes in Populations	3
PIBS 702	Scientific Reasoning	3
MBS 601	Biochemistry for the Biosciences	3
CPH (TBD)	Independent Climate and Health Topics	3
Dissertation Work - Required		**6**
CPH 680	Thesis Proposal	3
CPH 681	Thesis	3
TOTAL CREDITS		**36**

Description – Core courses.

CPH601 – An Introduction to the Health Effects of Climate – A Review of Applications. This course will introduce students to the intricate relationship between climate and health. A range of topics will be covered including: a) etiology of disease with respect to climate, weather, climate change and weather anomalies, b) shifting burden of disease and disability with respect to changing climate and climate-mediated changes in the environment across different communities and regions, and c) application areas of climate-health linkages: unintentional injuries and climate change, vector-borne disease and climate change, heat-related mortality, disease of metabolic syndrome and climate change, cardiopulmonary, allergy and immunology disease due to bioaerosols and air pollution.

CPH602 – Toxicology and Climate. The course will train students in developing an understanding of and skills in assessing the mechanism of the effects of climate, weather and climate and weather mediated effects of environment on biophysiological responses. For example, changes in levels of bronchoconstriction due to change in temperature is a direct effect of weather, and increase in allergies and asthma due to increase in bioaerosols in response to increase in precipitation and temperature is an indirect effect. Students will be exposed to general principles of toxicology and toxicological experimental design, including in-vitro and in-vivo experiments, designs needed to understand and investigate the health effects of climate, weather and climate mediated environmental conditions.

CPH603 – Introduction to Weather and Climate. This course will cover the structure, physics, dynamics and thermodynamics of the atmosphere; including weather analysis, weather forecasting, climate and climate change. Contemporary topics covered in this class will include global warming, the ozone hole, hurricanes, thunderstorms and other severe weather phenomena.

CPH604 – Climate Change. This course will provide an overview of the physical processes that regulate the earth's climate and its response to external forcings. Emphasis is placed on understanding feedback processes which determine the climate sensitivity of the climate to radiative forcings, robust responses of the climate system to external radiative forcings, historical observations of climate change, and model projections of both past and future climate change, and a critical analysis of the projection based on different models.

CPH605 – The course will introduce: **a**) different research designs needed to understand the linkages between climate/weather and health, and **b**) sources and types of data needed for different research designs. The course will train students in: **a**) the integration and management of weather/climate, environment, multi-level socio-demographic and health data sets that have different spatiotemporal scales, **b**) assessment of errors and uncertainty in the collocation/integration of these data sets, and **c**) visualization and presentation of these data.

CPH606 – The course will train students in analytical skills needed to quantify the health risks associated with climate change, weather and weather anomalies controlling for confounding factors and time-space hierarchical structures. The course will include quantification of time-space lagged exposure estimation, spatial, temporal and spatiotemporal analyses, exposure and risk uncertainty analyses.

CPH607 – Using a health-centered approach, the course will provide a critical review of the existing policies aimed at managing the health effects of climate/weather, identify potential gaps in the policies needed to improve and protect health effects of short- and long-term trends of climate and weather and extreme weather. Students will be exposed to the real-world preparation and adaption strategies to manage health effects of climate, and develop understanding of and skills in the cost-benefit analysis of evidence-based policies. As a part of the course, students will develop and evaluate (evidence-based) policies to manage a selected health outcome with respect to a selected (in)direct climate/weather related condition(s).

4. FACULTY

Given the interdisciplinary nature of the program, a highly interdisciplinary team of colleagues from difference colleges at UM will be engaged in teaching the core and elective courses, and advising students. Details on the faculty members who will be involved in the administration, teaching and supervision of the program are included in Table 1, and CV of the faculty members who will be responsible for teaching core courses are included in Appendix 4.

Table 2: Faculty members, their affiliation and role in the MSCH program.

Role/Designation	**Name**	**Department/School**	**Specialty**
Administration			
Program Director	Naresh Kumar, PhD	Public Health Sciences / Medical School	Air pollution toxicity; Climate mediated health effects of air pollution; time-space modeling;
Program Co-Director	Elliot Atlas, PhD	Atmospheric Sciences / RSMAS	Sources, transport, and transformation of atmospheric trace gases
Program Coordinator	TBA	Public Health Science / Medical School	Graduate study coordination
Faculty: core courses	John Beier	Public Health Sciences / Medical School	Ecology & vector-biology
	Mehdi Mirsaeidi	Internal Medicine / Medical School	Sarcoidosis, mycobacterial diseases, & bronchiectasis
	Ami P. Raval	Basic Science Div./ Medical School	Neurology
	Brian Soden	Atmospheric Sciences / RSMAS	Tropical climate change, climate modeling, & remote sensing
	Amy Clement	Atmospheric Sciences / RSMAS	Climate systems & mathematical modeling
	David Kelly	Economics / Business School	Environmental and policy & climate change policy under uncertainty
	Yongtao Guan	Management / Business School	Spatio-temporal processes & spatial epidemiology
Faculty: elective courses & advising	Scott Brown	Public Health Sciences / Medical School	Urban environment
	John Beier	Public Health Sciences / Medical School	Vector-borne disease & climate
	Jennifer Hu	Public Health Sciences / Medical School	Epi-genetic
	Alberto Caban-Martinez	Public Health Sciences / Medical School	Occupational Health
	TBA	Law School	Environmental law and policies
	Tony Alfieri	Law School	Environmental law and justice

	Hemant Ishwaran	Public Health Sciences / Medical School	Biostatistics & Statistical Methodology
Faculty: Advising	Roderick King	Assistant Dean of Public Health Education/ Medical School & CEO, Florida Institute for Health Innovation	Health policies for under-served communities; climate and health disparities.
	Laurence Kalkstein	Public Health Sciences / Medical School	Synoptic climatology & health effects
	James Klaus	Geology / RSMAS	Environmental microbiome & toxicity
	Helena-Solo-Gabriele	Civil & Environmental Engineering	Health effects of microbial & legacy contaminants
	David Nolan	Atmospheric Sciences / RSMAS	Hurricanes, tropical meteorology, severe storms, numerical modeling
	Ben Kirtman	Atmospheric Sciences / RSMAS	General circulation models for weather and climate prediction
	Sharanya Majumdar	Atmospheric Sciences / RSMAS	Tropical cyclones, adaptive observations, ensemble forecasting & predictability
	Joseph Prospero	Atmospheric Sciences / RSMAS	Global dust transport & health and aerosol chemistry
	Paquita Zuidema	Atmospheric Sciences / RSMAS	Clouds, radiation, climate & remote sensing
	Cassandra Gaston	Atmospheric Sciences / RSMAS	Air pollution and climate
	Douglas Fuller	Geography / Arts & Sciences	Remote Sensing, bio-geography & health geography
	Justin Stoler	Geography / Arts & Sciences	Spatial analysis and health geography
	Kenny Broad	Abess Center for Ecosystem Science and Policy, & Marine Ecosystem & Society /RSMAS	Ecological anthropology, society & climate, & environmental policy
	Gina Maranto	Abess Center for Ecosystem Science and Policy	Environmental communication
	David Letson	Marine Ecosystem & Society / RSMAS	Economics of climate variations and extreme weather

	Michal Campos	Pulmonary, Allergy, Critical Care and Sleep Medicine / Medical School	Chronic obstructive pulmonary disease, & air pollution & asthma
	Gianluca Iacobellis	Endocrinology, Diabetes and Metabolism / Medical School	Epicardial in coronary artery & metabolic disease
	Anat Galor	Bascom Palmer Eye Institute/ Medical School	Ocular surface disorder and microenvironment
	Abigail Hackam	Ophthalmology / Medical School	Ocular surface disorder & environmental stressors
	Sung Jun Kim	Electrical and Computer Engineering / Engineering	Biosensor and real-time environmental sensing
	Joanna Lombard	School of Architecture	Urban design, community health

5. STUDENTS

Expected Enrollment. Given the nature and tremendous popularity and interest in climate and health, we expected to recruit 8 qualified students into our first cohort in the academic year 2018-19, followed by 16 in academic year 2019-20 and the full capacity of 24 students in 2020-21. However, we have also contemplated on average and worse scenarios in developing this program and its business model. The anticipated enrollment under the best, average and worst scenarios are presented in Table 3. Even in the worst-case scenario we expect at least 10 or more students from third year onward.

Table 2: Expected enrollment in the first five years of MSCH program

Status	Academic Year					
	FY19	FY20	FY21	FY22	FY23	Total
Best Scenario						
New students	8	16	24	24	24	108
Returning students	0	8	16	24	24	84
Total Students	**8**	**24**	**48**	**48**	**48**	**192**
Average Scenario						
New students	5	10	15	16	16	62
Returning students	0	5	10	15	16	46
Total Students	**5**	**15**	**25**	**31**	**32**	**108**
Worst Scenario						
New students	2	4	6	8	8	28
Returning students	0	2	4	6	8	20
Total Students	**2**	**6**	**10**	**14**	**16**	**48**

Departmental history of successful graduate programs. The department of public health sciences has a track-record in developing and launching successful graduate programs. In the very first year of the, we

enrolled 24 students in Master of Science in Public Health in 1980-81. Currently all of our graduate programs are economically viable, including MSPH, MD/MPH and MS in Biostatistics. Climate and health program is similar to our MPH/MSPH program. Moreover, this program is even more interdisciplinary and builds on the partnership between two colleges.

Requirement. Although students from with a bachelor degree with most traditional majors can apply to this program, we expect that most our MSCH students will be drawn from public health sciences, medicine, environmental sciences including meteorology, biology, ecology and life sciences, policy and laws. The students who will meet the following requirements will be recruited in the program:

- Completed online application.
- Bachelor's degree from an accredited US institution - or a comparable degree from an international institution—with a minimum cumulative GPA of 3.0.
- One year of calculus
- One year of Physics
- A course in biology
- Graduate Record Examination (GRE) scores $\geq 60^{th}$ percentile (about 300 or higher in both verbal reasoning & Quantitative Reasoning) or MCAT score $\geq 60^{th}$ percentile.
- Test of English as a foreign language (TOEFL) score for foreign students only $> 86^{th}$ percentile.
- Two letters of recommendation.

6. ADMINISTRATION
The program will be housed in the Department of Public Health Sciences, Miller School of Medicine, and managed by the program committee that will include seven faculty members, as described below.

6. 1 Program Committee: The program committee will include Director and Co-Director and three faculty members from the Department of Public Health Sciences and three from Atmospheric Sciences Department. In the event of any conflict, department chairs of Public Health Sciences and graduate program directors of RSMAS and Department of Public Health Sciences will be involved to resolve the conflict.

6.3 Faculty advising process. Students will discuss their initial interest with the program director and/or co-director, who, depending on the interest of the students will refer them to faculty members who can potentially supervise their thesis. Thesis committee will include student's supervisor and another faculty member.

6.4 Thesis topic and thesis contents. Students have to come up with a topic of their interest and can work on ongoing projects on a topic that the project PI suggests. Thesis needs to make a novel contribution to the selected field and the quality of thesis must be such that it has the potential for a peer refereed publication.

6.5 Admission Process. The program director and co-director will screen the initial sets of application and the screen list will be presented to the Program Committee for final approval. Students in the approved list will then be sent offer.

6.6 Research, Travel and Laboratory Supply Costs. Business plan will have some funds for operation and maintenance of the laboratory, laboratory supplies and some money for students' travel and research support.

6.7 Review. The program review will be conducted by the program committee every three year. The program committee will develop a report of the program activities and performance of the program that will be subject to review by three external members. These members (non-UM affiliate) will visit the department and will have an opportunity to interact, meet and interview teaching faculty members, students and members of the program committee, and inspect the resources and laboratories relevant to the program. The final report of these three external reviewers, including their recommendations, will be submitted to the department, Faculty Council and the graduate school.

7. BUDGET

The business model for the MSCH program is developed in partnership with the RSMAS and Department of Public Health Sciences. There are seven core courses of the MSCH program. Two of these seven will be offered by RSMAS and five of these seven by the Department of Public Health Sciences. Based on the contributions to the core courses the cost and revenue will be shared in this ratio: 2/7 for RSMAS and 5/7 for Department of Public Health Sciences. Given $2,022/credit tuition revenue and 36 credit requirement, the program is expected to generate $3.53 revenue for the University for five years under the best scenario and $1.37 under the worst scenario of students' enrollment in the program. The program does not run into deficit under any of the scenarios except for Year 1 under the worst enrollment scenario. However, even under worst enrollment scenario, program is profitable to university as well as to the department and RSMAS starting from the second year of the program. Both, Miller School of Medicine and Rosenstiel School of Marine and Atmospheric Sciences have already agreed on this business plan (see LOS jointed signed by Deans Abraham and Avissar and Professor Rao).

Cost of degree. To pursue MSCH students will need to take 36 credits. Given $2,022/credit, the expected total tuition for the MSCH program will be about $72,000.

8. COMPARISONS

Currently there are no programs the nation that train health professionals, environmental sciences, research analysts, lawyers and decision-makers in understanding and quantifying (in)direct health effects of climate, climate change, weather and weather anomalies, and management of the health effects associated with climate, climate change, weather and weather anomalies. Based on extensive online search, we found the following four related and relevant programs (see Appendix 4):

- Columbia University – Climate & Health MPH Certificate
- Yale – Climate Change & Health Pre-Doctoral Fellowship
- Harvard – Climate, Energy, and Health Program
- George Washington - Climate Change Management and Policy MPS Certificate

None of the above listed programs offers a master's degree. A review of these programs further suggests that these programs simply familiarize students with link between climate and health, and methods and procedures available to bioclimatologists. A major focus of these programs is on policy issues and healthy solutions. However, the students in the above programs have limited access to climatologists, meteorologists, physicians, toxicologist and time-space modelers, needed to develop understanding of and

skills in evaluating health effects of climate ranging from cellular response to heat stress to weather mediated health effects of bioaerosols and air pollutants. Moreover, none of these programs provides skills needed to understand and quantify direct and indirect health effects of climate, climate change, weather and weather anomalies, which are critically important to develop evidence of the health effects of climate, climate change, weather and weather anomalies. Not only are such evidences important to assess their disease/disability burden and associated healthcare costs, but also required to guide evidence based policies to manage disease and disability burden. Drawing on the strengths of our interdisciplinary faculty, the MSCH program offers the following unique and unparalleled strengths as detailed in section 1. This will be the first program of its kind that will provide students with an in-depth integration of biophysiology, weather, climate, time-space modeling, policy and law, offering them unique understanding and skills needed to address health effects of climate, climate change, weather and weather anomalies in the 21st century.

8.1 Novel aspects of MSCH at UM

- ***Cutting scale barriers*** – The MSCH program will cut-across the scale barriers, because students will be exposed to and trained in assessing micro (i.e. intra-cellular), meso and macro level (in)direct health effects of climate and weather. For example, students will learn about changes in gene-expression to heat stress and responses of different communities with respective to their adaptation and infrastructure capacity. Likewise, they will also learn about precise mortality and morbidity burden associated with heat waves in a given city or a region, and reduction in mortality burden due to effective heat warning system.
- ***Dismantling disciplinary boundaries*** – students will learn skills and understanding of multiple and intricate aspects of climate and health from multiple disciplines, including atmospheric sciences, climatologist, biology, toxicology, healthcare delivery and time-space modeling.
- ***Miami a live laboratory*** – South Florida, especially Miami, is a live laboratory to understand and witness health effects of climate and weather. Climate and weather conditions and associated disease and disability that we experience in South Florida at present, the rest of the country is likely to experience it in the future. Therefore, the understanding and evidence of the health effects of climate and weather across different communities we generate in here holds the potential to guide future policies for the natation.
- ***Florida Public Health Institute (d.b.a. Florida Institute for Health Innovation*** www.flhealthinnovation.org) - Through the collaborative partnership with the University of Miami, students will have an opportunity to pursue internship opportunities with the only statewide public health institute which has led the way in identifying the public health impacts of climate change. In 2013, FIHI led the first Health Impact Assessment on the health effects of the Southeast Florida Regional Climate Change Action Plan for regional climate change adaptation and mitigation planning to demonstrate potential population health impacts given certain climate change effect. Then from 2014-2014, FIHI and regional planning and environmental organizations reported on the impact of sea-level rise on the health of populations in South Florida.

