



The John Knoblock  
Faculty Senate Office  
Ashe Administration Building, #325  
1252 Memorial Drive  
Coral Gables, FL 33146

[facsen@miami.edu](mailto:facsen@miami.edu)  
web site: [www.miami.edu/fs](http://www.miami.edu/fs)  
P: 305-284-3721  
F: 305-284-5515

## MEMORANDUM

**To:** Julio Frenk  
University President

**From:** Tomás A. Salerno  
Chair, Faculty Senate

**Date:** October 31, 2016

**Subject:** Faculty Senate Legislation #2016-21(B) –Establish a University-wide Institute for Neural Engineering (INEM) at the University of Miami

\*\*\*\*\*

The Faculty Senate, at its October 26, 2016 meeting, voted unanimously to approve the proposal to establish the Institute for Neural Engineering (INEM) at the University of Miami for five years and any extensions thereafter.<sup>1</sup> The Institute is collaboration between the neuroscience communities at the University of Miami Miller School of Medicine and the College of Engineering Department of Biomedical Engineering to facilitate the development of new clinical technologies for the assessment of neurological function and the treatment of neurological diseases. The INEM will offer expertise in every aspect of neuroscience and biomedical engineering that involves cutting-edge approaches currently used in these various disciplines.

Currently, the University does not have the infrastructure to bring the two disciplines together. The new Institute will help to recruit new students, and faculty as well as secure funding to accomplish its objective. The Institute will be led by two Co-Directors, one from the College of Engineering on the Coral Gables Campus, and one from the Miller School of Medicine on the Medical School Campus.

This legislation is now forwarded to you for your action.

TAS/rh

Enclosure

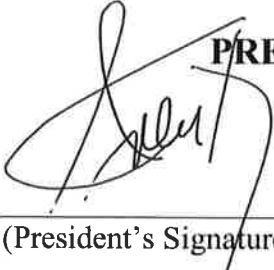
cc: Thomas LeBlanc, Executive Vice President and Provost  
W. Dalton Dietrich, Kinetic Concepts Distinguished Chair in Neurosurgery, Miller School of Medicine  
Özcan Özdamar, Chair and Professor, Biomedical Engineering, College of Engineering

---

<sup>1</sup> C18.2.1 If the Faculty Senate approves a UNIVERSITY CENTER OR INSTITUTE established under Bylaw 6.5, it may do so for an initial term of up to five years<sup>1</sup>. Continued approval by the Faculty Senate for a defined term of up to ten years requires a review of the unit upon receiving such a recommendation, forwarded by the Executive Vice-President and Provost after consultation with the cooperating departments and schools.

CAPSULE: Faculty Senate Legislation #2016-21(B) –Establish a University-wide Institute for Neural Engineering (INEM) at the University of Miami

**PRESIDENT'S RESPONSE**

APPROVED:  \_\_\_\_\_ DATE: 12/22/16  
(President's Signature)

OFFICE OR INDIVIDUAL TO IMPLEMENT: Dr. John Bixby

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

NOT APPROVED AND REFERRED TO: \_\_\_\_\_

REMARKS (IF NOT APPROVED): \_\_\_\_\_

# Proposal for the Establishment of the Institute for Neural Engineering at the University of Miami (INEM)

## TABLE OF CONTENTS

<b>INTRODUCTION.....</b>	<b>1</b>
<b>BACKGROUND.....</b>	<b>2</b>
<b>NEED FOR A NEW NEURAL ENGINEERING INSTITUTE .....</b>	<b>5</b>
<b>MISSION .....</b>	<b>5</b>
<b>MARKET ANALYSIS.....</b>	<b>6</b>
STRENGTHS .....	6
WEAKNESSES .....	6
<b>OPPORTUNITIES.....</b>	<b>7</b>
<b>ORGANIZATIONS OVERVIEW.....</b>	<b>7</b>
<b>NEURAL ENGINEERING INSTITUTE DIRECTORS.....</b>	<b>7</b>
<b>NEURAL ENGINEERING INSTITUTE EXECUTIVE COMMITTEE .....</b>	<b>8</b>
CHARGE OF THE EXECUTIVE COMMITTEE .....	8
COMPOSITION OF THE EXECUTIVE COMMITTEE .....	8
MEETINGS OF THE EXECUTIVE COMMITTEE .....	8
<b>INEM EXTERNAL ADVISORY COMMITTEE .....</b>	<b>8</b>
CHARGE OF THE EXTERNAL ADVISORY COMMITTEE.....	8
COMPOSITION OF THE EXTERNAL ADVISORY COMMITTEE.....	8
MEETINGS OF THE EXTERNAL ADVISORY COMMITTEE .....	8
<b>INEM INTERNAL ADVISORY BOARD.....</b>	<b>9</b>
CHARGE OF THE INTERNAL ADVISORY BOARD .....	9
COMPOSITION OF THE INTERNAL ADVISORY BOARD .....	9
MEETINGS OF THE INTERNAL ADVISORY BOARD .....	9
<b>UNIVERSITY OF MIAMI NEURAL ENGINEERING INSTITUTE APPOINTMENTS.....</b>	<b>9</b>
CRITERIA FOR INEM APPOINTMENT.....	9
INEM APPOINTMENT PROCESS .....	10
<b>INEM MEMBERSHIP .....</b>	<b>10</b>
INEM MEMBER RESPONSIBILITIES .....	10
<b>REVIEW OF THE INEM MEMBERS .....</b>	<b>11</b>
<b>INEM PROGRAMS AND PROGRAM DIRECTORS.....</b>	<b>11</b>
INEM INSTITUTE PROGRAMS.....	11
PROGRAM DIRECTORS .....	12
BIOMEDICAL ENGINEERING STRATEGIES FOR TRAUMA AND NEUROPROTECTION .....	12
TISSUE ENGINEERING STRATEGIES FOR NEUROREPAIR .....	12

NEURO-IMAGING FOR DIAGNOSTIC AND TREATMENT STRATEGIES .....	13
HUMAN MOTOR AND SENSORY CONTROL .....	13
BRAIN / MACHINE INTERFACE WORK FOR RESTORING FUNCTION .....	13
HUMAN BRAIN IMAGING OF COGNITIVE/EMOTIONAL PROCESSES AND DISORDERS .....	13
<b>INEM INSTITUTE RESOURCES.....</b>	<b>14</b>
NEURAL ENGINEERING FACILITY .....	14
MACHINING AND ELECTRICAL/ELECTRONIC WORKSHOP.....	14
3D PRINTING .....	14
ELECTRODE/PROBE MANUFACTURING .....	14
IMAGING AND ROBOTICS .....	14
CELL PROCESSING .....	14
MICRO-IMAGING .....	14
MRI FACILITY .....	15
ZEBRAFISH FACILITY .....	15
<b>EDUCATIONAL RESOURCES .....</b>	<b>15</b>
<b>SPACE .....</b>	<b>16</b>
<b>FUNDING SOURCES, BUSINESS PLAN.....</b>	<b>17</b>
<b>PROJECTIONS OF ACTIVITIES (FIRST YEAR).....</b>	<b>21</b>
<b>APPENDIX A .....</b>	<b>22</b>
<b>APPENDIX B .....</b>	<b>22</b>
<b>APPENDIX C .....</b>	<b>23</b>
<b>APPENDIX D .....</b>	<b>24</b>

## Introduction

This proposal seeks to formally establish a University-wide interdisciplinary Institute focused on the application of the dynamic field of neural engineering to discover and develop new approaches and therapies to enhance medical care at the University of Miami.