APPENDICES

Appendix 1: Labor Bureau – Statistics Concerning Comparable Job Market

Appendix 2: Comparable Programs in the Nation

Appendix 3: Example Job Opportunities

Appendix 4: Supporting laboratory resources

Appendix 5: Faculty CV

Appendix 6: Letters of Support

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CEPH Core Competencies
Master of Science in Climate and Health
Department of Public Health Sciences

Learning objectives	Describe how the SPH/PHP ensures grounding
Profession & Science of Public Health	
1. Explain public health history, philosophy and values	*Required MSCH Coursework: CPH 601 – Climate and Health *Previous completion of CEPH-accredited bachelor's degree
2. Identify the core functions of public health and the 10 Essential Services[1]	*Required MSCH Coursework: CPH 601 Climate and Health & CPH 607 – Policies and management of the health effects of climate *Previous completion of CEPH-accredited bachelor's degree
3. Explain the role of quantitative and qualitative methods and sciences in describing and assessing a population's health.	*Required MSCH Coursework: CPH 605 - Climate, Environment and Health – Data Integration and Management & & CPH 606 – Analysis of the Health Effects of Climate *Previous completion of CEPH-accredited bachelor's degree
4. List major causes and trends of morbidity and mortality in the US or other community relevant to the school or program	*Required MSCH Coursework: CPH 601 – Climate and Health; CPH602 – Toxicology and Climate; *Previous completion of CEPH-accredited bachelor's degree
5. Discuss the science of primary, secondary and tertiary prevention in population health, including health promotion, screening, etc.	*Required MSCH Coursework: CPH 607 – Policies and Management of the Health Effects of Climate; *Previous completion of CEPH-accredited bachelor's degree
6. Explain the critical importance of evidence in advancing public health knowledge	*Required MSCH Coursework: CPH 607 – Policies and Management of the Health Effects of Climate; CPH 602 – Toxicology and Climate; CPH 606 – Analysis of the Health Effects of Climate *Previous completion of CEPH-accredited bachelor's degree
Factors Related to Human Health	
7. Explain effects of environmental factors on a population's health	*Required MSCH Coursework: CPH 601- Climate and Health; CPH 602 – Toxicology and Climate *Previous completion of CEPH-accredited bachelor's degree
8. Explain biological and genetic factors that affect a population's health	*Required MSCH Coursework: CPH602 – Toxicology and Climate; CPH 601 – Climate and Health. *Previous completion of CEPH-accredited bachelor's degree
9. Explain behavioral and psychological factors that affect a population's health	*Required MSCH Coursework: CPH 607 – Policies and Management of the Health Effects of Climate *Previous completion of CEPH-accredited bachelor's degree

10. Explain the social, political and economic determinants of health and how they contribute to population health and health inequities	*Required MSCH Coursework: CPH 607 – Policies and Management of the Health Effects of Climate. *Previous completion of CEPH-accredited bachelor's degree
11. Explain how globalization affects global burdens of disease	*Required MSCH Coursework: CPH 607 – Policies and Management of the Health Effects of Climate; CPH 601 – Climate and Health *Previous completion of CEPH-accredited bachelor's degree
12. Explain an ecological perspective on the connections among human health, animal health and ecosystem health	*Required MSCH Coursework: CPH 601 – Climate and Health; *Previous completion of CEPH-accredited bachelor's degree

Item B2

MIAMI
BUSINESS SCHOOL

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MEMORANDUM

September 28, 2018

From: W. Brian Barrett, Chair of the MBS School Council

To: Dr. Tomas Salenro, Chair, Faculty Senate

RE: Proposal to Increase Educator (Professional Practice) Faculty Lines

The School Council of the Miami Business School voted in favor of the proposal to increase Educator Faculty lines. The vote was completed online on September 4 with a vote of 6 in favor and 1 against. Therefore two departments did not vote. Given the majority support, the measure was sent out to the Regular Faculty of the MBS. This vote was completed September 11th with the result of 51 in favor and 9 against. This was clearly a quorum as per MBS bylaws. So we are forwarding the proposal to the Faculty Senate.

MIAMI
BUSINESS SCHOOL

M E M O R A N D U M

TO: School Council

FROM: Dean John A. Quelch and Vice Dean for Faculty and Research Henrik Cronqvist

RE: Proposal to increase Educator (Professional Practice) Faculty lines

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Attached is a proposal to increase the number of Educator Faculty (also known as Professional Practice Faculty) at the University of Miami Business School (MBS) from 12 to 20.

In 2012, the Regular Faculty, supported by the Dean, of the Miami Business School voted to request approval from the Faculty Senate to establish up to 12 Educator Faculty positions (also known as Professional Practice Faculty). Please see the attached documentation. At that time, the school consisted of 80 Tenured or Tenure-Earning Faculty, with 52 non-tenure track colleagues, so the additional 12 Educator Faculty lines comprised 9% of the total. We are now, more than five years later, requesting an additional 8 Educator Faculty positions. During this five year period, the Regular Faculty has increased from 80 in 2013 to 94 currently with the expectation that the number of Regular Faculty positions will increase modestly over the next few years. The total MBS faculty currently is 161, with Educator Faculty comprising 7%. An increase of 8 more Educator Faculty positions will increase this percentage to 12% of the total MBS faculty (if all 20 positions are filled).

MBS is a professional school that relies heavily on clinical teaching to provide the exposure to professional practice our students require. Over the past five years, student enrollment has grown significantly, particularly in graduate business programs. For example, graduate enrollments were 601 in 2013 compared with 987 in 2017, a 64% increase, and a higher percentage increase than any other school at UM. Despite the significant enrollment increases – and we anticipate even higher increases in both undergraduate and graduate enrollment this fall – the number of Educator Faculty lines has remained the constant.

Since 2016, two UM colleges and schools have proposed and received approval for additional Educator Faculty lines: The School of Communication (from 12 to 20 lines) and the School of Education and Human Development (also from 12 to 20 lines). We respectfully request similar authorization to address the diverse program needs at MBS.

Proposal to Increase Educator Faculty Lines

Executive Summary

- Proposal is to increase the number of Educator Faculty (also known as Professional Practice Faculty) at the University of Miami Business School (MBS) from 12 to 20.
- MBS is a professional school that relies heavily on clinical teaching to provide the professional services our students require. Over the last five years, our student enrollment has grown significantly, while the number of Educator Faculty lines has remained the same.
- During the past five years, the Regular Faculty has increased from 80 in 2013 to 94 currently with the expectation that the number of Regular Faculty positions will increase modestly over the next few years. The total MBS faculty currently is 161, with Educator Faculty comprising 7%. An increase of 8 more Educator Faculty positions will increase this percentage to 12% of the total MBS faculty (if all 20 positions are filled).
- If the proposed increase in Educator Faculty lines is approved, the positions will be filled incrementally to ensure the appointment of only highly qualified candidates. The appointed faculty will hold terminal degrees in their respective fields and will possess high-quality teaching skills. They will be required to maintain professional qualifications in their field for licensing and accreditation.

1) Background and Rationale

In 2012, the Regular Faculty, supported by the Dean, of the Miami Business School voted to request approval from the Faculty Senate to establish up to 12 Educator Faculty positions (also known as Professional Practice Faculty). The faculty request was approved by the Faculty Senate in January, 2013. At that time, the school consisted of 80 Tenured or Tenure-Earning Faculty, with 52 non-tenure track colleagues so the additional 12 Educator Faculty lines comprised 9% of the group. We are now, more than five years later, requesting an additional 8 Educator Faculty positions. During this five year period, the Regular Faculty has increased from 80 in 2013 to 94 currently with the expectation that the number of Regular Faculty positions will increase modestly over the next few years. The total MBS faculty currently is 161, with Educator Faculty comprising 7%. An increase of 8 more Educator Faculty positions will increase this percentage to 12% of the total MBS faculty (if all 20 positions are filled).

Over the past five years (since 2013 when the 12 Educator Faculty positions were first approved), student enrollment has grown significantly. Specifically, undergraduate enrollment was 2,166 students in 2013 compared with 2,338 students in the fall of 2017 (an 8% increase over the five year period). Graduate enrollments were 601 in 2013 compared with 987 in 2017, a 64% increase, and a higher percentage increase than any other school at UM. The MBS total enrollment for the fall of 2017 was 3,325 (representing 20% of the students enrolled at UM) and second only behind the College of Arts and Sciences with an enrollment of 4,518 (27% of the total student body). The next highest enrollment percentages in 2017 were 8% each for the School of Engineering and the Miller School of Medicine. Despite the significant enrollment increases – and we anticipate even higher increases in both undergraduate and graduate enrollment this fall – the number of Educator Faculty lines has remained the constant.

MBS's mission is to "develop innovative ideas and principled leaders that transform global business and society." Implied in this statement is both a research mission ("develop innovative ideas") and a teaching mission ("develop principled leaders"). Having Educator Faculty as a part of MBS's portfolio of faculty members is critically important for the fulfillment of our mission:

- ***Support of Research Mission***. MBS's Tenured and Tenure-Earning Faculty help to fulfil the school's research mission, but many are currently overburdened with teaching extra sections or teaching large classes due to our significant growth in enrollment. To improve MBS's research productivity and execute on our vision of becoming a Top 25 Business School by 2025, it is critically important that faculty loads be consistent with that of our benchmark comparison schools. Particularly given the increase enrollments in graduate classes, staffing must be done by terminally qualified faculty with the requisite experience and background required by our accrediting body, AACSB. Although our Full-Time Lecturers and Adjuncts help alleviate staffing burdens at the undergraduate level, they are not typically qualified to do so for our graduate courses. As a result, a number of tenured faculty have taken on overloads to ensure that departments meet their obligations to our students. This leads to burn-out, and also, less time devoted to scholarship, ultimately impeding our research mission.

- ***Support of Teaching Mission***. Because we are a professional school, MBS relies on high-quality and innovative teaching, and again, given our significant growth in enrollment, strategically adding more Educator Faculty will help departments innovate curriculum to satisfy the challenges of a global marketplace. Educator Faculty also extend our reach and create long-lasting connections with our professional practice community and external stakeholders. These relationships help provide our students with networking opportunities and in a number of cases, exposure to experiential learning that would not otherwise take place.

The market for high-quality business school faculty to execute the school's teaching mission is competitive and Educator Faculty are critical for:

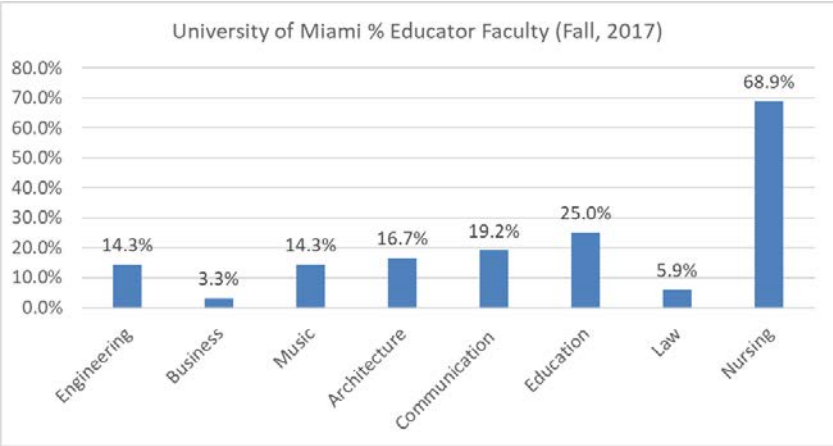
- ***Recruitment***. To compete with Top 25 Business Schools, we need to recruit experienced instructors who can engage in curriculum innovation in strategically important areas (e.g., Sustainability, FinTech, Entrepreneurship, Data Analytics, etc.). Clearly, we will only be able to recruit a faculty member who is already Professional Practice Faculty at another school, by offering a comparable contract. They will not accept employment for a "Lecturer" title.

- ***Retention***. We will continue to use a Professional Practice Faculty position as a potential retention device for our most talented Full-Time Lecturers who are beginning to receive competitive offers from other schools due to the limited number of qualified business faculty in the marketplace.

Thus, Tenured/ Tenure-Earning and Educator Faculty are complements, and not substitutes, both being critically important for MBS to fulfill our mission.

2) Benchmarking

To provide a University of Miami benchmark, data on percentages of full-time faculty, employed in the Fall of 2017 (the most recently available data), were compiled. The figure below shows that the percentage was the lowest for MBS (3.3%) and the highest for the School of Nursing and Health Studies (68.9%). In the Fall of 2018, because of recent hires and departures, the MBS percentage is estimated to be 7.1%, i.e., still one of the lowest across the University.



To provide an external benchmark, data on professional titles have been compiled for approximately 5,000 faculty members at Top 25 Business Schools. The following faculty were excluded: Faculty with "Visiting," "Part-Time," or "Emeritus" in the title. Lower and upper bounds on the percentages of Educator Faculty have been estimated as follows:

- ***Lower Bound***. "Clinical" or "Practice" in the title: 8.5%. This percentage is likely significantly underestimating the actual percentage of Educator Faculty as some schools appear to use other titles.

- ***Upper Bound***. "Clinical," "Practice," or "Adjunct" in the title (given that those with "Part-Time" in the title have already been excluded): 21.3%. This percentage is overestimating the actual percentage of Educator Faculty if some Adjuncts are part-time but this is not explicitly stated in their titles. If assuming that half of the Adjuncts are equivalent to Professional Practice Faculty and the other half are actually part-time faculty (which should be excluded from this estimation), the estimated percentage is 16.0%. Discussions with Vice Deans for Faculty at some Top 25 Business Schools confirm that this is a plausible average estimate for such schools.

We estimate that MBS currently has a significantly lower percentage Educator Faculty compared to Top 25 Business Schools (6.9% vs. 16.0%). If the increase in Educator Faculty lines is approved, we still estimate a lower than average percentage of Educator Faculty (11.0% vs. 16.0%).

3) Standards and Procedures for Appointment and Promotion

If the proposed increase in Educator Faculty lines is approved, the positions will be filled incrementally to ensure the selection of highly qualified candidates. The appointed Educator Faculty will hold terminal degrees in their respective fields and will possess high-quality teaching skills. They will be required to maintain professional qualifications in their field for licensing and accreditation.

Consistent with the MBS By-Laws, Educator Faculty will be eligible to hold one of three ranks, "Educator Assistant Professor," "Educator Associate Professor," or "Educator Professor." In each case, the rank at initial appointment will be commensurate with the candidate's background, experience, and stature in the associated field of practice.

Procedures for appointment, selection, promotion, evaluation, and reappointment of Educator Faculty will be in accordance with the Faculty Manual and the MBS By-Laws.

4) Educator Faculty Status and Voting Rights

The voting rights of all faculty are described in the Faculty Manual. In addition, the MBS By-Laws state that the voting members of the faculty consist only of the Regular Faculty within the school.

5) Annual Performance Reviews

Annual evaluation of our Educator Faculty will conform to the procedures for General Faculty, as required for Special Reviews and described in the Faculty Manual.

UNIVERSITY
OF MIAMI
FACULTY SENATE

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MEMORANDUM

To: Donna E. Shalala, President

From: Richard L. Williamson
Chair, Faculty Senate

Date: January 31, 2013

Subject: Faculty Senate Legislation #2012-22(B) – Establishment of EDUCATOR FACULTY at the School of Business Administration

****

At its January 30, 2013 meeting, the Faculty Senate unanimously approved the proposal to establish EDUCATOR FACULTY in all Departments within the School of Business Administration. This Clinical Faculty track will permit the appointment of no more than 12 full and part time clinical instructional staff. Appointments to Clinical Assistant Professor are for up to three years and are renewable by mutual agreement. Appointments to Clinical Associate Professor and Clinical Professor will be for up to five years and renewable upon mutual agreement. The legislation specifies the procedures the school will follow when appointing Clinical Faculty members and when promoting them to full professor.