Over the last several years, there has been a growing interest in strengthening existing productive collaborations between the neuroscience community at the University of Miami School of Medicine and the Department of Biomedical Engineering to facilitate the development of new clinical technologies for the assessment of neurological function and the treatment of neurological diseases. For example, there is significant knowledge and on-going research that aims to promote functional recovery in patients with brain and spinal cord injury (SCI) and other neurosensory and neuromuscular disorders such as deafness and blindness. These activities have been facilitated through several joint faculty hires between the Department of Biomedical Engineering and clinical departments at the School of Medicine.

In the College of Arts and Sciences, the recent addition of a research-dedicated functional magnetic resonance imaging (fMRI) facility to the Psychology Department has led to the recruitment of several neuroscientists studying the neural basis and treatment of autism, depression, anxiety. Moreover, recent neuroscience hires across Biology and Physics Departments, leverage model organisms such as flies fish and worms to study the genetic and neural circuit bases of behavior. Importantly, many of these models are relevant to neurological diseases studied in Psychology and at the Miami Project. In addition, a recent hire in the Department of Computer Science provides new expertise in the area of Computational Neuroscience, and other faculty in Computer Science have recently developed collaborations with faculty at the School of Medicine in areas such as bioinformatics and systems biology with applications to neurodegenerative diseases. These new research programs represent a new opportunity to develop new collaborations in the field of neural engineering across schools, campuses and disciplines.

To capitalize on this collective talent, it is critical to have an institute that help to coordinate efforts across departments and schools. Each discipline has a range of externally and internally-funded neural science and engineering research projects, but these individual initiatives are fragmented. Creating an institute will promote synergistic programs and allow large program development and organized innovation. To energize fundamental aspects of neural science, engineering and reparative medicine and facilitate active collaborations across these various disciplines, there is an urgent need to establish an interdisciplinary institute that offers the necessary expertise, infrastructure and resources. The establishment of a new, interdisciplinary Institute for Neural Engineering at University of Miami (INEM) will encourage multi-disciplinary and translational projects between diverse programs to promote engineering applications targeting neurological and psychiatric disorders by offering the expertise, infrastructure and resources necessary to bridge basic sciences with clinical applications and innovation at UM. We expect this new institute to plant the seeds for new future fields and establish collaborative cognitive, learning and psychiatric neuroengineering projects for mental health and disorders.

## BACKGROUND

Neural disorders represent one of the nation's greatest health care problems, affecting millions of Americans. Various groups across diverse departments at the University are dedicated to understanding pathophysiological mechanisms associated with damage to the nervous system in an attempt to reduce the detrimental consequences of stroke, neurotrauma, as well as a list of neurodegenerative disorders. Thus, neuroprotective strategies targeting a range of cellular and molecular secondary injury mechanisms are being developed and tested to translate into the clinical field. In parallel to these studies, other programs are actively developing strategies to promote tissue repair and functional recovery resulting from neurodegenerative disorders and trauma. In addition to utilizing conventional biological approaches to improving function following nervous system injury, scientists are now turning toward more collaborative studies with investigators in other disciplines to build synergistic programs to significantly impact their research activities.

Neural engineering integrates the disciplines of neuroscience, medicine and engineering to promote technological advances and medical discovery for diagnosis, treatment and rehabilitation of neural disorders. Major engineering advances in health care have resulted in the design and utilization of novel strategies at the interface of biology, medicine and engineering. Complementing the work in neural engineering, neuroscientists focus on the nervous system and its impact on behavior and cognitive functions. However, while fundamental neuroscience concepts are concerned with the normal functioning of the nervous system, this discipline is heavily involved in determining the underlying neural mechanisms responsible for neurological, psychiatric and neurodevelopmental disorders. At the University of Miami, major programs in the neurosciences include disciplines in engineering, behavioral, cellular, cognitive, computational, developmental, molecular, imaging, neuroinformatics, neurolinguistics, neurophysiology, social neuroscience, as well as systems neuroscience. The new Institute will therefore serve a group of investigators that have the vision of creating a new platform for research excellence.

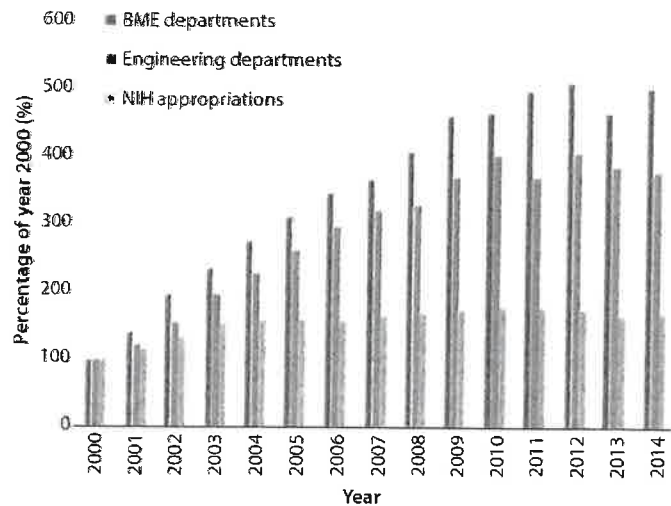
Over the past decade, Biomedical Engineering has emerged as its own study compared with other engineering fields. It integrates engineering and design principles with concepts of medicine and biology for health-related problems. Both diagnostic as well as therapeutic approaches are being advanced to improve patient care. The development of medical devices and systems are extremely important to the current medical research field. The Biomedical Engineering field is helping to close the gap between engineering and medicine by translating the design and problem solving skills of engineers into biomedical and healthcare applications that medical and biological scientists are concerned with. Similar to neuroscience, Biomedical Engineering consists of research and development spanning a broad array of subfields including tissue, genetic, neuroscience and pharmaceutical engineering along with regulatory issues and medical device development. Current biomedical engineering applications include the development of biocompatible prosthesis, diagnostic and therapeutic medical devices, imaging equipment, applications to regenerative tissue growth and pharmacological drug discovery.