Faculty with these titles shall not hold tenured or tenure-earning appointments.

The supporting materials are enclosed for your reference.

This legislation is now forwarded to you for your action.

RW/rh

Enclosure

cc: Thomas LeBlanc, Executive Vice President and Provost
David Birnbach, Vice Provost for Academic Affairs
Eugene Anderson, Dean, School of Business Administration

CAPSULE: Faculty Senate Legislation #2012-22(B) – Establishment of EDUCATOR FACULTY at the School of Business Administration

PRESIDENT'S RESPONSE

APPROVED: _____ DATE: 2/7/13
(President's Signature)

OFFICE OR INDIVIDUAL TO IMPLEMENT: DEAN GENE ANDERSON

EFFECTIVE DATE OF LEGISLATION: IMMEDIATELY
(if other than June 1 next following)

NOT APPROVED AND REFERRED TO: _____

REMARKS (IF NOT APPROVED): _____

UNIVERSITY OF MIAMI
SCHOOL of BUSINESS ADMINISTRATION

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Anuj Mehrotra
Vice Dean, Faculty Affairs
and Graduate Business Programs,
Leslie O. Barnes Scholar and Professor
of Management Science

MEMORANDUM

TO: Faculty Senate

FROM: Anuj Mehrotra, Vice Dean
School of Business Administration

DATE: December 20, 2012

SUBJECT: Establishment of Educator Faculty at the School of Business Administration

This is a follow up to Dean Anderson's memo dated June 6, 2012 seeking approval of the establishment of Educator Faculty track at the School of Business Administration. The proposal was considered by the General Welfare Committee on August 15, 2012. As per their recommendation, the proposal was revised (the highlighted portions capture the suggestions). The amended documents were approved unanimously by Department Chairs on September 20, 2012, and approved unanimously by the School Council on October 1, 2012. Furthermore the proposal was approved by the voting faculty of the School of Business Administration on November 21, 2012.

Here is some more information on current faculty composition that was requested to be included in this proposal.

1. Number of Educator Faculty slots requested: 12
2. Number of SBA Regular Faculty: 83
3. University Faculty:
   - Research Faculty: 2

Please let me know if any further information is required. Thank you for your consideration.

AM:bir

Enclosures: Original Memo from the Dean
Revised Proposal

cc: Eugene Anderson, Dean

Endorsed by the Dept. Chairs 9/20/2012
Approved by the School Council 10/1/2012
Approved by the Voting Faculty 11/21/2012

School of Business Administration
Clinical Faculty Track Policy

The School of Business Administration proposes the creation of a clinical faculty track that will permit the appointment of full and part time clinical instructional staff for terms of up to five years. Clinical appointments will be without tenure and are not tenure track appointments.

Statement of Principle

The changing landscape of business education calls for a more diverse faculty than in the past. Our mission is to develop innovative ideas and principled leaders that transform global business and society. Our vision is to become a premier learning community engaged in discovery and dissemination of transformative knowledge that enables its members to make innovative and responsible contributions that advance sustainable prosperity worldwide. We desire to distinguish ourselves by building a truly global learning community and offering extraordinary learning and career opportunities for our students. We plan to accomplish this by pursuing a strategic portfolio of areas of excellence that engage business and community organizations while creating and disseminating high impact intellectual capital through our research initiatives.

We believe that adding a small number of excellent clinical track colleagues to the faculty will strengthen our ability to fulfill our mission. Clinical track faculty are particularly important to the School in supporting executive education and enriching the curriculum through their teaching excellence, program leadership, and strong connections to the world of business practice.

We note that because of the very wide range of educational tasks in a top business school and the consequent knowledge and skill requirements of the faculty, there is a growing trend among the leading business schools to establish clinical or practice tracks similar to what we propose here. Establishment of a clinical track will help ensure our ability to continue to compete successfully with the world's top business schools.

The number of individuals with clinical appointments will be limited to no more than twelve (12) unless this limit is changed by appropriate approvals of the School Council and the Faculty Senate.

The Need for Clinical Faculty

The mission of our School requires the faculty to teach and engage in research. In addition, because we are a professional school, our faculty understand and contribute to both the academic disciplines (the business disciplines and underlying fields) and the world of business practice.

Clinical track faculty will enhance our ability to achieve our mission in the following ways:

Endorsed by the Dept. Chairs 9/20/2012
Approved by the School Council 10/1/2012
Approved by the Voting Faculty 11/21/2012

(1) By bringing to our School's faculty specialized knowledge and skill that are required for excellence in our teaching programs, but which are not currently adequately represented in our tenure track faculty.

(2) By increasing our visibility and stature in the world of business practice and, in the process, generating financial resources essential to supporting the School's entire operation, including research, at a level required to compete with other top business schools.

(3) By enabling the School to have a larger, richer and more successful set of educational offerings, especially in executive education and elective courses, than would be possible through the tenure track and current associated faculty (lecturers, adjuncts and visitors).

Creation of a clinical track will enable the School to maintain and improve areas of strength that we have developed in executive education. It will also ensure that we have the faculty required to support features of the programs, particularly our MBA program, that combine education with professional development. Additionally it will enable us to provide a richer and more diverse set of elective offerings that are much in demand by our students.

We propose three levels of clinical track appointments. These will be named Clinical Assistant Professor, Clinical Associate Professor and Clinical Professor. However, we will retain the options in the choice of titles we use within the School (e.g. "Clinical Professor of Business" or "Professor of Business Practice"). Adoption of the clinical titles will also bring greater consistency in the future and align the School's practice with the rest of the University.

Clinical titles will be "of Business" or "of Business Practice" unless qualified by an area title (e.g., Clinical Professor of Marketing or Professor of Business Practice in Marketing). Such a qualification will require the agreement of the faculty group or department, the candidate and the dean.

Searches and Standards for Appointment and Promotion

The availability of clinical positions will be advertised and affirmative action procedures will be followed.

The initiation of clinical appointments and promotions may come from the appropriate department chair upon consultation with the departmental faculty.

All clinical track appointments and promotions will require a similar process to that already in place for the appointment and promotion of tenure track faculty as outlined in the Faculty Manual, including a vote of the departmental faculty, supporting recommendation from the department chair, review by the School's Promotion and Tenure Committee, and the approval of the Dean. The Department Chair shall consult the qualified members of department faculty and his/her recommendation will ordinarily be made in conformity with the results of this consultation.

All clinical track appointments will require a visit by the candidate, a professional presentation, and meetings with appropriate department faculty members and deans.

Endorsed by the Dept. Chairs 9/20/2012
Approved by the School Council 10/1/2012
Approved by the Voting Faculty 11/21/2012

Candidates for appointment to Clinical Associate Professor and Clinical Professor will meet with the appropriate department faculty and Department Chair(s) who, after a vote of the departmental faculty, will make a recommendation to the School's Promotion and Tenure Committee and to the Dean regarding the appointment.

Appointments to Clinical Assistant Professor will require submission by the candidate of a current vita, a statement of professional achievement, and other materials pertinent to the clinical track appointment.

Candidates for appointment or promotion to Clinical Associate Professor or Clinical Professor will submit the materials specified above and, in addition, reference letters will be sought from persons who can comment knowledgeably about the candidate's professional stature and suitability for the clinical track appointment or promotion. The candidate and associated department faculty may submit names for possible inclusion as reviewers.

Candidates for clinical appointments must have the ability to make high quality contributions in teaching and in some cases, leadership of educational programs. They should also have the demonstrated ability and willingness to provide valuable professional service to the School. Candidates will be expected to have substantial, valuable, first-hand knowledge of the practice of business in their areas of specialization.

Clinical faculty are expected to be intellectually active and committed to career-long professional development. Writing and publishing are valued activities for our entire faculty as a means of disseminating knowledge. Clinical faculty will be expected to maintain qualifications in accordance with the School's guidelines for purposes of accreditations, and they will be encouraged to communicate to people engaged in the practice of business by writing for professional journals and/or by writing books directed primarily to a professional audience. Clinical faculty will hold terminal degrees and/or have evidence of exceptional professional experience and achievement.

Appointment and promotion considerations will include excellent teaching, educational program leadership, professional service, relevant professional experience, research, publications, and other evidence of stature in the candidate's area of specialization.

Appointments to Clinical Assistant Professor, and appointment or promotion to Clinical Associate Professor or Clinical Professor, will require appropriate evidence of merit at each rank. Increasing standards for Clinical Associate and Clinical Professor will be reflected in the quality, quantity, and impact of the individual's body of professional work and his/her professional stature in the field.

Terms of Appointment; Notice of Non-Reappointment

Appointments to Clinical Assistant Professor will be for up to three years and are renewable by mutual agreement. Appointments to Clinical Associate Professor and Clinical Professor will be for up to five years and renewable by mutual agreement. A review to determine reappointment will be conducted in the year before the appointment ends. This review will be conducted by the voting

faculty of the department who may invite other clinical faculty members of the department to participate. A summary of deliberations of this review as well a recommendation from the department chair will be submitted to the Dean. A one-year notice of non-renewal of appointment to the faculty member is required. All clinical track appointments will be made for a specified term and are not tenure track appointments. The instructional and program needs of the School, as well as the performance of the faculty member, will be of primary importance in renewing clinical track appointments.

Faculty Status and Voting Rights

Clinical faculty will be members of the Faculty and members of the teaching staff of the School of Business Administration. The voting rights of Clinical Faculty shall be as described in the Faculty Manual for Educator Faculty and as permitted by the Bylaws of the School of Business Administration. Clinical faculty will not participate in the promotion and tenure process, but they may be invited to participate in the evaluation and review of other clinical faculty members.

Performance Appraisal

Clinical track faculty will submit an annual report on their professional activities, as do the tenure track faculty. The Department Chair, the Dean's Advisory committee and the Dean's office will review this report. Feedback and follow-up discussion with the dean or his/her designee are available upon request. As stated above, a review to determine reappointment will be conducted in the year before the appointment ends.

Endorsed by Dept. Chairs 9/20/2012
Approved by the School Council 10/1/2012
Approved by the Voting Faculty 11/21/2012

School of Business Administration
Guidelines for Reappointment and Promotion of Clinical Faculty

As stated in the Clinical Policy of the School of Business Administration, the mission of our School requires the faculty to teach and engage in research. But because we are a professional school, our faculty also understands and contributes to both the academic disciplines and the world of business practice. Clinical track faculty members enhance our ability to achieve our mission by (1) bringing to our faculty specialized knowledge and skill that are desirable for excellence in our teaching programs, but which are not adequately represented in our tenure track faculty; (2) increasing our visibility and stature in the world of business practice; and (3) enabling a larger, richer, and more successful set of educational offerings, especially in executive education and elective courses, than would be possible through the tenure track and current associated faculty (lecturers, adjuncts and visitors).

Appointments to the clinical track will be for up to five years and are renewable. A review to determine reappointment will be conducted in the year before the appointment ends, by the department chair(s) of the candidate's home department(s) in consultation with appropriate faculty members. The department faculty and the Department Chair(s) will make the recommendation for reappointment/promotion to the Dean. A one-year notice of non-renewal of appointment to the faculty member is required. All clinical track appointments will be made for a specified term and are not tenure track appointments.

Areas of Evaluation and Performance Expectations

In making recommendations for reappointment with or without promotion, the whole record of each candidate will be reviewed. The categories to be considered from all candidates seeking reappointment or promotion are teaching, scholarship, and service. Candidates are expected to provide evidence of excellence in teaching, recognized accomplishments in scholarship, and service. For some candidates, whose assignments involve major administrative responsibilities, a fourth category – program administration – may also be considered.

Reappointment without Promotion

For reappointment as a Clinical Professor, excellent teaching, accomplishments in applied research and scholarship, and service are all required. For the reappointment without promotion of a Clinical Assistant Professor or Clinical Associate Professor, excellence in teaching is required, and the categories of scholarship and service also apply with the expectation both that the service and scholarship are appropriate for the level of reappointment and that the candidate is on a clear trajectory toward being meritorious in service and recognized for accomplishment in the area of applied scholarship. Administrative responsibilities should be considered whenever it is appropriate to do so.

Reappointment with Promotion

All clinical track reappointments with promotion will require a similar process to that already in place for the reappointment and promotion of tenure track faculty as outlined in the Faculty Manual, including a vote of the departmental faculty, supporting recommendation from the department chair, review by the School's Promotion and Tenure Committee, and the approval of the Dean. For

Endorsed by Dept. Chairs 9/20/2012
Approved by the School Council 10/1/2012
Approved by the Voting Faculty 11/21/2012

promotion from Clinical Associate to Clinical Professor, a sustained record of excellent teaching, service, and recognized scholarship that collectively brings distinction or recognition to the School must be demonstrated. To warrant a recommendation for reappointment with promotion from Clinical Assistant Professor to Clinical Associate Professor, a candidate must demonstrate excellence in teaching; recognized accomplishment in applied scholarship and meritorious service, to the extent deemed appropriate for the level of reappointment, are also necessary. Administrative responsibilities should be considered whenever it is appropriate to do so.

Evidence

Below are descriptions and examples of types of evidence a candidate might use in each area of evaluation to support a recommendation for reappointment and/or promotion. These descriptions and examples are intended to be illustrative rather than exhaustive. Given the nature and variety of responsibilities among clinical faculty within the School, candidates should be given considerable latitude in assembling evidence that accurately reflects their responsibilities and contributions.

Excellent Teaching

For reappointment and/or promotion, a candidate must demonstrate excellence in teaching. The evaluation of teaching excellence should consider a candidate's contributions to the design and enactment of superior courses and demonstrated commitment to the development of the School of Business Administration students as leaders in the field of business practice. Candidates should demonstrate excellence and innovation in teaching in elective courses and also in our executive education offerings.

Evidence demonstrating excellence in teaching should document the nature and impact of the full range of the candidate's teaching, advising, and mentoring. Of special importance are ways in which clinical faculty members lend attention to and forge connections between management scholarship and management practice in their course development and teaching activity. Clinical faculty members should also document ways in which their course development, teaching, and advising/mentoring incorporate exceptionally promising innovative practices (e.g., simulations, project formats, etc.).

Recognized Accomplishment in Applied Scholarship

For reappointment and/or promotion, a candidate must demonstrate accomplishment in scholarly activities that are closely tied to business practice. Given the nature of the appointments and responsibilities of clinical faculty, their scholarly focus and scholarly productivity are expected to be somewhat different from that of tenure track faculty. Nevertheless, clinical faculty members of the School are expected to make substantive contributions in this area. The evaluation of accomplishment in applied scholarship should consider a candidate's contributions across a broad range of types of practice-oriented scholarship.

We fully expect that clinical faculty will have contact with the world of business practice and the problems of business more than other faculty and will have both an expertise and an understanding of business contexts. Moreover, we fully expect that clinical faculty will show both an ability to communicate with, as well as a capability to influence, a broader business audience. In effect, clinical faculty should show evidence of commitment to work with and engage this distinctive audience.

Endorsed by Dept. Chairs 9/20/2012
Approved by the School Council 10/1/2012
Approved by the Voting Faculty 11/21/2012

Evidence of accomplishment in applied scholarship can reasonably include publications, presentations, work with business leaders, policy makers, and organizations, speaking (speeches), advising, or obtaining grants to support or enhance integration and interaction between scholarship and business practice or activities related to the School's programs and projects. The evidence should demonstrate an intimacy with the world of practice and an influence upon it. Evidence of accomplishment in applied scholarship might include published materials of various kinds, including articles in academic journals, but is more likely to be demonstrated by journals for academic business leaders such as the *California Management Review*, *Harvard Business Review*, *Sloan Management Review*, or other practice-oriented journals; books, chapters in books, or manuals that focus on business practice; or materials that would be useful to leaders and managers. Evidence of scholarly presentations might include those made at state, regional, national, or international conferences of professional organizations or to policy bodies.