At the University of Miami there are currently several faculty and research groups, which have independently built active collaborations between Biomedical Engineering and the School of Medicine. For example, some researchers are developing bioactive hydrogels and novel scaffolding biomaterials to promote angiogenesis for wound healing and other problems. In

addition, new approaches for locally administering therapeutic treatments including local cooling for conservation of residual hearing and neuroprotection are being tested. Novel imaging strategies to evaluate nervous tissues using functional imaging and laser stimulation procedures during intraoperative processes are being conducted. Improved screening and rehabilitation of hearing and visual disorders are being developed and behavioral and neural monitoring of mental and neurological disorders are actively being pursued. The clarification of spinal and supra-spinal neural circuits that contribute to voluntary motor control in individuals with or without SCI is actively being pursued. To bypass areas of circuit damage such as SCI, MS ALS, brain /computer interface functional systems for restoring function are being developed with industry partners. Thus, individual groups at UM have already established productive collaborations within their various fields of research expertise that emphasize the growing field of neural engineering. The new institute will bring these fragmented collaborations together, and provide an infrastructure and direction that will allow large program development and a full integration of basic sciences with clinical application, IP and workforce development.

An exciting new research initiative on the Coral Gables campus has arisen following the construction of the three story, 40,000 square foot Neuroscience Annex. This building was constructed through funding from the NIH, and is an interdisciplinary hub for neuroscience research. Faculty, students and postdocs from the College of Arts and Sciences, Engineering, the Miller School of Medicine, Florida International University and Nova Southeastern University conduct collaborative research in this state-of-the-art facility. An important component of this building is a research-dedicated magnetic resonance imaging (MRI) suite, which allows for functional and structural human brain imaging. As a result, six new cognitive neuroscientists have been hired in recent years, and using this new technology these faculty are conducting research into the neurobiological bases of cognition, emotion, perception, attention, memory, as well as treatment strategies for mental and behavioral disorders.

The Biomedical Engineering and Neuroscience programs at the University of Miami are supported by significant federal funding by the NIH and NSF. A new Neural Engineering Institute will position UM to be competitive for future grant submissions, including center and program grants from both NIH and NSF that will help drive breakthroughs in the medical and neural engineering field over the next 5 to 10 years. The fact that at the current time none of the federal investments resulting from the Presidents' BRAIN Initiative in



2014 are in Florida, emphasizes the need for UM to more effectively position our programs for new funding opportunities in research and workforce development. In this regard, recent studies have shown that engineering is the new frontier for translational medicine (Chien et al., 2015). Most importantly, NIH has steadily increased funding for biomedical engineering since 2000, in comparison with NIH funding as a whole (Figure 1). Based on the success that has already been

demonstrated at UM, a greater emphasis on developing strategies to bring these two strong research groups together will promote increased interdisciplinary interactions and new grant submissions. The fields of Neuroscience and Biomedical Engineering are optimal disciplines to enhance new synergies, leading to new questions and solutions for neuroimaging, neuroprotection as well as new approaches to enhance circuit plasticity and functional recovery.

The continued rapid development of the fields of Neuroscience and Biomedical Engineering dictates also the need for an identified workforce and trainees capable of performing research in this true interdisciplinary field of science and technology. In this regard, several leading institutions throughout the United States have already taken steps to develop Neural Engineering Institutes or Centers at their respective institutions. These include some of the highest NIH funded institutions, including; Case Western Reserve, Georgia Tech, University of Washington, UC Berkeley, Penn State, UC San Diego, Illinois, Columbia and Duke, to name a few (see Table 1). Through discussions with the Directors of these Institutes, our Neural Engineering Planning Executive Committee has learned much about the day-to-day activities being conducted in their respective institutions. It is clear from these discussions that for the future of this research area at the University of Miami to continue to successfully compete in this radically emerging field, it is imperative that we provide an infrastructure that promotes interdisciplinary collaborations and resources that function as a scaffold to promoting excellence in this emerging field. The proposed INEM at the University of Miami is also intended to encourage interactions among investigators in other universities that can utilize the infrastructure and expertise within this Institute. As previously mentioned, several members of the proposed Institute have already developed productive collaborations with investigators at UM as well as other universities throughout the nation. The goal of this outreach function of the proposed institute is to establish INEM as a hub for Neural Engineering, in the southeast, the nation and globally.

In terms of research funding, current collaborations, as listed in the Appendix, are being funded by NIH, NSF, Department of Defense, State of Florida as well as other funding agencies. To successfully compete for new funding opportunities, it is time to formalize the University's work in this area under the umbrella of the INEM. The creation of this Institute will position the University of Miami among the leaders in Neural Engineering technology, training and advancement.

**Need for a new Neural Engineering Institute:**

None of the existing infrastructure at UM supports the broad interaction of Engineering and Neuroscience. This institute is needed to

- Promote the submission of more new collaborative investigative grant applications,



- Help with the recruitment of outstanding students within the new, rapidly developing field of neural engineering and neuroscience,
- Help with the submission of new training grants,
- Enhance collaborations between the Medical Center and Coral Gables as well as other institutions,
- Build a state of the art infrastructure and core equipment for conducting collaborative studies.
- Promote the development and transfer of technology within an interdisciplinary group, bringing engineering to clinical application
- Help with the recruitment of more outstanding faculty and researchers

Our new Institute will provide physical space, active collaborative pairing of faculty and students from different disciplines that do not typically interact, via research exchange in events, such as seminars and symposia, and a virtual platform for exchange of research interests. These and other initiatives will identify the faculty and students to participate in unique, multidisciplinary groups and new teaching initiatives outlined in the proposal to accomplish these goals.

## **MISSION**

The ultimate goal of the INEM Institute at the University of Miami is to integrate basic sciences, clinical application and intellectual property development across disciplines by strengthening research synergies between members and creating core facilities for research, teaching and development. The Institute will initially concentrate efforts on catalyzing interdisciplinary interactions between the neuroscience community and biomedical engineering. This collaborative effort will involve individual departments, centers, institutes, schools and colleges that currently are the home of various investigators and student populations involved in this exciting research initiative. It is planned that the new Institute will be housed on the medical campus to enhance collaborations between these various scientific disciplines. In addition to state-of-the-art research laboratories, space will be available for training of pre- and postdoctoral students as well as clinicians and clinician-scientists and office space. In addition to developing these research programs, the INEM will coordinate educational efforts among the schools and colleges to train the next generation of students who will become leaders in the interdisciplinary field of neural engineering. The University of Miami has for the first time established the ability of MD/PhD students to major in Biomedical Engineering. Thus, the goals of the new Institute will include multi-disciplinary research, educational objectives, industry relationships and fundraising initiatives.

## **MARKET ANALYSIS**

The establishment of the new INEM Institute at the University of Miami should be examined with due consideration of strengths and weaknesses in the current opportunities:

### **Strengths**

- Our Neuroscience and Biomedical Engineering scientific communities at the University of Miami are two of the strongest programs based on extramural funding and graduate student programs. The enhanced integration of neurosciences with biomedical engineering is a logical step in terms of bringing multiple research groups together to build new and fundable, interdisciplinary and collaborative programs. This interdisciplinary institute will primarily focus on neuroscience issues that relate to improving function in people with different types of neurological problems as well as detection and assessment of neurosensory, motor, cognitive and emotional disorders. Disciplines that will be involved in this interdisciplinary program therefore include medicine, neurology, psychiatry, otolaryngology, ophthalmology, psychology, neurosurgery, diagnostic and interventional radiology, mathematics, chemistry, engineering as well as a variety of basic science departments.
- There are a number of ongoing studies and faculty members with unique expertise who will benefit from and will assist in the proposed INEM Institute. With access to new resources and an effective framework around which to organize the biomedical neural engineering expertise, new research initiatives will grow and prosper. It should also be emphasized that our UM libraries have significant journal subscriptions and book holdings to support interdisciplinary work in the neural engineering field.
- In terms of workforce development, the Institute will allow for the exposure of engineering/basic science students into this translational field, bridging historic barriers between disciplines, in particular those between engineering and applied healthcare.

### **Weaknesses**

- There is currently no structural or formal organization that promotes interdisciplinary collaborations and communication between the disciplines of neuroscience and biomedical engineering.
- There is limited coordination of neuroscience and biomedical engineering resources.
- There is a critical lack of infrastructure that is needed to perform work in the neural engineering fields, which inhibits the competitive acquisition of grants and limits the recruitment of top scientists and students to this discipline.
- There is a lack of infrastructure that systematically protects the intellectual property created by our neuroscience and biomedical engineering society.
- In 2015, several of the top medical schools (in terms of NIH funding) had dedicated Neural Engineering Institutes or Centers. We are one of the few research intensive universities associated with a strong Medical School in the United States that does not have a Neural Engineering Institute that specifically brings these different disciplines together to promote new research activities.

### **OPPORTUNITIES**

President Julio Frenk, President of the University of Miami, has emphasized the importance of University wide collaborations across the University including investigative and educational programs. This new Institute will support that vision bringing together neural engineering experts from various schools and campuses. Also, the recent recruitment of Dr. Jean-Pierre Bardet as

the new Dean of Engineering in combination with the growing interest from the Department of Biomedical Engineering to work with the neuroscience community on the medical campus, represents a pivotal time for the University to establish the Institute for Neural Engineering. The Miami Project to Cure Paralysis, University of Miami Miller School of Medicine received a gift of \$25 million by Christine Lynn to help build a new Rehabilitation Hospital on the medical campus in conjunction with Jackson Memorial Hospital and University of Miami Hospital. This new facility represents an excellent opportunity to promote the development of this new Institute to enhance neuro rehabilitative approaches at the University of Miami. With a critical mass of researchers and trainees and the human technological resources, this institute will facilitate interdisciplinary research and expand institutional collaborations to accelerate the pace of discovery across disciplines and into the healthcare field. With the establishment of the Dr. John T. Macdonald Foundation Biomedical Nanotechnology Institute, a unique nanofabrication facility has been created. This facility can help promote technologies that will be created by the INEM students and faculty.

Another recent development is the recruitment of faculty members across Departments of Physics, Computer Science, Psychology for the BRAIN initiative. Additionally, resources such as the Neuroscience Annex on the Coral Gables campus is an interdisciplinary hub that brings together faculty, students and postdocs from the College of Arts and Sciences, Engineering, the Miller School of Medicine, as well as external institutions to engage in collaborative research. An important component of this building is a research-dedicated magnetic resonance imaging (fMRI) suite, which should be a major component of the proposed Neural Engineering Institute.

## **ORGANIZATIONAL OVERVIEW**

The INEM will offer expertise in every aspect of neuroscience and biomedical engineering that involves cutting edge approaches currently used in these various disciplines. Importantly, the Institute will be used to recruit other leaders in the field. The Institute will be led by a two Co-Directors, one from the College of Engineering on the Coral Gables, one from the Miller School of Medicine on the Medical School campus, that will report to and receive annual reviews jointly from the Provost of the University of Miami and the Deans of the Miller School of Medicine, College of Arts and Sciences, and Engineering. An Executive Committee will advise the Directors on the various issues related to Institute operations. An Advisory Committee will assess the scientific progress of the Institute and advise the Directors in long term planning. The Institute activities will be initially organized into 5 programs (led by individual Program Directors) and 6 resources. This basic organization is explained in more detail below.

### **Neural Engineering Institute Directors:**

The INEM Institute Directors are responsible for articulating and representing the vision of the Institute as well as overall leadership and management.

### **Neural Engineering Institute Executive Committee:**

Charge of the Executive Committee:

The INEM Institute Executive Committee is an advisory board whose purpose is to assist the Director in the management, operations, and governance of the Institute, including project prioritization and allocation of Institute resources. The Executive Committee also reviews and approves applications for Institute appointments. In addition, the Executive Committee will review the INEM Charter and leadership every three years and approve any recommendations for amendments.

Composition of the Executive Committee:

The Executive Committee reflects the interdisciplinary nature of the INEM, and in addition to the Office of the Provost, will include representation from the Miller School of Medicine, College of Arts and Sciences, and the College of Engineering. The Executive Committee will be comprised of the Institute Co-Directors, the Provost of the University of Miami, the Dean of the Miller School of Medicine, Dean of the College of Arts and Sciences, the Dean of the College of Engineering, the Program Directors and at least three at-large Institute members identified by the Executive Committee. The at-large Institute members will be determined by a majority vote of the Executive Committee and will serve for three year terms. Terms of service are renewable at the discretion of the Executive Committee. The at-large Institute members will be University of Miami faculty who are demonstrated leaders in their field of study, regular Institute shared resource users, and faculty who have established research programs with a strong track record of interdisciplinary research and activities. At the discretion of the Executive Committee, other members of the University research community will be invited to attend the Executive Committee meetings.

Meetings of the Executive Committee:

The Executive Committee will be co-chaired by the INEM Directors who will convene the Committee at least bi-annually.

**INEM External Advisory Committee:**

Charge of the External Advisory Committee:

The Institute External Advisory Committee is an advisory group that evaluates the Institute's scientific progress, technological needs and assists the Institute Co-Directors in developing strategic plans for the future of the University of Miami Neural Engineering Foundation.

Composition of the External Advisory Committee:

The External Advisory Committee is composed of the INEM Co-Directors, Dean of the Miller School (or designee), the Dean of the College of Engineering (or designee), the Vice Provost for Research (or designee) and three external luminaries in neuroscience or biomedical engineering research or education. The Institute Co-Directors, in conjunction with the INEM Executive Committee, will identify and invite three internationally renowned senior scholars or industry

leaders with a strong track record of interdisciplinary research and activities. The three-year term of service for external luminaries is renewable at the discretion of the INEM Co-Directors, in conjunction with the Institute Executive Committee. At the discretion of the External Advisory Committee, other members of the University research community may be invited to attend the Advisory Committee meetings.

Meetings of the External Advisory Committee:

The External Advisory Committee will be chaired by the INEM Co-Directors who will convene the Committee annually.