Evaluation in this area should be based on the quality rather than the quantity of a candidate's applied scholarship. The School will judge quality by considering the reputation of the publications in which scholarly work appears and the conferences in which presentations are made; and assessments of the impact of the candidate's scholarship on practice.

Meritorious Service

For reappointment and/or promotion, a candidate must demonstrate meritorious service that supports the mission of the School. The evaluation of service should consider a candidate's contributions within the school as well as contributions to other institutions and the larger professional community.

Evidence demonstrating service should document the nature and impact of the candidate's local, regional and national service activities. Evidence of service to the life of the School might include documented contributions as a member of committees or task forces, work on special projects of the school, or the occasional performance of special tasks. Evidence of service as a member of a university committee or task force could also be provided. Evidence of service to other institutions might include work with business leaders or business consulting, providing expert assistance to state, national, or international agencies, or service on committees or task forces convened by these agencies. Evidence of service to the profession might include contributing to the operation of state, national, or international professional organizations; serving as a member of a committee in a professional organization; or service as an officer or member of a board of directors in an organization or other professional organization.

Program Administration

Some clinical faculty members may have positions that require substantial administrative duties and responsibilities. In such cases, administrative effort and responsibilities will be explicitly considered in evaluating a candidate for reappointment and/or promotion. In particular, candidates should document their accomplishments in program administration, so that they can be evaluated as part of the process.

Item B3

UNIVERSITY OF MIAMI

Proposal Submission Checklist

Proposals are to be submitted to the Office of Assessment and Accreditation (OAA), if applicable, the Graduate Council (for graduate programs excluding Law and Medical), if applicable, and the Faculty Senate. Refer to the Procedures for Program Changes document for information on the approvals and notifications needed for program changes and the Proposal Submissions Specifications document for an explanation of the process and a list of the materials required.

(Please note that change approvals can take 2 semesters to complete.)

Include this checklist at the beginning of each proposal.
(Complete the information below, save the form as a pdf, and insert it with the background materials that are specified, in the order listed, and send the package electronically as noted above.)

KEY CONTACT PERSONNEL INFORMATION

First Name: Stephen

Last Name: Cantrell

Proponent's Title: Professor

Department, if applicable:

School/College: College of Arts & Sciences

E-mail: r.cantrell@math.miami.edu

Phone: 305-284-2348

Title of Proposal: Proposal to Create New Educator Faculty Lines in the College of Arts & Sciences

(-continue to next page-)

MANDATORY MEMORANDA AND FORMAT

Please check that each item listed below is included in the proposal package of materials, in the ORDER as listed. The applicable title (i.e. Letter of Explanation, Memo from the Dean, etc.) is to precede each section in the materials.

Only proposals conforming to this format will be accepted.

1. This completed checklist.

2. Letter of explanation. (2-3 pages only, double spaced, 12 pt font)

◉ Yes ○ No

If no, explain why:

3. A memo from the dean(s) signifying approval of the faculty of the relevant School(s) / Colleges(s).

◉ Yes ○ No

If no, explain why:

4. A memo that all affected or relevant School / College Council(s) have approved.

◉ Yes ○ No

If no, explain why:

5. A memo from the department chair(s) signifying approval of the faculty of the relevant department(s).

◉ Yes ○ No

If no, explain why:

6. A memo from the Office of Accreditation and Assessment (OAA) if the proposal involves academic programs (degrees, certificates, majors, minors, concentrations, specializations, tracks, etc.) such as new programs, closing programs, or program changes (such as changes in requirements, program length, modality, name, location).

(To be submitted by OAA to the Graduate Council or the Faculty Senate, as appropriate.)

○ Applicable ◉ Not applicable.

If not, explain why:

The proposal does not involve changes to academic programs.

7. A memo from the Graduate School Dean signifying approval of the Graduate Council (for graduate programs only).
(To be submitted to the Faculty Senate by the Graduate Council.)

○ Applicable ◉ Not applicable.

If not, explain why:

The proposal does not involve changes to graduate programming.

8. Academic Deans Policy Council (ADPC) approval, for interdisciplinary issues and as appropriate. Please consult with the Dean of the Graduate School or the Secretary of the Faculty Senate to check if this is needed.

○ Yes ◉ No

If no, explain why:

The proposal does not involve interdisciplinary issues.

9. Additional required documents as listed on the "Proposal Submissions Specifications," i.e. market analysis, budget information, assessment of library collections, etc. as specified.

List additional documents included:

Please click on the "Save Form" button below to save this form, then e-mail to facsen@miami.edu.
To print the form, click "Print Form."

Save Form Print Form

End form.

UNIVERSITY OF MIAMI
COLLEGE of
ARTS & SCIENCES

Office of the Dean
1252 Memorial Dr., Ashe Bldg 227
Coral Gables, FL 33146

Phone: 305-284-4021
Fax: 305-284-5637
www.as.miami.edu

September 29, 2018

TO: Tomas Salerno
Chair, Faculty Senate

FROM: Leonidas Bachas
Dean, College of Arts and Sciences

RE: Proposals to Create New Educator Faculty Lines in the College of Arts and Sciences

Dear Tom,

At the College Faculty meeting of September 18, 2018, several proposals to create new Educator Faculty Lines were presented to the faculty. After discussion, a motion to approve the proposal to create new additional Educator Faculty Lines in the College was offered, seconded and approved by the faculty, in its entirety, with 1 opposition.

For your convenience, I am attaching a copy of the proposal for the 13 new Educator Faculty lines. Below is a summary of requests from each department:

a. Department of Art & Art History ---- one (1) position as Artist-in-Residence
b. Department of English ---- five (5) positions in Writing and Composition
c. Department of Mathematics ---- three (3) positions in Mathematical Finance
d. Department of Psychology ---- three (3) positions in Clinical Psychology
e. Department of Sociology ---- one (1) position in Criminology and Criminal Justice

I trust that the Senate will consider and approve these proposals. Should you have any questions or require additional information, please let me know.

LGB/mtt

Sept 12, 2018

To: Leonidas G. Bachas, Dean
College of Arts & Sciences

From: Hermann Beck, Speaker
College Council

This memo confirms that the Proposal to Create Additional Educator Faculty lines in the College of Arts & Sciences was unanimously approved by the College Council at a regular meeting on Monday, September 10, 2018.

The proposal is now being forwarded to you for a vote by the College Faculty.

With best wishes,

Dr. Hermann Beck, Professor of History
Speaker, College Council
College of Arts & Sciences

Sept 18, 2018

To: Leonidas G. Bachas, Dean
College of Arts & Sciences

From: Tom Lopez, Chair
Department of Art and Art History

This letter confirms the support of the faculty of Department of Art and Art History for an additional educator faculty line as Artist-in-Residence. Practicing artists are vital to enriching the educational experiences of our students and distinguished artists would bring attention and visibility to the department.

Best Regards,

J. Tomas Lopez
Chairperson
Department of Art & Art History

JTL/mtt

October 3, 2018

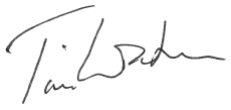
To: Leonidas G. Bachas, Dean
College of Arts & Sciences

From: Tim Watson, Chair
Department of English

This letter confirms the support of the faculty of Department of English for five additional Educator Faculty positions (Professor of Professional Practice) in Writing and Composition. The faculty of the Department affirmed their unanimous support for these positions in meetings held on May 1, 2018 and September 13, 2018.

The expertise needed for effective writing instruction is vital to the Department of English, and to the entire University, and we seek to add these lines for full-time faculty members who demonstrate exceptional professional accomplishment in teaching writing.

Sincerely,



Dr. Tim Watson
Professor and Chair
Department of English

UNIVERSITY OF MIAMI
COLLEGE of
ARTS & SCIENCES

Department of Mathematics
P.O. Box 249085
Coral Gables, FL 33124-4250

Phone: 305-284-2575
Fax: 305-284-2848
math@math.miami.edu

Sept 18, 2018

To: Leonidas G. Bachas, Dean
College of Arts & Sciences

From: Robert Stephen Cantrell, Chair
Department of Mathematics

This letter confirms the support of the faculty of Department of Mathematics for up to three educator faculty lines in Mathematical Finance to support our successful Master of Science in Mathematical Finance program and our newly approved 5-year BS in Mathematics/MS in Mathematical Finance.

Regards,

Robert Stephen Cantrell, Ph.D.
Professor and Chair
Department of Mathematics

RSC/mtt

UNIVERSITY
OF MIAMI

Sociology Department
P.O. Box 248162
Coral Gables, FL 33124-2030

Phone: 305-284-6762
Fax: 305-284-5310

Sept 18, 2018

To: Leonidas G. Bachas, Dean
College of Arts & Sciences

From: George Wilson, Chair
Department of Sociology

Dean Bachas, please accept this letter as confirmation of the support of the faculty of Department of Sociology for an Educator Faculty line in Criminology and Criminal Justice. The department launched a graduate certificate program and a Master of Science program in this field two years ago and, due to the nature of the professional training involved in the program, we seek to hire an individual with considerable experience/expertise in the criminal justice system. We forward this to you for your approval.

Regards,

George Wilson, Ph.D.
Chairperson
Department of Sociology

GW/mtt

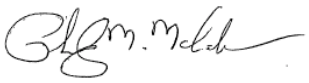
Sept 15, 2018

To: Leonidas G. Bachas, Dean
College of Arts & Sciences

From: Phil McCabe, Chair
Department of Psychology

This letter confirms the support of the faculty of Department of Psychology for three additional Educator/Clinical Faculty positions whose primary duties are in the department's clinical programs. The department was previously granted five lines in 2001, and to meet our clinical needs, we are requesting to add up to three more lines in the future.

Regards,



Dr. Philip McCabe
Chairperson
Department of Psychology

College of Arts and Sciences
Proposal to Create New Educator Faculty Lines

Date: September 13, 2018

Executive Summary

The College of Arts and Sciences proposes that 13 new educator faculty lines be included as part of its General Faculty. At present, the College has a total of 22 clinical-professional practice lines approved, from which 10 are occupied as shown in the table below:

Biology	Professional Practice	1
English	Professional Practice	2
Psychology	Clinical	4
Theatre Arts	Professional Practice	3

With the addition of the 13 educator faculty lines being proposed now, the College will have a total of 35 such positions. In contrast, the College currently has 309 Regular Faculty (tenured and tenure-track) lines, from which 301 are occupied. Thus, these educator faculty lines will constitute a small percentage (11.63%) relative to its Regular Faculty. A detailed table of the percentage of Educator Faculty by department is included in this proposal (Appendix A).

These proposed educator lines will be filled incrementally and during years when specific departmental teaching needs are identified. The proposed educator lines will not be construed as substitutes for tenure-earning lines and the duration of the initial appointments will typically be 1-3 years with possibility of renewal. The candidates who fill these educator appointments must have the ability to make high-quality contributions in teaching. Specific teaching assignments for educator faculty will be determined separately for each appointment and, in some instances, may be less than full time. Educator faculty will also be expected to maintain their professional qualifications in accordance with the College's guidelines for accreditation. In accordance with SACS guidelines, educator faculty will hold terminal degrees and/or have evidence of exceptional professional experience and achievement in lieu of a terminal degree.

New educator faculty may also be known as "Clinical Faculty," "Artist-in-Residence," or "Professor of Professional Practice" according to the needs and standards of each department within the College. The initial appointment will be commensurate with a candidate's experience and stature within their field of practice. Annual evaluation of educator faculty will conform to current evaluative practices in the College for General Faculty and persons who fill these positions may be eligible for promotion to a higher rank in cases of outstanding performance.

College of Arts and Sciences

Proposal to Create New Educator Faculty Lines

1. Educator Faculty - Statement of Principle

Higher education continues to evolve at a rapid pace, including the growth of professional programs and programs that attract non-traditional students. The need for a diverse faculty who can bring transformative knowledge to our campus has become increasingly apparent. Our mission calls for the creation of a truly global learning community that offers unique educational and career opportunities for our students. One way to achieve this is to bring to our College extraordinary individuals with specialized professional knowledge and skills that can be shared with our students. Accordingly, the College of Arts and Sciences' faculty is proposing the establishment of a discrete number of Educator Faculty lines to support our expanding graduate programs and create lasting connections to professional practice in a variety of fields.

While many disciplines in the College possess a practical component as exemplified by a cognate professional field, certain departments are more likely to have stronger ties with industry and professional practice than others. Section 5 of this proposal includes details of a specific number of educator lines (a total of 13) to be proposed to the Faculty Senate during the current academic year. These proposed educator lines will be filled incrementally through time and will not be construed as substitutes for tenure-earning lines.

The candidates who fill these educator appointments must have the ability to make high-quality contributions in teaching. Specific teaching assignments for educator faculty will be determined separately for each appointment and, in some instances, may be less than full time. Educator faculty are expected to be intellectually active and committed to their continued professional development. As such, they will also be expected to maintain their professional qualifications in accordance with the College's guidelines for accreditation. In addition, they will be encouraged to communicate to people engaged in their field by presenting their work primarily to professional and lay audiences. In accordance with SACS guidelines, educator faculty will hold terminal degrees and/or have evidence of exceptional professional experience and achievement in lieu of a terminal degree.

2. Search Procedures and Standards for Appointment and Promotion

Consistent with our titles for Regular Faculty, new Educator Faculty lines will be considered at the following titles:

- Clinical Assistant Professor
- Clinical Associate Professor
- Clinical Professor
- Assistant Professor of Professional Practice
- Associate Professor of Professional Practice
- Professor of Professional Practice
- Distinguished Professor of Practice in Residence (Artist)
- Artist-in-Residence

In each case, the rank at initial appointment will be commensurate with a candidate's

experience and stature within their field of practice. Assessment of candidate qualifications will involve consultation with the faculty of a department, the department chair, and the Dean (details below), as the appointing authority. New Educator Faculty lines will be of limited duration (1-3 years) and will not involve the award of tenure or be tenure-earning. The departmental chair, after consultation with the department faculty, shall make a recommendation to the Dean regarding the length of the appointment for each position.

All educator positions will be advertised and equal opportunity procedures will be followed in accordance with all State and Federal laws. The initiation of educator appointments and promotions may come to the Dean of the College from the appropriate department chair after consultation with the departmental faculty.

Searches to fill educator faculty appointments will follow standard College procedures, including on-campus visit by the candidate, a professional presentation, and meetings with appropriate department faculty members. Candidates for appointment will require submission by the candidate of a curriculum vitae, a statement of professional achievement, and other materials pertinent to the educator track appointment. Candidates will also meet with the appropriate department faculty and department chair(s) who, after a vote of the departmental faculty, will make a recommendation to the Dean regarding the appointment.

Procedures for appointment, selection, promotion, evaluation, and reappointment of educator faculty will be in accordance with the University of Miami Faculty Manual and the Bylaws of the College of Arts and Sciences.

3. Educator Faculty Status and Voting Rights

The voting rights of Educator Faculty shall be as described in the Faculty Manual and as permitted by the Bylaws of the College of Arts and Sciences. Educator faculty will not participate in the promotion and tenure process, or any matters related to tenure and the tenure-earning faculty. They may participate in the evaluation and review of other members of the educator faculty who possess lower rank within their departments.

4. Annual Review of Performance

All educator track faculty will submit an annual report on their professional activities to their respective department chair and shall be eligible for merit salary adjustments. The department chair and the Dean will review each report and consider recommendations for salary increases. Feedback on performance will be provided by the department chair in accordance with procedures for University faculty. A review to determine reappointment will be conducted in the year before each appointment ends.

5. Proposed Educator Faculty Lines

a. **Department of Art and Art History** – one (1) position
Educator Faculty in Art and Art History
Proposed Titles:
- Artist-in-Residence
- Distinguished Professor of Practice in Residence (Artist)

The Art and Art History Department's creative faculty contribute to the life of the University,

as well as to the visual artistic community. Though many visual artists are also professors, not all practicing artists of national and international importance are academics. Many practicing artists hold positions outside the academy; we seek to include them in the development of our program as "Professors of Practice: Artist".