**INEM Internal Advisory Board:**

Charge of the Internal Advisory Board:

INEM Advisory Board shall be involved in the planning and implementation of the IEM, and is charged with providing insight and recommendations.

Composition of the Internal Advisory Board:

The Internal Advisory Board consists of no more than 8 members who shall have equal representation from the University and the INEM, where the University shall be represented by the INEM Co-Directors and leadership from the Miller School of Medicine, and the School of Engineering.

Meetings of the Internal Advisory Board:

The Advisory Board will be chaired by the INEM Co-Directors who will convene the group at least annually.

**University of Miami Neural Engineering Institute Appointments:**

Faculty and Affiliate members are invited to request and maintain appointments in the University of Miami Neural Engineering Institute through a formal application and review process. All University of Miami Neural Engineering Institute members must have a faculty appointment in an academic department. Membership categories are independent of academic rank. Any interested faculty from the University of Miami or affiliated institutions are eligible for appointment to the Institute according to the criteria listed below. Faculty appointments within the Institute are for a three-year term and are renewable.

**Criteria for INEM appointment (all are not required for consideration):**

1. Demonstrated interest or scientific activities in the Neural Engineering Institute,
2. Demonstrated research activity in any of the Institute programs,
3. Active/Proposed funding in research with a neural engineering component or relevance,
4. Neuroscience and/or Biomedical Engineering - focused publications

### **INEM Appointment Process:**

To be considered for an appointment within the Institute, an interested faculty member must submit the following information to the Executive Committee:

- Description of research interest and statement of research focus
- Current CV (NIH or NSF Bio sketch will also suffice)
- Current research funding information

Prospective members are asked to select one of the Institute Programs for alignment and request a letter of support from the coordinating Program Director. This information is then reviewed by the Neural Engineering Institute Executive Committee. Should an applicant be denied membership, the applicant can appeal in writing directly to the Institute Director for re-consideration. The Director can grant the appeal or refer the matter to the Provost for final decision. If denied, the faculty member will be allowed to re-apply after 1 year.

### **INEM Membership**

The following are benefits of Institute membership:

1. Access to shared resources.
2. Eligible to receive developmental funding for innovative ideas.

### **INEM Member Responsibilities:**

All Institute members are expected to contribute to the mission and growth of the Neural Engineering through support of Institute activities, including:

1. Willingness to work collaboratively with other scientists and clinical researchers on problems related to neural engineering.
2. Active participation in Institute activities including research programs and disease oriented working groups.
3. Active participation in the Institute education and visibility raising efforts, including appropriate symposia and community education.
4. Where applicable, willingness to provide mentoring to junior faculty and other Institute members.
5. All Institute members will be responsible to provide information updates as required, and must be willing to share this information for the purpose of reporting requirements.
6. All Institute members are required to report all funding to the Institute Director, and allow this funding to be listed in the INEM
7. Institute reports.
8. All Institute members will update publications on at least a yearly basis, along with participation in local national and international meetings and other activities, for the purposes of reporting requirements.

9. All Institute members are expected to use resources provided by the Institute, in particular the neural engineering facility, when such resources are needed. In the use of these resources, members are expected to pay facilities charges, and to contribute appropriate direct and indirect costs from grants to the facilities and resources. The level of contribution will be negotiated with the Co-Directors, and approved by ORA, based on use. The appropriate use and contributions to the resources are an essential component of the sustainability of the Institute, its programs and resources.

### **Review of the INEM Members:**

The Executive committee will meet yearly for a review of the appropriate Institute members (as determined by the three-year cycle). Each member is discussed on the basis of evidence for:

- Scientific activities in the neuroscience and/or biomedical engineering
- Demonstrated collaborative research efforts
  - Publications with other Institute members.
  - Service as a PI or Co-investigator on grant/grant proposal(s) with other members.
  - Service as a PI or Co-investigator on clinical protocol with other members.
  - Participation as a mentor to junior members.
- Participation in Institute activities
- Research retreat.
  - Committees, special initiatives and meetings.
  - Educational efforts.
  - Demonstrated use of Institute shared resources

Members not meeting these criteria are counseled by the Co-Directors. An Institute appointment is withdrawn if progress is not demonstrated in the 12-month period following counseling. Should an appointment be rescinded, the member can appeal in writing directly to the Institute Co-Directors for re-consideration. The Co-Directors can grant the appeal or refer the matter to the Provost for final decision. Rescinded members can apply for reappointment after 1 year.

## **INEM PROGRAMS AND PROGRAM DIRECTORS**

### INEM Institute Programs:

INEM will have 6 Core Scientific Programs that represent the research strengths found at UM, as described below. Over time, the Institute expects to potentially expand and develop programs in other areas as well. As the University of Miami is not authorized to support “classified research”, the Institute programs do not involve “classified research.” All University of Miami faculty members are encouraged to participate in the activities of the INEM as appropriate for their research needs.

The Programs are the core components of the Institute and are not designed to exist apart from the INEM. Programs have three primary areas of activity. First, Programs are interdisciplinary research groups focused on specific areas of expertise or methodologies within neural

engineering. Second, Programs provide various shared (core) resources to the University of Miami research community. Third, programs provide an interdisciplinary platform for student education. In fulfilling these roles, Programs contain state-of-the-art technologies and equipment along with highly-skilled personnel that have experience using these technologies.

Program Directors:

Each Program is led by two Program Directors, with primary appointments in the neuroscience/biomedical field, or engineering. The program directors work with the Co-Directors to oversee, develop and administer the Program within the mission and vision of the Institute. Program Directors are selected by the Director, in conjunction with the Executive Committee or a designated search committee. Program Directors report to and are reviewed by the Co-Directors. Program Directors hold faculty appointments in an appropriate academic department and are expected to have extramurally funded interdisciplinary research programs.

**Biomedical Engineering Strategies for Trauma and Neuroprotection**

Program Directors: Michael Hoffer (Otolaryngology), Suhud Rajguru (Biomedical Engineering)  
The program in neuroprotection involves strategies to combine biological and engineering approaches to protect nervous tissues from various types of injuries. These CNS injuries can be acute or progressive and result from various environmental factors including everyday stresses to sensory organs or from pathological levels of sound and vibration. Under pathological conditions such as hypoxia, cerebral ischemia or trauma, nervous tissues become highly vulnerable resulting in dysfunction of cells and circuits or irreversible cell death. Current work between neuroscientists and biomedical engineers involve developing of new strategies for the delivery of therapeutic agents or treatment protocols.

**Tissue Engineering Strategies for Neurorepair**

Program Directors: Martin Oudega (Neurological Surgery), Ashutosh Agarwal (Biomedical Engineering)

The program in tissue engineering and repair brings together neuroscientists and biomedical engineers to address and share problems associated with development and testing of novel strategies for promoting reparative process. The production of several novel hydrogel compositions and scaffolding materials for example, are being produced for the controlled delivery of growth promoting factors and drugs targeting neuroprotection and repair mechanisms. The use of nanospheres / microparticles are also currently being incorporated into these reparative strategies to deliver neurotrophic factors and cell transplants or products that can lead to axonal regeneration and sprouting, neurogenesis, oligodendrogenesis and angiogenesis, resulting in the enhancement of multiple neuroreparative process.