Practicing artists who have a record of excellence and visibility, but who do not necessarily have a terminal degree in the field, are particularly important in supporting innovative practices that enrich the curriculum through their professional experience, teaching excellence, community leadership, and strong connections to the world of art. Professors of practice from outside the academy would provide our students with a model for how to make a living, how to build contacts with the art community outside academia and what it is to be a working artist. The Art and Art History Department would increase its national presence by appointing at least one 'Distinguished Professor of Practice in Residence' routinely. Such an artist would have an international reputation and would be a major figure in the artistic world; thus, she or he would bring distinction and attention to our department and MFA. Bringing in a series of internationally recognized artists as professors of practice would help us to provide our students with the widest possible range of artistic aesthetics to consider as they hone their craft.

b. **Department of English** – five (5) positions
Educator Faculty in Writing and Composition
Proposed Titles:
    - Assistant Professor of Professional Practice in Writing and Composition
    - Associate Professor of Professional Practice in Writing and Composition
    - Professor of Professional Practice in Writing and Composition

Writing instruction has long been recognized as an established field of academic practice and inquiry, with its own professional organizations and journals. The expertise required for effective writing instruction, along with empirical and theoretical research in writing studies, are vital components of the Department of English and, indeed, of the University of Miami. Our writing faculty teach the practice of writing to the whole University community, from first-year undergraduates to graduate students and other faculty members in grant-writing and collaborative research. Our writing faculty are performing invaluable service and providing academic leadership on multiple campuses of the University. We propose to create positions as Educator Faculty in Writing and Composition for full-time faculty members in writing in the English Department who will demonstrate exceptional professional accomplishment in teaching. The position of Educator Faculty in Writing and Composition would meet several institutional needs, fulfill pedagogic and research aspirations, and demonstrate an institutional commitment to a vital scholarly mission. The ability of faculty to undertake effective writing instruction is universally seen to have transcended the traditional service function of writing instruction and emerged as an essential component of general education and across all levels of student and faculty development. The majority of peer R1 institutions have equivalent writing faculty representation in curriculum and research units.

c. **Department of Mathematics** – three (3) positions
Educator Faculty in Mathematical Finance
Proposed Titles:
    - Assistant Professor of Professional Practice in Mathematical Finance
    - Associate Professor of Professional Practice in Mathematical Finance
    - Professor of Professional Practice in Mathematical Finance

The Master of Science in Mathematical Finance (MSMF) produces technically trained professionals with an understanding of how to analyze and value complex investments and assess the associated risks. Program growth has created a need for Educator Faculty in Mathematical Finance. Individuals with expertise in quantitative trading strategies and trading infrastructure, financial derivatives, credit models, and quantitative risk management will be sought to fill these positions. Candidates should have considerable experience in the financial industry. Appointees would be expected to teach courses in the MSMF program and advise MSMF students in their projects, including capstone projects. The teaching assignment would be up to two classes each year, which will place this appointment in a part-time status.

d. **Department of Psychology** – three (3) positions
Clinical Faculty
Proposed Titles:
- Clinical Assistant Professor
- Clinical Associate Professor
- Clinical Professor

These positions are designed for those Educator Faculty whose primary responsibility is in the Psychology Department's clinical programs. These appointees are primarily responsible for supervising students who are learning practice skills and are being trained to become licensed psychologists, pursuant to the rules of the State of Florida and other similar authorizing bodies. The primary qualification for these faculty members is demonstrated competence in the practice of clinical psychology or other applied psychological work. The Department of Psychology was granted five (5) educator/clinical faculty lines in 2001. Program growth has necessitated three more lines of clinical faculty. Hiring criteria may include but not be limited to licensure in clinical psychology, American Board of Professional Psychology (ABPP) status, professional/teaching experience, research productivity, publications, and service.

e. **Department of Sociology** – one (1) position
Educator Faculty in Criminology and Criminal Justice
Proposed Titles:
- Assistant Professor of Professional Practice in Criminology and Criminal Justice
- Associate Professor of Professional Practice in Criminology and Criminal Justice
- Professor of Professional Practice in Criminology and Criminal Justice

The Department of Sociology proposes to add an educator faculty line to support the growing Master of Science in Criminology and Criminal Justice and the Graduate Certificate in Criminology and Criminal Justice. The graduate programs present an interdisciplinary approach, providing advanced knowledge of the U.S. criminal justice system including tools to evaluate policy and practice through training in criminological and criminal justice theory and in quantitative research methods. These programs are primarily geared toward individuals already employed within criminal justice as well as those seeking employment in the wide range of criminal justice professions across the areas of law enforcement, courts and corrections. An individual with considerable expertise in the criminal justice system (the judiciary, corrections, crime prevention, probation, etc.) will be sought to fill this position.

Appendix A

Faculty by Department						
Department	Total Regular Faculty	Existing Educator Faculty **Passed in 2001**	Existing Educator Faculty **Passed in 2015**	New Educator Faculty **Request 2018**	Total Educator Faculty	Percentage Relative to current Regular Faculty
Anthropology	9		1*		1	11.11%
Art and Art History	10			1	1	10.00%
Biology	22		1		1	4.55%
Chemistry	15		2		2	13.33%
Classics	3					0
Computer Science	11					0
English	30		2	5	7	23.33%
Geography & Regional Studies	9					0
History	21					0
International Studies	6					0
Mathematics	26			3	3	11.54%
Modern Languages	21		4		4	19.05%
Philosophy	15					0
Physics	19					0
Political Science	18		2		2	11.11%
Psychology	35	5		3	8	22.86%
Religious Studies	11		1		1	9.09%
Sociology	14			1	1	7.14%
Theatre Arts	6		4		4	66.67%
	301	5	17	13	35	
				Total: 301 (309)	**35**	**11.63%**

*Anthropology, Biology, Psychology (Animal Behavior and Conservation)

Item B4

UNIVERSITY OF MIAMI

Proposal Submission Checklist

Proposals are to be submitted to the Office of Assessment and Accreditation (OAA), if applicable, the Graduate Council (for graduate programs excluding Law and Medical), if applicable, and the Faculty Senate. Refer to the Procedures for Program Changes document for information on the approvals and notifications needed for program changes and the Proposal Submissions Specifications document for an explanation of the process and a list of the materials required.

(Please note that change approvals can take 2 semesters to complete.)

Include this checklist at the beginning of each proposal.
(Complete the information below, save the form as a pdf, and insert it with the background materials that are specified, in the order listed, and send the package electronically as noted above.)

KEY CONTACT PERSONNEL INFORMATION

First Name: Sanjoy

Last Name: Bhattacharya

Proponent's Title: Professor

Department, if applicable: Ophthalmology

School/College: Miller School of Medicine

E-mail: sbhattacharya@med.miami.edu

Phone: 3054824103

Title of Proposal: Miami Integrative Metabolomics Research Center (MIMRC) at Miller of School of Medicine

(-continue to next page-)

MANDATORY MEMORANDA AND FORMAT

Please check that each item listed below is included in the proposal package of materials, in the ORDER as listed. The applicable title (i.e. Letter of Explanation, Memo from the Dean, etc.) is to precede each section in the materials.

Only proposals conforming to this format will be accepted.

1. This completed checklist.

---

2. Letter of explanation. (2-3 pages only, double spaced, 12 pt font)

(•) Yes ( ) No

If no, explain why:

---

3. A memo from the dean(s) signifying approval of the faculty of the relevant School(s) / Colleges(s).

(•) Yes ( ) No

If no, explain why:

---

4. A memo that all affected or relevant School / College Council(s) have approved.

(•) Yes ( ) No

If no, explain why:

---

5. A memo from the department chair(s) signifying approval of the faculty of the relevant department(s).

(•) Yes ( ) No

If no, explain why:

---

6. A memo from the Office of Accreditation and Assessment (OAA) if the proposal involves academic programs (degrees, certificates, majors, minors, concentrations, specializations, tracks, etc.) such as new programs, closing programs, or program changes (such as changes in requirements, program length, modality, name, location).

(*To be submitted by OAA to the Graduate Council or the Faculty Senate, as appropriate.***)**

( ) Applicable (•) Not applicable.

If not, explain why:

Not a academic course curriculum program. It is a center to provide research services and help in assembly of research faculty not a certification or degree program.

---

7. A memo from the Graduate School Dean signifying approval of the Graduate Council (for graduate programs only).
(To be submitted to the Faculty Senate by the Graduate Council.)

( ) Applicable (•) Not applicable.

If not, explain why:

Not a degree or certification program.

---

8. Academic Deans Policy Council (ADPC) approval, for interdisciplinary issues and as appropriate. Please consult with the Dean of the Graduate School or the Secretary of the Faculty Senate to check if this is needed.

◯ Yes ◉ No

If no, explain why:

It is not a degree or certification program.

---

9. Additional required documents as listed on the "Proposal Submissions Specifications," i.e. market analysis, budget information, assessment of library collections, etc. as specified.

List additional documents included:

Executive summary, detail proposal, support letters.

Please click on the "Save Form" button below to save this form, then e-mail to facsen@miami.edu.
To print the form, click "Print Form."

Save Form Print Form

End form.

Bascom Palmer Eye Institute
UNIVERSITY OF MIAMI HEALTH SYSTEM

SANJOY K. BHATTACHARYA, M. TECH, PH.D.
PROFESSOR

Tomas Salerno

Chair, Faculty Senate

University of Miami

Ashe Building, Suite #325, 252 Memorial Drive

Coral Gables FL 33146

October 8, 2018

Dear Prof. Salerno,

Please find attached a proposal for **Miami Integrative Metabolomics Research Center (MIMRC) at the Miller School of Medicine for consideration of review and approval by the Faculty Senate**. MIMRC is an attempt to enable full service metabolomics for research. We now have 14 analytical instruments in room 727 McKnight Building, medical campus, which includes four existing Ophthalmology mass spectrometry core facility. The Ophthalmic mass spectrometry core will be subsumed in MIMRC. These are further detailed in the proposal. A core grant from National Eye Institute, NIH partially supports the annual maintenance of one of the mass spec bundles (Q-exactive bundle) whereas the maintenance of other instruments are supported by user fee and my funded grants.

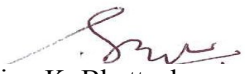
For two reasons MIMRC is important: 1) Federal grant funding posts a premium on a center much more than on core facility; 2) A center brings cross-disciplinary individuals to collaborate whether loosely yielding papers or tights which enables joint grant application. These cannot be obtained without having a center. The other benefits are attracting unique philanthropic support for specific instruments. Both procurements and long-term maintenance are candidates for seeking philanthropic donations. MIMRC is envisaged to support projects beyond the immediately interest of Ophthalmology and Vision Research and bring greater number of funded and impactful interdisciplinary research harnessing the potential of clinical research resources of the medical school. Whereas Ophthalmology core facility will continue to provide fee based

service, MIMRC is expected to bring together quality investigators generating high impact research using the common platform, reagents, know-how and expertise. The personnel and instrument maintenance supported by fee, direct and indirect cost sharing. Several interdisciplinary individuals who are already being supported by these instruments has expressed their support. . Pertinent to note are two points-1) during the council voting Dr. Adrien Eshraghi, Vice Speaker 2 presided over the council segment that voted this proposal due to its conflict with current Speaker. 2) The legislative oversight committee (LOC) of the council recused all its members that had any involvement with MIMRC.

Although I am the main proposer but Dr. Daniel Pelaez from Department of Ophthalmology and Dr. Santanu Banerjee from Department of Surgery will be co-proposer of MIMRC. These individuals are involved in the scientific and administrative aspects of MIMRC. I am happy to further address any question or concern that may arise during a scrutiny at Senate or General Welfare Committee. I hope the proposal and documents will be found suitable for your consideration. We are seeking the name and not any financial support from the administration at this point.

Thank you.

Sincerely,



Sanjoy K. Bhattacharya

Professor of Ophthalmology

Director of Ophthalmology Shared Instrument (Mass spectrometry) facility

Executive Summary: We propose to create and name a center Miami Integrative Metabolomics Research Center (MIMRC). The center will house several instruments including the mass spectrometers that pertain to Ophthalmology mass spectrometry facility (see details below) as well as other instruments (total 9) transferred from US Department of Justice. The center will subsume the current ophthalmology mass spectrometry core. In essence it will encompass the ophthalmology mass spectrometry core without change of function or scope of that core but add-on other functions as detailed in the proposal. The objective of MIMRC is to bring additional imaging mass spectrometry, super resolution structured illumination and asymmetric ion mobility instruments enabling full service proteomics, lipidomics and metabolomics. The MIMRC intends to combine a service platform (core facility) with intellect in order to offer extended service to investigators, selected industry and integrate trainees in the process. In the initial phase other than core facility type services MIMRC will support 5-7 core projects encompassing basic lipid, metabolomics questions with neurosciences (cluster 1), general metabolomics/endocrinology/microbiome related to human metabolism (cluster 2), cancer (cluster 3) and training related to NIH training grants (cluster4). The investigators and clusters will be added and deleted based on utility, the ability of payment and scientific viability of projects.
The operators of instruments are currently paid from the grants of Dr. Sanjoy Bhattacharya. The current service fees only partly cover the maintenance of the instruments and a significant part is paid by the NEI core facility grant for Ophthalmology investigators awarded to Dr. Vittorio Porciatti. As the project and services are added the need based operators will be recruited and trained supported by direct salary support from the grants. The indirect cost of some of the grants (external to the department of Ophthalmology) will be used for instrument maintenance and future expansion. As of now operator, salary is entirely Dr. Bhattacharya's responsibility and operator is paid from Department of Defense grants.
MIMRC will aim to provide service beyond the routine services and intellectual input for projects, which is the big difference in perception and necessitates this name. Having this center will also enable writing different grant proposals by a group of interdisciplinary investigators, collaborate across different disciplines, bring different platform and technologies for common use. It will provide a venue for different volunteer trainees to collaborate with different principal investigators, industry and acquire skills. Eventually it will allow dynamic addition of instrument, maintenance and their addition/deletion based on need and acquired resources: Philanthropic and grant funding.

Aims:

1) To convey the grant reviewer that a serious facility exists, which is more than a mere core facility. Core facilities do only a few routine analysis repeatedly. Whereas a center assist in designing experiments besides doing routine experiments.
2) To convey the colleagues that a serious facility exists where routine analysis can be done but it is also a networking place where there is a possibility to find colleagues with cross-disciplinary expertise and ideas. MIMRC is envisaged to be a breeding ground of cross-disciplinary developmental platform uniting researchers from diverse fields bound by usage of common analytical platform, reagents and methods. MIMRC thus will facilitate cross-investigation of multidisciplinary problems based on usage of common platforms.
3) Addition of new developing instruments, ensuing their operation and effective usage. Developing a usage based model with other aids to render them sustainable over their good usage lifetime and beyond.

4) Evolve the financial sustainability by a group of users seeking suitable aids in steps. The important driver of sustainability are academic user-leaders and users.
5) Most important aim is to generate greater impact of scientific research by combining strengths of multidisciplinary science with cutting edge instruments and collaborative users.

Miami Integrative Metabolomics Research Center

Housed in McKnight Vision Research Building room 727 and directed by a member of faculty Miami Integrative Metablomics Research Center aims to identify therapeutic intervention strategies by unrevealing metabolic and lipidomic differences between control and disease states. The center has state of the art orbitrap, triple quadruple coupled with direct infusion or liquid chromatography and gas-chromatography-mass spectrometry as well as high throughput capillary electrophoresis, currently a total of 11 high end instruments for comprehensive proteomic, metabolomic and lipidomic analyses. Aligned with ocular pathology services and Lions Eye Bank the center is equipped to compressively catalyze discovery across an array of eye diseases encompassing anterior, posterior eye and beyond. The center is also aligned with researchers in Miami Project addressing the critical elements in generation of neurons in central nervous system. A joint project of this nature is funded by National Eye Institutes Audacious Goal Initiative.

The center also aims to serve the needs of integrative metabolic discoveries in medical sciences. Some of its current contributions are in Rheumatoid Arthritis-Associated Interstitial Lung Disease (PMID: 27448590), Pharmacokinetics and Pharmacodynamics in cancer, in pathologic infectious diseases in humans. A number of grants pertaining to innovative discoveries in cancer are pending review that has benefited from analytical capabilities of the centeras are a few training grants from Department of Surgery, Neurology and Ophthalmology (K08) grants.