**Neuro-Imaging for Diagnostic and Treatment Strategies**

Program Directors: Vance Lemmon (Miami Project), Fabrice Manns (Biomedical Engineering)

This program in cellular and molecular imaging strategies is focused on the development of novel strategies to utilize state-of-the-art optic laser imaging approaches to access nerve tissue to guide diagnostic strategies as well as test novel therapeutic interventions. Strategies for imaging



damage circuits or cell populations are major components of these investigations. Also, intraoperative image guided surgical procedures is also an area for collaboration.

### **Human Motor and Sensory Control**

Program Directors: Monica Perez (Neurological Surgery), Vittorio Porciatti (Ophthalmology)

The program in human motor sensory control brings together neuroscientists, computational scientists, and biomedical engineers interested in developing novel strategies for controlling voluntary movements in normal subjects as well as individuals following brain and SCI. Baseline studies are required in able bodied subjects to identify and monitor brain circuit activities functionally associated with specific functions. This is complemented by computational neural modeling of normal sensory and motor activity, and alterations that result in disease states. Also, new strategies for the neuromodulation or electrical stimulation of specific circuits, axons and terminal fields are being evaluated to potentially enhance function. Electrophysiological recordings and stimulation approaches are coordinated with functional measures of motor recovery including walking and arm functions. Active collaborations are combining stimulation approaches with novel assessment tools to quantitatively access the beneficial effects of neurorehabilitation.

### **Brain / Machine Interface Work for Restoring Function**

Program Directors: Jonathan Jagid (Neurological Surgery), Abhishek Prasad (Biomedical Engineering)

The brain/machine interface work program will bring together biomedical engineering expertise with medical researchers interested in developing better ways to improving functions in people living with various types of brain or SCI. Brain controlled functional electrical systems for brain injured subjects are needed to enhance upper limb function. The long-term goal is help enable damaged circuits or new brain circuits to function and promote recovery. These types of studies can be conducted in various animal models to provide preclinical data for patients to control movements and enhance circuit neuroplasticity.

### **Human Brain Imaging of Cognitive/Emotional Processes and Disorders**

Program Directors: Jennifer Britton (Psychology), Pradip Pattany (Radiology)

The human functional brain imaging program will bring together faculty from Psychology, Radiology, Neurology, Neurological Surgery, Psychiatry, Computer Science, and Engineering to study the neurobiological substrates of cognitive processes (memory, attention, perception, language, executive processes) and emotion, as well as disorders of these functions (e.g., autism, depression, anxiety disorders, cognitive impairment). The program will also integrate approaches from computational neuroscience, machine learning and engineering to develop models of the cognitive processes, enhance functionality, and explore ways to improve brain imaging methodology by developing acquisition (e.g., real-time imaging, enhanced image resolution), multi-modal processing methodology, and analysis tools (e.g., signal processing, network analysis).

## **INEM INSTITUTE RESOURCES**

Institute resources are led by IEM Co-Directors and are defined as resources that support the Programs and are available to the University research community.

### **Neural Engineering Facility**

The Neural Engineering Institute will have a need for particular core facilities or specified facility to conduct work. Each shared resource will work closely with the Office of Research Administration on cost structure for internal and external use of facilities.

### **Machining and Electrical/Electronic Workshop**

Director: Jorge Bohorquez (Biomedical Engineering)

This shared resource provides capabilities to design and build projects in the Biomedical Engineering field, including the development of new biomedical engineering tools and prototypes.

### **3D Printing**

Director: Ramon Montero (Biomedical Engineering)

This shared resource provides rendering and 3D printing capabilities, utilizing various materials.

### **Electrode/Probe Manufacturing**

Director: Abhishek Prasad (Biomedical Engineering)

This resource provides manufacturing capabilities toward measurements of neuronal signals.

### **Imaging and Robotics**

Director: Weizhao Zhao (Biomedical Engineering), Monica Perez (Miami Project)

This facility provides imaging directed robotic devices for use in neural operations and robotics-supported rehabilitation.

### **Cell processing**

Director: Anthony Izquierdo (Interdisciplinary Stem Cell Institute)

The Cellular Manufacturing Program provides a cell production facility, a development laboratory and a preclinical laboratory and offers long term cell culture, preclinical development and procedures and production of cellular products for animal studies.

### **Micro-Imaging**

Director: Ed Dauer (Biomedical Engineering), Noel Ziebarth (Biomedical Engineering)

The Scanning Electron Microscopy and surface imaging (AFM) provide surface topography images relevant to many neuroscience projects.

### **MRI Facility**

Director: Jennifer Britton (Psychology)

The MRI facility contains a General Electric 3.0T scanner with 32-channel head coil and psychophysiological recording system.

## **Zebrafish Facility**

Director: Julia Dallman (Biology)

The University of Miami zebrafish facility is the largest of its kind in Florida and supports the generation and study of zebrafish models of inherited nervous system disorders in humans. The facility has helped to generate models of autism spectrum disorders, optic atrophy, retinitis pigmentosa and deafness. As such zebrafish provide a valuable first pass for understanding the underlying biology and therapeutic value of a particular intervention.

## **Educational Resources**

The educational component of the INEM will provide an exciting resource to help train the next generation of scientists, engineers, and physicians in the area of Neural Engineering. INEM will provide much needed infrastructure for existing programs, as well as the development of unique programs that address high in-demand jobs, thereby providing an essential platform for the improvement of workforce development in the region, nationally and globally.

Specific programs that will play a central leading role in the educational mission of INEM include: a Neuroscience graduate program, a Neuroscience undergraduate program, undergraduate and graduate programs in Biomedical Engineering, MD/PhD program, Physical Therapy PhD program and a new Master's program in Biomedical Engineering and Neuroscience.

- The Neuroscience program at the University of Miami is currently one of the leading graduate programs at the University. This established program trains students in the areas of basic and translational and clinical neuroscience. The INEM will therefore provide a focus for the recruitment of students, specifically interested in combining Neuroscience with the Biomedical Engineering fields, addressing the growing student interest, as well as job demands in this area.
- The undergraduate Neuroscience program at the University of Miami is one of the largest undergraduate programs at the University. Currently, these students take a course curriculum for a bachelor's degree in the neurosciences. The INEM will complement the current curriculum and establish a new program that will allow neuroscience undergraduates to receive their BS degree in neuroscience and a Master's degree in Biomedical Engineering (BS-NEU/MS-BME) in a total of 5 years. For this five year accelerated program (BS+MS, neuroscience/biomedical engineering), students will apply in their junior year for the Master's degree, complete pre-requisite engineering courses in their junior and senior years, and have the opportunity to complete up to 6 credits of BME graduate courses per semester in their senior year.
- To complement the accelerated BS-NEU/MS-BME program, the Department of Biomedical Engineering will create a new MS concentration in Neural Engineering with two sub-concentrations: Neural tissue engineering and Neural Instrumentation. By bringing together students with different undergraduate backgrounds, this new MS track will provide a unique cross-disciplinary training environment.

- The University of Miami has approved the addition of Biomedical Engineering as a degree-granting program of the MD/PhD program, by which MD/PhD students can now train in the area of Neural Engineering. The INEM will provide an infrastructure to help those students be adequately trained and to compete in the neural engineering field as they also train to be clinical scientists. The medical school has been actively involved with training PhDs in the Department of Physical Therapy housed on the Coral Gables campus. The new INEM will promote cross-disciplinary programs with Physical Therapy and Neural Engineering. Because these Physical Therapy PhD students require contact with patients, the INEM will present an important conduit on the Medical School, facilitating student interactions with patients.
- In addition to these programs, the INEM will promote the organization and submission of new training grant applications to support the training and mentoring of future scientist/clinicians in neural engineering. Currently, we have faculty mentors scattered throughout the University that would contribute to this program. The new INEM will allow a critical mass of individuals working together to establish competitive fellowship proposals to both NIH and NSF.
- The educational programs associated with INEM will emphasize innovation and entrepreneurship through the immersion of students in device-oriented research projects and collaborations with industry.
- There is a growth of Biotech companies within South Florida. INEM will provide opportunities for professional development of company investigators who will have the opportunity to obtain terminal degrees or take special courses at the University. These degrees and course work will be associated with the new INEM.

### **Space:**

The research and educational activities of the INEM require a well-equipped facility, with offices and administrative spaces for faculty staff and students. The Institute will have space designated on the Miller School and Coral Gables campuses to promote collaborations with investigators focusing on neural disorders. A proposed location of the new Institute on the Medical Campus is felt to be optimal because of the potential interactions with established Research Centers and Institutes directed to the neurological disorders are located this campus. Also, the completion of the new Christian E. Lynn Rehabilitation Hospital will provide an excellent opportunity to translate new technologies to various patient populations. Potential locations for the Multidisciplinary Neural Engineering Institute are being developed. Appropriate administrative, educational and research space in the Lois Pope Life Center will become available when specific Miami Project activities are relocated to the new Rehabilitation Hospital. This facility already houses several neuroscience investigators that are conducting collaborative studies with the Department of Biomedical Engineering. The Lois Pope Life Center is also a convenient location within the medical center complex for collaborative work with the other Departments and Centers interested in the establishment of this new Institute. The Life Science Technology Park adjacent to the Medical Center offers research and office space that could also accommodate the new Institute.

The newly constructed Neuroscience Annex on the Coral Gables campus will serve as a nexus for functional brain imaging research for the Institute. This building is in close proximity to the Engineering Building and Department of Computer Science.

## **FUNDING SOURCES, BUSINESS PLAN**

The INEM is developing a sustainable financial plan to maintain the day-to-day activities of the program. It is proposed that funds from the University of Miami along with support from key departments and centers will help with maintaining the critical support for equipment and infrastructure needs. Available funding from Principal Investigator Federal grants and indirect costs can also be negotiated on an individual basis based on Institute utilization. In addition, potential funding streams through collaborative research grant applications between neuroscience and engineering groups to the Medical Research Office (SAC), the Clinical and Translational Science Institute (CTSI), or the Provost's Award Program are envisioned. In addition to cost share and commitments from the Office of the Provost, the Deans of the Miller School of Medicine and College of Engineering could also provide support for this new Institute. Industry and Philanthropy will be targeted as a major source of funding for this new Institute. There are currently individuals that are dedicated to promoting a neural engineering program at the University of Miami that may be recruited for such a gift or help with fund raising. Also, Industry partners already working with University faculty can be considered potential partners in the establishment and maintenance of this exciting program.

We also propose the future recruitment of new faculty members to the University with special interests in being associated with the INEM. For these situations, a special partnering arrangement between the Department of Biomedical Engineering and a Clinical Department will be established. This arrangement will allow the creation of competitive recruitment packages and a business plan that is shared by the individual departments that are most interested in faculty recruitment.

Projected costs for the institute are as follows:

The administrative cost of the INEM should be relatively minimal during the initial phase of the program.

- We will require 5-10% percent effort for the Co-Directors.
- Full time support of a Senior Administrator to run the program.
- An Educational Administrator will also be recruited to organize and successfully run the important educational components.
- We will establish a IEM core facility where the most expensive and commonly used equipment will be housed. Some percent effort for a Core Administrator to oversee and help train students utilizing the state-of-the-art equipment will also be required.
- The institute will conduct an annual presentation of the Institute's progress and will submit a summary of the budget for review by Institute members with at least one representative.

### **Budget information redacted**

Specifically, the business plan for the INEM is composed of various initiatives that include, but are not limited to:

- The Co-Directors will negotiate with the Deans of the Medical School and School of Engineering to provide support for the INEM through tuition income from different educational programs.
- The Master's program in Biomedical Engineering and Neuroscience will recruit a large number of new students, specifically for the proposed the five year combined BS/MS degree program.
- Student enrollment in other established programs or those taking specific courses can provide tuition moneys that can support the INEM.
- Negotiation with appropriate University officials for indirect cost sharing of federal grants associated with the INEM faculty will also be conducted on a case-by-case basis according to University policy of IDC sharing. We expect that these indirect cost could also compliment the other sources of funding for the INEM.
- Philanthropy is an important source of funding at the University of Miami. Funds resulting from fundraising efforts will therefore be a component of the business plan of help support the INEM mission. Currently, the University has many successful fundraising programs that emphasize our ability to interest the community in medical and engineering research.
- We are identifying several individuals with the help of the University Advancement who may be interested in helping to financially support INEM. A donor naming the INEM is a strong possibility that will be actively pursued.

Grant submissions will be administered by the PI's home academic department with indirect cost (IDC) returns distributed across departments/institutes by UMMSM guidelines. This strategy is currently working for many of our currently funded multi-disciplinary programs at the Medical Center. However, since this Institute will be a cross-campus program, only the

medical school IDC portion could be distributed according to those guidelines. Dr. Bixby's office has recently proposed guidelines for cross-campus collaborations, which is based on NIH definitions of F&A. Cross-campus collaborations will follow the recommendations outlined in these guidelines.

Together with facilities planning, we have identified available space on the 8<sup>th</sup> floor of the RMSB that can serve for the Core laboratory with several small rooms for faculty offices. Also, teaching rooms are available in that building that can be routinely scheduled for these purposes.

To start off with, the proposed space will be equipped by equipment currently in other laboratories at the Coral Gables or Medical campuses. The Department of Biomedical Engineering will provide core equipment that can be used for teaching students and other basic activities. Also, Dr. Michael Hoffer will be providing additional equipment for the Core at no cost that he has obtained from a collaborating laboratory that will help with the translational studies.