The center also supports infectious pathology of rare important non-laboratory animals that are of high veterinary importance. In recent times it has assisted in analyses of rare fungal infections in Dolphins sought by veterinary pathologists.

The center is aiming to procure a comprehensive imaging mass spectrometry to enhance its capability and offer a full range investigation capability. The goal of the center is to help investigators in perform quality high impact generating research and to attract extramural funding for support. The center seeks active philanthropic support to procure instruments, name instruments after supporters and initiate a named seminar series where world renowned metabolomic researchers such as Sarah Spiegel, James M. Ntambi, Marcus R. Wenk, Alfred H. Merrill, Michael J. O. Wakelam to help energetic and vigorous research in this area all across the biomedical and natural sciences at University of Miami.

The potential need, Science and advantages of the center: The DNA carries the central information in all biological cells. The secrets of a multicellular body including that of humans lies largely in the secrets of cells. The human DNA has been sequenced and so is a number of other organisms. However, that is just a tip of the iceberg. Though the information is contained in DNA but it is usually carried out by interaction with proteins and a number of other molecules. Most molecules smaller than 4 kilodaltons are collectively often referred to as metabolites. Though biomedical scientists often regard molecules ~1000 dalton or less as metabolites. Lipids are a

special group of metabolites that are generally not water soluble. While nucleic acids chemistry (DNA and RNA) is based on four purine/pyrimidines bases [Adenine, thymidine (or uracil for RNAs) guanine, cytosine], proteins are composed of 20 amino acids (not counting occasional unusual amino acids). Current thinking is that there are about 10,000 metabolites and 100, 000 lipids that belongs to about 78 classes of lipids.
Due to four bases the chemistry of nucleic acids is relatively simple and methods for detection and quantification relatively straightforward, easy to implement. There is also an advantage of faithful in vitro amplification available only for nucleic acids whereby an exact replica of a macromolecule can be made in vitro. Such amplification cannot be done for any other of the above. In absence of amplification step, the sensitivity of the instrument for detection and quantification has to be increased. This renders them much more expensive.
The highthroughput methods and bioinformatics approaches are also completely different for analysis of proteins, lipids and metabolites. There is no cross talk between methods or analytical instruments for proteins, lipids metabolites with nucleic acids.
The frontier for analysis of DNA and RNA is more than four decades old. The lipids and metabolites analytical methods are still being perfected and so are software and algorithms to integrate all these data. NIH has made a metabolomics common fund about 5 years ago that is picking up. At University of Miami, there is no institutional effort to have a concerted effort to procure or build highthroughput analytical instruments or centers to support and complement individual efforts of investigators despite Miami being resource rich in diversity of diseases as well as in patient population and their numbers. MIMRC aims to fulfil this void. Florida International University (FIU), a local state supported University has a history of investigators with analytical instrument strength and have invested in such capacities. However, their medical researcher is relatively weaker and they are for obvious reasons not going to put UM researcher tasks a priority. UM medical School has a larger base of researchers for whom MIMRC will be more fulfilling. Local facility has a number of other advantages, training of personnel, allowing labile sample experimental planning, better priorities for our researchers and of course collective growth for UM researchers. The key to find new translational molecules and ability to alter course of high complexity progressive diseases reside with integrative analysis of lipids and metabolites and further integrating that information with genomic information. Proteomics is an intermediary and important step. MIMRC fulfils the analytical gap for proteomics, lipidomics and metabolities. Advantage of the center are analytical costs, personal training, creating better scientific environment and rendering our research high priority thus effective on a time scale. Each of these can be detailed with several examples from medical school as well as from College of Arts and Sciences should that be necessary.

Some definitions:

Proteomics refers to identification of all proteins or a number of proteins simultaneously. There are several methods that can identify proteins in a “highthroughput” manner. Highthroughput means capturing several proteins simultaneously and all proteins associated with a given state of cell or tissue will be ideal. Mass spectrometric sequencing is the most high confidence, time and cost effective method. It is often thought to be synonymous with proteomics. However, there are other approaches such as protein array, phage display etc. Again the mass spectrometry enables best coverage and most confident sequenced dataset. It also enables simultaneous determination of protein modifications. There are two approaches in mass spectrometry, top down and bottoms up. Top down refers to identification of intact protein and then determining its parts, bottoms up refers to

identification and quantification of proteins based on sequencing of its constituent parts or peptides (produced by proteolysis, most commonly with trypsin).

Lipidcomics and **Metabolomics** refers to identification and quantification of all (or most) lipids and metabolites respectively in a cell/tissue/biological fluid simultaneously. Again mass spectrometry is now the easiest and time effective method. Another upcoming method is NMR. However, NMR is much more complex and at present can capture only a tiny fraction of either lipids or metabolites. Whereas mass spec is great for complex mixtures, NMR has big time problem with complex mixtures. Even as of now it can only perform a handful of lipids or metabolites for which standardized NMR spectra has been obtained (that too varies with interfering metabolites in the mixtures). Lipidomics and metabolomics necessitate very different mass spec experiments, bioinformatics and software systems than proteomics. MIMRC has both softwares. The softwares costs $20K-$35K and has a yearly licensing fee that need to paid and maintained. These softwares are also updated almost every 3-6 months due to new advancements.

Knowledge of Proteomics, Lipidomics and Metabolomics complement that in genomics. These analysis are different spectrum of a continuum. Lipidomics and Metabolomics arguably is the lower functional end and proteomics being an intermediate end. Thus they complement information obtained by other approaches, say genomics. Arguably, Lipidomics and Metabolomics are new frontiers and help biomedical researchers identify targets and help in translational aspects to find and fin tune new intervention strategies.

Advantage for the users:

1) Local training and help in design of experiments. An example is a PI and a grad student at Interdisciplinary stem cell institute (ISCI). Dr. Bhattacharya spent time at bench level to help them design the experiment after 3-rounds of oral explanation or paper sketches failed. The issue was a two-step gel fractionation followed by a mass spectrometry. Dr. Bhattacharya's services were charity. He is not a co-author or never received any percent effort for his help. However, without his help at the bench level the fractionation may not have happened in correct manner and subsequent experiments would have been garbage-in-garbage-out. Another example is Dr. Vazquez-Padron's work. Three core facilities had simply refused to undertake the work. Without constant back and forth Dr. Diana Hernandez, his postdoc could not have solved the issues on-hand and no core facility would undertake this kind of work, which is non-routine. Yet another example is Dr. Dana Ascherman. Sometimes he needs help from Dr. Bhattacharya and his graduate student Anddre Valdivia to assist in some steps of wet processing. Again a core facility will not provide such assistance and sometimes whole experiment is under jeopardy for want of very simple assistance. Often they also result in enormous delay.
2) The ability to time the labile samples. Labile samples need to be analyzed in a time effective manner and without local facility and expertise this would not happen.
3) Priority for users. Often we perform services for users, whose own core facility has long backlogs. We have twice served University of Florida (UF) users because they have six months wait period.

4) Cost effectiveness: OSU and Case Western Reserve University utilizes our facility because it comes 1/10th to 1/5th times cheaper for them. Cost advantage is not trivial in performing such experiment particularly if the goal is to publish high impact papers.
5) The assistance in study design and subsequent interpretation of data is the biggest advantage for users. This helps them save time and effective utilization of resources. An example is isotopic ratio outlier analysis (IROA) for identification and quantification of metabolites. We adopted IROA analysis from IROA technologies. Once this has been done Dr. Santanu Banerjee has gained considerable expertise in the back end bioinformatics analysis. This is not trivial. He has agreed to help at least a few other investigators to make a broader base of expertise.

Ophthalmology Mass spectrometry Core Facility Instruments: Q-exactive, TSQ Quantum Access Max, Acela HPLC, Easy nLC nano LC system and Triversa Nanomate.

Other Instruments/USDOJ transferred instruments: Agilent 7100 CE Capillary Electrophoresis System, a Thermo Scientific Nicolet 380 FT-IR Spectrometer, two Agilent 7890A / 5975C Gas Chromatograph / Mass Selective Detector coupled units, four Agilent 7890A Gas Chromatograph units and an ASAP IRD II Infrared Detector and Agilent 6890N Gas Chromatograph unit.

Current mode of operation: Currently for Ophthalmology mass spectrometry core facility, a modest fee is charged. The fee has not been revised in last 5 years. The idea is to popularize the services. The operator is paid by the grants of Dr. Bhattacharya and a significant maintenance fee is covered by NEI core grant that is to promote vision research. At present the fee covers consumables and a modest part of maintenance of instruments. The utilization of the services has improved in the last year. We need to determine at the end of this year the financial performance and revision of fee necessary.

Operator salary: The operator salary used to be 100% paid from Dr. Bhattacharya's grants. From May 2018 the utilization of fee-based service has tremendously increased and thus about 70% operator salary is now being contributed from fee-based services. The operator is currently paid below market price, even with a 15% jump in salary provided to her since April 2018. With enhanced services, we expect to cover majority portion of salary covered by services. It should be noted that now we are serving Cleveland Clinic Foundation, Ohio, Columbia University, New York, Ohio State University, Columbus, Ohio and a number of small start up industry at Cambridge Innovation Center. Also, there has been a 50% jump in utilization of fee-based service in the medical campus. At the same time as expected there has been a 90% fall in fee-based services from College of Arts and Sciences. In any event, the fee-based service of College of Arts and Sciences always had been less then 5% of total fee-based service. Also, it must be noted that the operator has been trained at our facility and her salary is about 15-30% less compared to current market value. For larger grants with dedicated instrument time, we expect the investigator to put some direct and indirect support which will help towards salary and also build reserves towards future instrument upgrade or purchases.

May and June has seen a big jump in fee-based services. Dr. Bhattacharya also had presented the service option at a research think tank meeting in New York in June, which led an increase in outside services. A 75% growth in services will provide operators salary but will cover only a fraction of maintenance costs. Currently maintenance cost of the most expensive instrument is covered by a

NEI core grant from NIH to support ophthalmology researchers. Philanthropic donations and expanding user base and IDC can eventually results in sustainability. A complete service mix of instruments may result in that kind of cost structure. As stated above, we have noted a 50% increased user utilization from medical campus. All these will help being completely sustainable. Our six years of OMSC experience suggests that there is now better awareness and with outside users awareness we will be able to maintain and sustain the facilities and make MIMRC sustain.

We see no problem of Ophthalmology chair agreeable to shared IDC coming to OMSC (or MIMRC) account towards maintenance of instrument or operator salary. As noted above, we have changed from 0 to 70% salary support from OMSC account for the operator this year. Also due to greater utilization we needed constant supply of Nitrogen gas. With 50% assistance from Research and Innovation Management (RIM) office we have now procured a nitrogen generator (Genius 3022 from Peak Scientific for approximately $36K) supporting 24/7 operation of Q-exactive and TSQ Quantum Access Max.

Consumables: We encourage the wet lab processing by the end users. This is a common practice in all core facilities and mass spectrometry collaborating laboratory unless necessary due to nature of work. However, despite processing there are other consumables necessary, for example, high purity solvents to run HPLC, gases such as high purity Helium, Argon and Nitrogen to run mass spectrometers.

Repairs/maintenance: Current repair and maintenance is covered by NEI core grant/ Dr. Bhattacharya's DOD or other grants. Only a fraction is covered by the user fee. As noted with greater utilization the sustainability and proper salary aspect of the operator is rapidly changing.

The nitrogen supply used to be a tremendous problem. Against weekly need of 14 cylinders, we used to get only 8 at the max. This is a medical campus wide problem. As the services grew, with help from Dr. Richard Lee (50% of the generator cost paid from an endowment grant that supports Dr. Lee's research) and from our RIM office we procured Genius 3022 Nitrogen generator (Peak Scientific). This generator has made us not only able to serve 24/7 but our maintenance of Q-exactive has significantly improved due to this generator. Without the appropriate service need level, we did not had a case for procurement of Nitrogen generator. One can always understand that there is never institutional support with a long range planning for this sort of instrument. In other words there is lack of institutional support from day one with long-range vision/support in mind. However, with current service utilization from internal and external users it appears likely that both operator salary and maintenance will be eventually covered by user fees alone.

Current routine core services: The routine core services are profiling for proteins, quantitative protein estimation, routine profiling of lipids.

Current fee structure: The protein profiling is $150 per samples (with trypsin and processing reagents shared), per mass spec run+ one bioinformatics analysis against an organism stated, the iTRAQ 8-plex with iTRAQ reagent provided plus one mass spectrometry plus one bioinformatics analysis against one organism stated is $1500 (8-plex). Per sample run of extracted lipid samples is $50. For lipids and metabolites the instrument has to run either in positive or in negative or in both modes. Two to three runs are needed to align peaks to get confident results. We charge $50 for

each run (whether positive or negative ion mode). In the per run fee we accommodate a range of collision energy thus maximizing identification of compounds. A bioinformatics analysis with Lipidsearch per sample is $50. We have started a isotopic ratio outlier analysis for metabolites. This is about $150 per sample after an initial method development. Similarly, we analyze various small molecules. The method development is charged on a mutually agreeable basis based on work and utilization of the instruments. We also train people on GC-MS. Training on GC-MS is going to be charged $800 (it is $1250 in FIU) for training. GC-MS sample analysis will be charged $30 per sample.

Non-core services: We perform various types of non-core services. We provide consultation as gratis. However, now we provide free but indemnified consultation. We perform pan lipidomic services, isotopic ration outlier analysis for metabolomics, We have recently helped laboratories with protein cross linking analysis. Several similar non routine modified analysis is done as non-core services.
We help in grant writing, provide support letters, assist in study design.

Current supported projects: K08 grant of Luis Vazquez, U01 Kevin Park, Sanjoy Bhattacharya, Vance Lemmon, DOD grant of Dr. Rammohan Kottill, DOD grants of Sanjoy Bhattacharya, W. H. Wallace Coulter Center grant of Dr. Bhattacharya, Ross Chair Professorship Grant of Dr. Richard K. Lee.

Other grants/applications that has been supported: R01 Grant of Dr. Roberto Vazquez-Padron, R01 grant of Dr. Dana Ascherman, R01 grant application of Dr. Santanu Banerjee, R01 application of Dr. Sulagna Banerjee. Planned K08 applications for Drs. Robert Starke and Roberta Soares.

Budget: At this point we are not seeking any separate budget or any support. We may seek support for partial cost of instrument repair or accessory purchase or procurement via SAC mechanisms involving RIM office. These applications will follow the standard procedures. Budget for MIMRC in its stable phase (when it becomes a stable operating entity)

Proposed initial projects:

Basic lipid, metabolomics questions with neurosciences (**Cluster 1**): R01 grant pertaining to role of flippase, floppase and scramblases of Dr. Sanjoy Bhattacharya, Cell Division related lipidomic changes of Dr. Bhattacharya. The lipid related projects in optic nerve neuroregeneration (Kevin Park, Sanjoy Bhattacharya), The mitochondria lipid projects (Dr. Antonio Barrientos), A planned R21 application of Drs. Sanjoy Bhattacharya, Abigail Hackam and Richard Lee.

General metabolomics/endocrinology/microbiome related to human metabolism (**Cluster 2**): RA-ILD related work of Dr. Dana Ascherman, Isotopic ratio outlier analysis (IROA) project of Dr. Santanu Banerjee,

Cancer (**Cluster 3**): The lipid rafts of cancer cells project R01: Sulagna Banerjee, DG project of Dr. Jonathan Trent.
NIH training grants (**Cluster4**): Planned K08 applications for Drs. Robert Starke, Luis Vazquez and Roberta Soares.

How a center is different than core facility services: The core facilities do the routine services, they do not provide investigation tailored to grant or research work. When such services are provided it need several changes in analysis, software and often need new accessories. Tailoring methods to analysis is beyond core services, which is often what is provided to the investigators. Consultation for specific experimental design is not part of any core services which will be provided by MIMRC.

Summary: We are seeking a name, which is Miami Integrative Metabolomics Research Center (MIMRC). This center will help attracting interdisciplinary research, acquire and maintain instrumentation for metabolomics research in biomedical sciences. No budgetary resources are sought. Naming the center will enable formal grouping. The Ophthalmology Mass Spectrometry Core Facility existing charge center will continue be the charge center. Formal grouping will help attract/put together applications metabolomic common fund grants. It will enable harnessing existing instruments and build future upgrade/maintenance funds for the instruments.

UHealth
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MILLER SCHOOL
of MEDICINE

Carl I. Schulman, MD
Professor of Surgery
Executive Dean for Research

Sanjoy K. Bhattacharya, Ph D
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine

May 4, 2018

Dear Sanjoy,

This letter is to confirm my support for the **Miami Integrative Metabolomics Research Center (MIMRC)**. MIMRC is expected to support interdisciplinary projects pertinent to Neuroscience, Medicine, Cancer, Surgery, Ophthalmology/Vision Science and others that will use proteomics/lipidomics and metabolomics approaches. The MIMRC is expected to bring a greater number of funded and impactful interdisciplinary research projects. This will enable optimal utilization and maintenance of common instrumental platforms, and cross-fertilization of ideas. The MIMRC is envisioned to enable harnessing the potential of clinical research resources of the medical school. This Ophthalmology core facility will continue to operate on the model of fee-based services and will be subsumed in MIMRC.

Instruments that will be housed in MIMRC are Q-exactive-nanoLC bundle, TSQ-Quantum Access Max-Acela HPLC/Triversa Nanomate bundle (Ophthalmology Core Facility Instruments) as well as nine other instruments donated/transferred by the US Department of Justice (USDOJ). These instruments are: Agilent 7100 CE Capillary Electrophoresis System, a Thermo Scientific Nicolet 380 FT-IR Spectrometer, two Agilent 7890A / 5975C Gas Chromatograph / Mass Selective Detector coupled units, four Agilent 7890A Gas Chromatograph units and an ASAP IRD II Infrared Detector and Agilent 6890N Gas Chromatograph units.

I support your plan to use the currently operational finance model of supporting maintenance of Q-exactive with the NEI/NIH core grant, including the partial operator salary with fee-based services and building funds for the maintenance of other instruments that are supported by user fees and your/others funded grants. In addition, I support your plan to add new instruments based on utilization by the projects, writing extramural grants and aiming to attract philanthropic support. For minor repairs or emergencies, you can utilize the research, research education and innovative medicine support mechanism.

I am aware of the hard work that is being put into this endeavor. Your instruments have been used by several individuals from different academic units such as Drs. Dana Ascherman and Alessia Fornoni (Medicine), Drs. Roberto Vazquez-Padron and Santanu Banerjee (Surgery) who are supportive of MIMRC. The aim of MIMRC is to create an interdisciplinary group of "Involved Participants" rather than just "passive" users.

This letter is to express my strong support for MIMRC.

Sincerely,

Carl I. Schulman, MD, Ph.D., MSPH, FACS
Executive Dean for Research and Research Education
Professor of Surgery
Eunice Bernhard Endowed Chair in Burns
Director, William Lehman Injury Research Center

Bascom Palmer Eye Institute
UNIVERSITY OF MIAMI HEALTH SYSTEM

Eduardo C. Alfonso, M.D.
Professor of Ophthalmology
Kathleen and Stanley J. Glaser in Ophthalmology
Chairman, Bascom Palmer Eye Institute

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Email: ealfonso@med.miami.edu
Please respond to: P.O. Box 016880, Miami, FL 33101-6880

May 2, 2018

Sanjoy K. Bhattacharya, Ph D
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine

Dear Sanjoy

This letter is to confirm my enthusiasm and support for **Miami Integrative Metabolomics Research Center (MIMRC)**. We have allocated room 727, which will house existing Ophthalmology mass spectrometry core facility and will be subsumed in MIMRC.

Instruments that will be housed in MIMRC are Q-exactive-nanoLC bundle, TSQ-Quantum Access Max-Acela HPLC/Triversa Nanomate bundle (Ophthalmology Core Facility Instruments) as well as 9 other instruments that has been donated/transferred by US Department of Justice (USDOJ). These instruments are: Agilent 7100 CE Capillary Electrophoresis System, a Thermo Scientific Nicolet 380 FT-IR Spectrometer, two Agilent 7890A / 5975C Gas Chromatograph / Mass Selective Detector coupled units, four Agilent 7890A Gas Chromatograph units and a ASAP IRD II Infrared Detector and Agilent 6890N Gas Chromatograph units.

The NEI core grant from National Eye Institute, NIH partially supports the annual maintenance of one of the mass spec bundles (Q-exactive bundle) whereas the maintenance of other instruments are supported by user fee and your funded grants.

MIMRC is envisaged to support projects beyond the immediately interest of Ophthalmology and Vision Research and bring greater number of funded and impactful interdisciplinary research harnessing the potential of clinical research resources of the medical school. Whereas Ophthalmology core facility will continue to provide fee based service, you envision that MIMRC will bring together quality interdisciplinary investigators helping generate high impact research while using the common platform, reagents, know-how and expertise while the personnel and instrument maintenance supported by fee, direct and indirect cost sharing.

I am aware of hard work that is being put into this endeavor. In all of last decade you have put at least one major instrument grant every year. That is substantial. You have now assembled a team of over 12 interdisciplinary individuals who are already being supported by these instruments.

Ophthalmology and Vision research will also benefit from having such platform, resources and expertise. You have my support in this endeavor.

Sincerely,

Eduardo Alfonso, MD

Bascom Palmer Eye Institute
UNIVERSITY OF MIAMI HEALTH SYSTEM

Please respond to:
P.O. Box 016880, Miami, FL 33101-6880

www.bascompalmer.org
Phone 800-329-7000

Sanjoy K. Bhattacharya, Ph D
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine

May 2, 2018

Dear Sanjoy,

This letter is to confirm my enthusiatic support for **Miami Integrative Metabolomics Research Center (MIMRC)**. You have been allocated room 727 on the 7th floor of McKnight building that has larger space than current room 710 where the most of the instruments are currently housed. You will move instruments from room 710 and house the existing Ophthalmology mass spectrometry core facility which will be subsumed in MIMRC. The Ophthalmology core facility will continue to serve as core facility with the existing charge center.

Instruments that will be housed in MIMRC are Q-exactive-nanoLC bundle, TSQ-Quantum Access Max-Acela HPLC/Triversa Nanomate bundle (Ophthalmology Core Facility Instruments) as well as 9 other instruments that has been donated/transferred by US Department of Justice (USDOJ). These instruments are: Agilent 7100 CE Capillary Electrophoresis System, a Thermo Scientific Nicolet 380 FT-IR Spectrometer, two Agilent 7890A / 5975C Gas Chromatograph / Mass Selective Detector coupled units, four Agilent 7890A Gas Chromatograph units and a ASAP IRD II Infrared Detector and Agilent 6890N Gas Chromatograph units.

I am the PI of the NEI/NIH core grant (EY14801) that partially supports the annual maintenance of one of the mass spec bundles (Q-exactive bundle) whereas the maintenance of other instruments are supported by user fee and your funded grants.

MIMRC is envisaged to support projects of the immediate interests of Ophthalmology and Vision Research as well as several that are beyond Ophthalmology but supports proteomic, metabolomics analytical platforms (instruments, reagents, resources, and expertise). We recognize that it will bring greater number of funded and impactful interdisciplinary research harnessing the potential of clinical research resources of the medical school.

Ophthalmology core facility will continue to provide fee based service. The MIMRC will bring interdisciplinary investigators to generate high impact research to use instruments, reagents, and expertise helping with the remuneration of the personnel and instrument maintenance supported by fee, direct and indirect cost sharing of the funded projects by all user investigators.

I am aware that you have put a lot of hard work to arrive at this point. I am also aware that a number of prominent investigators from outside the department has agreed to utilize and support the services and form a group of interactive faculty.

Ophthalmology and Vision research will also benefit from having such platform, resources and expertise. You have my enthusiastic support in this endeavor.

Sincerely,

Vittorio Porciatti DSc, FARVO
James L. Knight Professor of Ophthalmology
Director, Vice Chair of Research
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine
Phone 305-326-6050, E-mail vporciatti@med.miami.edu

MILLER
SCHOOL OF MEDICINE
UNIVERSITY OF MIAMI

Sanjoy K. Bhattacharya, PhD
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine

May 2, 2018

Dear Sanjoy,

I am pleased to enthusiastically express my support for the Miami Integrative Metabolomics Research Center (MIMRC).

As you know, one of our major research efforts focuses on defining biologically meaningful biomarkers of Rheumatoid Arthritis-related interstitial lung disease (RA-ILD). In particular, we are interested in establishing biomarkers of early disease (derived from serum and other biological specimens such as bronchoalveolar lavage fluid) that will enable us to predict which patients with RA are most at risk of developing progressive interstitial lung abnormalities contributing to the significant morbidity and mortality of this disorder. At present, there is no consensus screening strategy for RA patients with incipient ILD (via imaging or other conventional modalities), highlighting the unmet need addressed by our novel approaches to biomarker discovery.

Towards this end, we have been extensively using Q-exactive-nanoLC bundle to identify deiminated proteins as potential biomarkers in RA-ILD patients. As a complement to these studies, we are also trying to define post-translationally modified proteins that are linked to both cigarette smoking and RA-ILD, as smoking tremendously exacerbates this disease.

We have worked with your facility extensively in last 3 years. Often the investigative analysis extends well beyond what is normally provided by a fee-based core facility, as evidenced by the role that you and your technician have played in designing experiments, troubleshooting, or interpreting data over this time period. For me, the discussions surrounding this work are very helpful in understanding different dimensions of the analytical process. These collaborative interactions have contributed to several co-publications, including an important manuscript published in the *Journal of Immunology* (Travers T. S. et al. J Immunol. 2016 Sep 1;197(5):1926-36. doi: 10.4049/jimmunol.1600162. Epub 2016 Jul 22, PMID: 27448590f). Equally important, this interdisciplinary effort will help to support one of our existing NIH grants as well as a pending R01 that includes budget allocations for mass spectrometry services.

Overall, I have found our collaborative interactions extraordinarily helpful, and my understanding is that with the MIMRC, we will be able to incorporate new analytical tools and become collective “shoppers/bargainers” for new technologies related to full spectrum metabolomics analysis.

In short, I strongly support the MIMRC that will help foster such interdisciplinary research efforts. With the ability to attract federal grants by collaborators such as myself, I do foresee fee-based service or allocated percent efforts partly supporting analytical platforms, reagents, technical help, and expertise by the MIMRC—all critical components in making future advancements.

Sincerely,

Dana Ascherman, MD
Associate Professor of Medicine

May 2, 2018
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine

Dear Sanjoy

This letter is to express my support for Miami Integrative Metabolomics Research Center (MIMRC). We have been using your mass spec facility utilizing both TSQ Quantum Access Max and Q-exactive instruments. Diana Hernandez, my postdoc received training on TSQ and extensively utilized it for analysis of small molecule drug for our pharmacokinetic analysis.

Very recently Dr. Hernandez did analyze the normal degradation of cross-linked proteins using high-resolution Q-exactive instrument. These results are useful and constitute part of my R01 application. I am happy to attest that such experiments cannot be easily performed in core facilities. Three of the four core facility that we had approached had turned us down for their inability to assist in this experiments. Locally available expertise enabled faster analysis without waiting for a long queue. It also has the advantage of my postdoc performing the experiments and labile samples are analyzed right away.

The proposed MIMRC is expected to bring platform, reagents, help and expertise together. Particularly, it aims to create an interdisciplinary group of “Involved participants” rather than just “passive” users.

We are here to use fee-based services but we will also participate in grant applications in both ways. That is MIMRC on ours and, we on MIMRC’s as needed.

I must mention that for last few years you have been putting together a S10 grant to procure a Imaging Mass Spectrometer (IMS) and I have been consistently a participant. We have also published a peer-reviewed book chapter on the same. You have facilitated analysis of tissues for our chapter with vendors of the IMS instrument.

This letter is to state my strong support for creation of MIMRC.

Sincerely,

Roberto Vazquez-Padron, PhD

Roberto Vazquez-Padron, PhD
Professor of Surgery and Molecular Pharmacology,
University of Miami, Miller School of Medicine,
1600NW 10th Avenue, RMSB 7147A,
Miami FL 33136
P: 305-243-1154

To

Prof. Tatjana Rundek, MD
Chair, LOC
University of Miami Miller School of Medicine.

July 8, 2018

Dear Dr. Rundek,

Please find attached a copy of our revised proposal, a copy with track-changes, support letters (single pdf document) and supporting tables in Excel. I sincerely thank you and the reviewers for helpful comments/suggestions, which has helped improve our MIMRC proposal. We have made an earnest attempt to revise our proposal in light of reviewers comments. Our response to reviewer's comments, highlighted in blue is provided below. In light of reviewers comments/suggestions we have incorporated changes in the proposal. A copy of proposal with "track-on" changes left as is have been provided herewith as a supplemental document to facilitate the review process along with support letters as a single pdf copy.

I hope the revised proposal will be found suitable for consideration by LOC. Please feel free to contact me should additional materials need to be provided.

I shall look forward to communication for LOC.

Thank you.

Sincerely,

Sanjoy Bhattacharya, M. Tech., Ph.D.
Professor of Ophthalmology
Proposer of MIMRC

Response to LOC/reviewers comments:

Proposal:

To name a center Miami Integrative Metabolomics Research Center (MIMRC)

LOC Committee review:

This is a request to change the name of a departmental facility to a school-wide center. As such it is more than a mere name change. This proposal represents the creation of a new center and the LOC suggest to appropriately entitling the proposal.

The proposer is thankful to the reviewers. Indeed the idea is not a name change but rather subsuming the core and leave the core functions intact and expand services and bring in additional instrument, facilities and individuals working together to share platform, resources, reagents in a more effective manner. The idea is to put a functional center that works to serve enabling impactful science and expand our collective ability to increase collaborative grant funding.

The Ophthalmology "omics" facility is really the only one in the campus. Therefore, the possibility of expanding it to technical capabilities and services, while making it more self-sustainable, it is of great importance for our Medical school. Dr. Bhattacharya should be commended for growing the current facility from his own grant support and contributions from other sources. His expertise in the field, along with his demonstrated leadership to build this Core demonstrates his unique position to accomplish the proposed creation of MIMRC.

We thank the reviewers for their encouraging comments.

There are several strengths in the current facility that will provide the foundation for the proposed new MIMRC:

- It already has space and state-of-the-art equipment
- It already has a well-trained operator
- Dr. Bhattacharya has already established a track record of funding for himself, which support the facility, as well as local collaborators, either funded or well-positioned to get funding in the near future.
- Likewise, Dr. Bhattacharya has a solid record of fruitful collaborations resulting in publications and funding.
- There are extramural collaborations as well as prestige at the national level to attract possible external users of this facility.
- The facility will be organized in dynamic clusters of projects grouped by scientific interests. This is a clever approach because it will better focus the priorities for equipment acquisition and maintenance, as well as training for the operators and users.
  The proposal puts forth an interesting growth model with very little or no upfront investment. This model has some potential disadvantages, stated below. However, if appropriately developed it may serve as a paradigm for future similar core facilities. As such is viewed by the LOC with great

interest, considering that missing or underdeveloped core facilities have been recognized as a major hindrance for our research enterprise, faculty recruitment and retention, and ability to successfully secure extramural funding.

Again, we thank the reviewer's and LOC for their encouraging comments.

Despite these numerous strengths, the LOC also recognized several weaknesses.

The major weakness of the proposal is that it is sketchy. Considering that it will have to be approved by other internal bodies (e.g., The Medical School Council and the UM Faculty Senate) by individuals not necessarily versed in leading-edge biochemical procedures and their possible applications, the project will be best served by a much more detailed description of both the science, the potential need, and advantages of this Center for the institution, the faculty, and the mission of UMMSOM (and the UM).

We thank the reviewers for their guidance.

Also, the financial aspects of the proposal and a growth plan leading to a self-sustainable facility should present with more details. Finally, if indeed the plan includes changes in the structure of IDC reimbursement, letters of support from the department chair and major collaborators will be necessary.

We thank the reviewers for these comments too. Since the first submission of MIMRC application, the services of the Ophthalmology mass spectrometry core (OMSC) has changed substantially. This has resulted in changing the percentage salary contribution of the operator from 100% on Dr. Bhattacharya's grant to about 30% on his grant. OMSC has started accepting more fee-based service inquisitions from outside academic as well as industries. This has increased the work load but well within manageable bounds. We see the development of collaborative work in steps with IDC sharing. Chair of Ophthalmology is open to charging IDC and transferring them to OMSC/MIMRC accounts. As the center serves more and investigators from different units start using it effectively we see no problem to get such financial planning done. For last three years, the financial cushion for operator salary was Dr. Bhattacharya's grants and instrument maintenance on a NEI, NIH core grant. As the use is changing, the fee-based revenue is changing (being generated) and again we do not foresee any problem to capture IDC charges being negotiated. The hard part will be convincing the user investigators to acknowledge efforts and be ready to share some IDC.

The LOC has also consulted Dr. Carl Schulman, our Executive Dean for Research, who confirmed that Centers/Institutes can be founded on soft money if the Council and Senate feel the funding sources are sufficient and sustainable. In addition, in the new IDC centralized scheme, the Centers/Institutes might request and get between 5-10% of IDC's back, but that may not be sufficient for this new MIMRC.

The following suggestions are intended to help Dr. Bhattacharya in writing a more granular proposal.

1- Define proteomics, lipidomics, and metabolomics for lay individuals. Indicate the significance of the information that can be obtained with these techniques.

   We thank the reviewer for his/her comments. We have incorporated this in the revised proposal.

2- Clearly state objectives ("specific aims") of the new center. As currently presented, the proposal may be interpreted, as it will be more of the same. Examples may be: Enable setting accounts independent from Ophthalmology; enable IDC sharing (if still possible); applications for extramural funding; etc. What will be the advantages for Dr. Bhattacharya, the department of Ophthalmology, UMMSOM researchers, and the school/university to have this expanded core facility?

My personal thanks are due to this reviewer. It has helped develop clarity in my mind to write the proposal. In response to reviewers comment, I have put aims. We expect the users to find seriousness in efforts and in dedicated instrument usage. We will discuss with these users about IDC sharing. The user's thought process is biggest impediment not the department of Ophthalmology. The department of Ophthalmology will be willing to park IDC with the mass spec account should the users are up to a stage to do so.

3- When describing the present facility, make a list of the equipment available, approximate cost to maintain and replace, and, more importantly, what are the applications each piece of equipment can fulfil.

Provided in summary Table 1 attached herewith. This can be further detailed if the LOC so advices.

4- Provide a table of the currently available extramural grants made possible by the existence of this facility, and how much they contribute to the maintenance and salary support of the technician. Information about direct and indirect costs as well as the funded period would be helpful. Pending applications would be also informative to list.

A list has been provided in attached table 2. The pending grants are rapidly expanding. We have included repeat users as major users. There are several other one time users not included in the list.

5- Proteomic facilities are available for fee elsewhere. It is essential to articulate what are the advantages for the institution and local researchers of having a facility here, as opposed to outsourcing the service. This is possibly the most common critique to this type of core. Biochemical samples can be submitted via FedEx to anywhere in the world. What is unique of having this facility in our institution?

The FedEx service does not support much beyond routine services. Core facilities fail to perform when study design needs deviation from routine. Also, core facility works when users exactly knows what is needed. Mass spec experiments has front end fractionation plus design of experiments. The user knowledge is lacking in all our campuses with respect to mass spec. Examples of help needed (that could not have been provided by a core) are experiments performed by Drs. Lina Shehadeh, Roberto Vazquez-Padron, Naresh Kumar, Tekin Mustafa, Ashok Saluja, Nicholas Acquavella, Joseph Duffraine, Carolyn Cray, Santanu Banerjee, Daniela Frasca and for assistance and modification of methods: Dr. Dana Ascherman. The list is longer for other users who had needed simple help which needed personal interaction.

6- There is a brief mention of tailoring services to users' needs, and providing training and intellectual support to users. This is certainly a unique feature of the facility and to a large extent, justifies the need for a local service. However, it is stated that this aspect is gratis. Dr. Bhattacharya's time is valuable and finite. How (and who) will be providing this services as the facility grows? Training user's personnel may be key to free time of the operator and would solve the technical aspects of

sample preparation. Is there any possibility that project planning and tailoring may be also delegated? Large facilities have PhD- faculty-level full time directors advising users.

The reviewer has captured the essence. We are a campus who are largely ignorant of instrument, services and our utilization is sub par. Both go hand in hand. We will not be able to afford a full time PhD person. Not even with current rate of growth. Dr. Bhattacharya has been spending 20-30% of his time advising people as gratis. This has now prepared a user base. Dr. Santanu Banerjee, Dr. Roberto Mendez, Dr. Diana Hernandez, Dr. Hong Yu are people who have developed considerable expertise in wet sample processing, IROA methods etc. These trained people often provide assistance as gratis. For example, Drs. Banerjee and Mendez on IROA and GC-MS analysis. The idea is to have a hybrid model: part gratis, part fee-based analysis. Whereas instrument utilization service is always via dedicated operator but help can be availed under MIMRC umbrella for wet processing, sample prep, bioinformatics analysis. As we move we evolve and develop cost effective strategies. Some of the aspects need to be provided as gratis. MIMRC is expected to enhance those services and distribute the gratis part on a few other people. Hope is that some of them will become collaborators despite working in different disciplines.

7- Related to the previous point, it is important to define the possible demand here, as well as to identify other similar facilities in South Florida (FIU?). How many investigators can benefit from this facility in campus, or in Miami?

Local demand is increasing. Outside demand is increasing. We have observed 70% increased demand starting May 2018. We perform a workshop and a 2-hour seminar in the month of June every year. That has been helpful in increasing awareness. The workshop requires a payment of $100. Lunch is included in this pay. We have found quality participation ever since this fee was incorporated some four years ago. Also, the 2-hour Metabolomics-MIMRC seminar is invitation only to keep the group accommodated in a small seminar room plus participation of only deeply interested people. Dean Prof. Henri Ford and Associate Dean of Research Dr. Dushyantha Jayaweera attended this year's seminar. These events are resulting in serious increase in utilization. FIU has some instruments but not for proteomic analysis. Their services are more expensive (about 30 to 50% more than us in most cases). Their training is never free. When we plan to institute a fee for training on instruments it will be 25-50% less than FIU for at least next 5 years. We also waive the training charges on a case by case basis through creative arrangement. Our first goal is to provide training when we encounter a serious user. The consideration of fee comes later.

8- Can the core attract outside users? How many? How would this core be competitive with similar facilities in the country?

Table 2 provides a list. We have slowly opened ourselves. We are superbly competitive compared to outside cores. Our Lipidomics services on a head to head basis is much better qualitatively and quantitatively compared to University of Virginia (Dr. Sara Spiegel's group) and University of Texas (Dr. McDonald group). We and others have compared it. My postdoc Dr. Trzeciecka utilized these core facilities for a head to head comparison and we came far above on all aspects. Now a metabolomics society has also compared our technical services (not cost), we have performed within top 3 for all technical aspects in a list of total 1 to 50 ranking. This has not been made public

but if and when done we will capitalize on this. The society has recognized some problems in making these details public due to opposition from participants. The initial agreement was to keep the information limited among participants and the groups will only know their numbers but not how others fared just to have this information masked. Thus we know our standing but not that of our colleagues (other participating core facilities).

9- The financial plan is humble and realistic. However, it may not be sustainable. In the first phase, the facility will aim to support 25% of the operator salary. That is feasible. What will happen if Dr. Bhattacharya has a gap in funding? There is a need for a growth plan to achieve 50% and then 100% of the operator support, as well as support for equipment maintenance (service contracts?). At some point the project describes multiple operators. How does the facility plan to get there?

Very humbly, it has taken Dr. Bhattacharya nearly 12 years with relentless effort to reach there. He does not have all answers. If he has a gap in funding, he is not entirely clear what happens. So is if NEI core grant which has to be renewed by August 2019 ever expires. Currently 70% of operator salary is supported by user fees. Hopefully we will reach a plane where 100% of one operator will be entirely supported by user fees. A single operator now operates three instruments (Q-exactive, TSQ Quantum Access Max-Triversa configuration and GC-MS). With user growth and shared instrument use in grants providing some IDC this may be solved.

10- Considering the new schedule of IDC redistribution, 10% of IDCs may not fully cover the needs described above. For local users, what will be the cost? IDC share and fees? Only fees? How will the facility categorize and charge heavy users versus light sporadic users? At this time, proposed changes in IDC redistribution will require a written consent from the Department chair, and the support of key users. Likewise, what would be the fees for external users? Are those fees competitive with fees from other similar facilities in South Florida and beyond?

Currently local users are paying the fees only. The only individual to ever come close to sharing IDC is Prof. Mary Lou King. She extensively used the mass spec to generate preliminary data to get funded a R21 and R01 grant with consent to put percent effort and IDC share. Once funded, her funding scenario considerably changed. She also made retirement plans (which itself changed several times). She requested taking back both percent effort and IDC. Considering her plea both Dr. Bhattacharya and his chair agreed not to take or revert back IDC. This case and others illustrate the flexibility in IDC needed. However, yes IDC and external users are way to go. With external users, our current fee is the same as with internal users. Our aim to seek percent efforts and IDC consortium agreements based on their need of our expertise rather than simple user fee. This has motivated us to serve relatively small number of users. I must mention this was not the only reason. Right in the beginning, Dr. Jenifer McCafferty-Cepharo tried to discourage us to serve outside users. This had been key factor not to accept outside users readily. However, we have begun performing service and will continue to do so. Outside service acceptance comes with some risks. For example, someone can misuse data. Someone can blame for data not fitting their paradigm. These are the reasons why even as of now we are careful to accept any and every one. However, we are expanding with an eye to have consortium arrangement in addition to being a fee-based service provider with distinction in both services.

11- Dr. Bhattacharya should provide an ideal scenario and a worst-case scenario for income and expenses in the facility for the time period expected to elapse until the facility is self-sustainable.

The salary of the operator below market value is an additional problem to address. The investigator may have to consider some kind of subsidy from the institution, but, in that case, a letter of support from the appropriate budget authorities will be necessary as well.

The worst case scenario being the use drops to 25% level. The best case scenario being use becomes 100% and we are also able to increase the fee by 25% at some time point in next 2 years. We hope to achieve more than 100% (based on todays utilization base) use. However, I am not a marketing genius so any projection I make may have a tendency to be proven wrong.

12- The facility is currently supported by the NEI core grant. Will that support continue as the core becomes more independent from the department and less focused on eye research? Clusters 2 - 4 described cannot be under the NEI umbrella. For example, this is critically important for equipment maintenance. It is stated that it is currently covered by the NEI core grant, and that only a fraction will come from fees. As the core moves toward several non-eye related research this distribution of maintenance expenses will not be viable, or even unacceptable for NEI. A description of the transition is necessary.

NEI core grant have not differentiated the use. It pays $40K for Q-exactive maintenance. The chair have been generous to contribute to repairs. This is also because the repairs theoretically have been paid from Dr. Bhattacharya's indirect costs. As long as 3 eye related users utilize the facility we do not foresee these problems. Realize that operator salary is not provided by the core grant since its inception. So the largest subsidy has come at the expense of Dr. Bhattacharya's grants and indirect costs in some way. The NEI core expires in August 2019. We hope to have renewal. I must add that in general Ophthalmology has liberally contributed in refurbishing the space and with ancillary needs. Dr. Richard Lee, from his research endowment provided $18K as alms for procuring Genius 3022 Nitrogen Generator, when we discovered that despite having money core account cannot accrue capital instrument procurement charges. RIM office paid 50% and on Dr. Bhattacharya's approach Dr. Richard Lee generously paid from his endowment research support another $18K (total cost of the generator is about $36K). This is a net savings of $19 K in Nitrogen cylinder charges ($26K in theoretical costs -$7K in maintenance charges for the generator beyond year 1). Also having Nitrogen generator enables smooth functioning of instrument with pressure and heat being maintained much better saving the instruments (Q-exactive's, TSQ Quantum Access Max's) life and enabling 24/7 operation. The extended operation (24/7) is enabling on time delivery of services.

13- The project hints at the possibility of obtaining philanthropic support. This notion needs further elaboration.

It is possible that one of the critical users of instrument be he/she an ophthalmologist or another physician can bring it to a wealthy donor and we may succeed getting a philanthropic support. I would rather like the addition of following instruments:

1) An UltraFAIMS asymmetric ion mobility fractionator at the front end ($70K),
2) AAP-MALDI front end for Imaging Mass Spec on Q-exactive ($150K)
3) If possible, a dedicated Imaging Mass spec ($780K).
4) Having a cushion of operator salary will also be good.

The LOC committee is very enthusiastic about this new Center and would like to support it given the appropriate responses to our main points before recommending it to the Medical School Council for approval. Thank you.

I personally thank the LOC and the reviewers for taking time and providing guidance and constructive criticism. On advice of LOC I look forward to the day that it can be brought forth in the Medical School Council for discussion and for voting. Thank you.

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August 22, 2018

Tomas Salerno, M.D.
Chair, Faculty Senate
University of Miami
Ashe Building, Suite #325
252 Memorial Drive
Coral Gables, FL 33146

Re: Council Approved a Proposal to Create and Name a Center – Miami Integrative Metabolomics Research Center (MIMRC)

Dear Dr. Tomas Salerno,

This is to inform the Faculty Senate that the Medical School Faculty Council met on August 14, 2018 to review the **Proposal to Create and Name a Center – Miami Integrative Metabolomics Research Center (MIMRC).**

The council members voted to *approve* the proposal.

Respectfully Submitted,

Sanjoy Bhattacharya, M.Tech, Ph.D.
Speaker, Medical Faculty

Medical School Faculty Council
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of MEDICINE

August 28, 2018

Sanjoy K. Bhattacharya, Ph.D
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine

Dear Sanjoy,

This letter is to confirm my support for **Miami Integrative Metabolomics Research Center (MIMRC)**. This center is to promote collaboration of a group of interdisciplinary researchers and clinician-scientists. It is expected to support interdisciplinary projects pertinent to Neuroscience, Medicine, Cancer, Surgery, Ophthalmology/Vision Science and others that will use proteomics/lipidomics and metabolomics approaches.

The collaboration is expected to bring greater number of funded and impactful interdisciplinary research. This will be facilitated by optimal utilization of common instrumental platforms, their maintenance and cross-fertilization of ideas. Ophthalmology core facility will continue to operate on the model of fee-based services and will be subsumed in MIMRC. You are building this center with procured and donated instruments. I am glad that you have met with some success from U. S. Department of Justice/Drug Enforcement Administration to receive donation of instruments and some more are likely to be obtained as your detailed in medical school council presentation.

Some of these instruments maintenance are supported by NEI/NIH core grant. The partial operator salary are covered with fee-based services. You also aim to build funds for the maintenance of other instruments are supported by user fee and your/others funded grants. You plan to add new instruments using extramural grants. You also aim to attract philanthropic support as possible. For minor repair or emergencies, you utilize the research, research education and innovative medicine support mechanism.

Your instruments have been used by several individuals from different academic units such as Drs. Dana Ascherman and Alessia Fornoni (Medicine), Drs. Roberto Vazquez-Padron and Santanu Banerjee (Surgery) who are supportive of MIMRC. The aim of MIMRC is to create an interdisciplinary group of "Involved participants" rather than just "passive" users. I am aware of the efforts put into this work and express my strong support for MIMRC.

Sincerely,

Henri R. Ford, M.D., M.H.A.

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