### **PROJECTION OF ACTIVITIES (First Year)**

- 1) Organize a Neural Engineering Symposium
- 2) Initiate Neural Engineering Institute Seminar Series
- 3) Organize Core Laboratory Space and Equipment
- 4) Start Competitive Multidisciplinary Grant Funding Program using SAC administrative/review infrastructure
- 5) Start teaching selective Biomedical Engineering courses on Medical campus
- 6) Submit New T32 Training Grant
- 7) Submit new NSF and NIH grant applications

### **Appendix A.**

#### **Table 1. Top ten NIH/NSF funded medical schools in the country with Neural Engineering Institutes**

1. UC, San Francisco
3. University of Washington
4. University of Pittsburgh/Carnegie Mellon
5. UC, San Diego
6. Duke University

7. UC, Los Angeles
8. Columbia University
9. Emory University/Georgia Tech
10. New York University



## **Appendix B. Biographical information**

### **Institute Directors:**

**Proposed University of Miami Neural Engineering Institute Co-Director:** The proposed Institute Co-Director is Dr. Dalton Dietrich. Dr. Dietrich is the Scientific Director of The Miami Project to Cure Paralysis, and the Senior Associate Dean for Discovery Science. He is also Professor of Neurological Surgery, Neurology and Cell Biology at the Miller School of Medicine.

**Proposed University of Miami Neural Engineering Institute Co-Director:** The proposed Institute Co-Director is Dr. Ozcan Ozdamar. Dr. Ozdamar is the Professor and Chair of the Department of Biomedical Engineering in the College of Engineering.

### **Program Directors:**

**Program Directors for Biomedical Engineering Strategies for Trauma and Neuroprotection:** The proposed Program Directors for the Program are Dr. Michael Hoffer, Professor of Otolaryngology, and Dr. Suhred Rajguru, Assistant Professor in Biomedical Engineering.

**Program Directors for Tissue Engineering Strategies for Neurorepair:** The proposed Program Directors for the Program are Dr. Martin Oudega, Research Associate Professor in Neurological Surgery, and Dr. Ashutosh Agarwal, Assistant Professor in Biomedical Engineering.

**Program Directors for Neuro-Imaging for Diagnostic and Treatment Strategies:** The proposed Program Directors for the Program are Dr. Vance Lemmon, Professor in The Miami Project to Cure Paralysis, and Dr. Fabrice Manns, Associate Professor in Biomedical Engineering.

**Program Directors for Human Motor and Sensory Control:** The proposed Program Directors for the Program are Dr. Monica Perez, Associate Professor in Neurological Surgery, and Dr. Vittorio Porciatti, Professor of Ophthalmology.

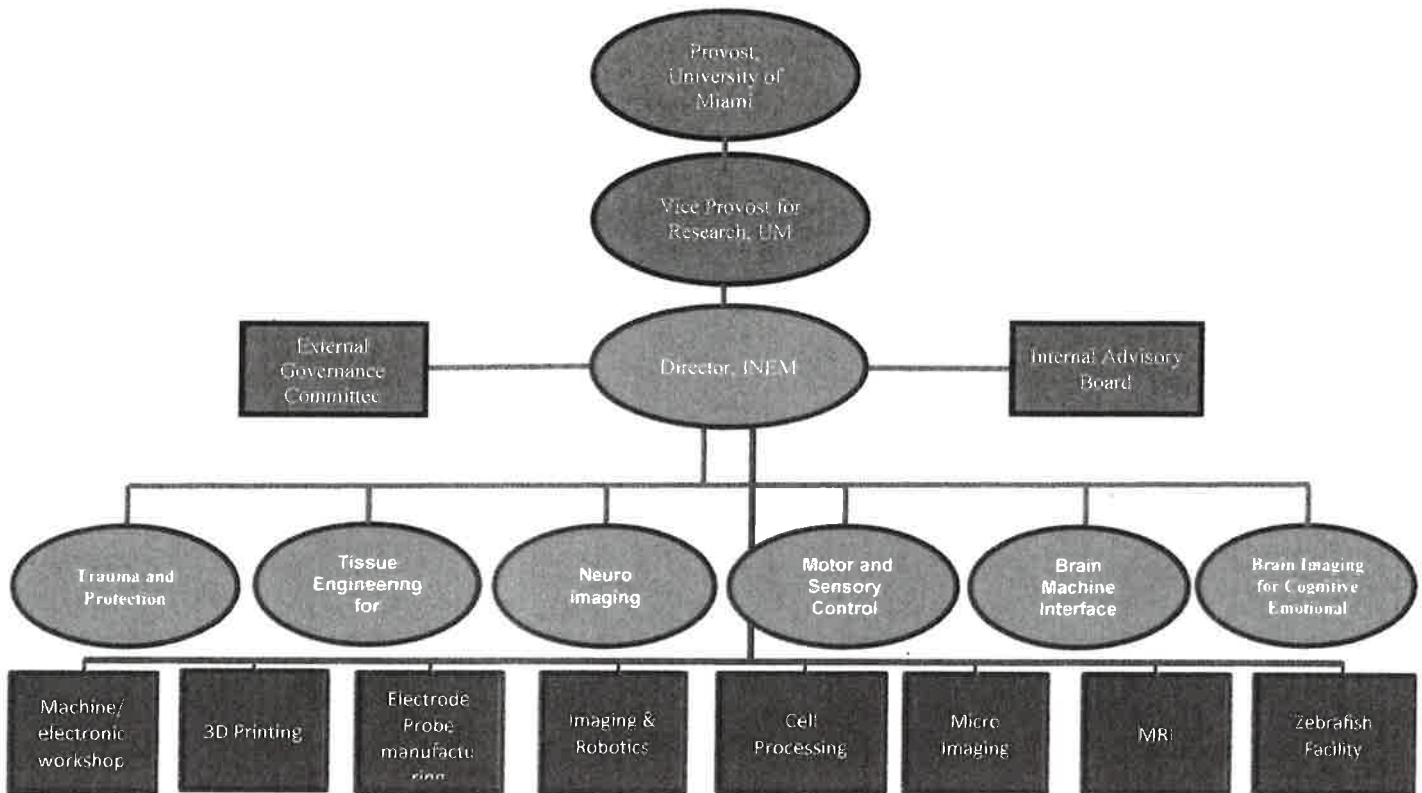
**Program Directors for Brain/Machine, Interface Work for Restoring Function:** The proposed Program Director for the Program is Dr. Abhishek Prasad, Assistant Professor in Biomedical Engineering.

### **Program Directors for Human Functional Brain Imaging of Cognitive/Emotional Processes and Disorders:**

The proposed Program Directors for the Program is Dr. Jennifer Britton, Assistant Professor in Psychology and Director of the fMRI Facility, and Dr. Pradip Pattany, Research Associate Professor in Radiology.

# Administrative Structure

## Appendix C. Tentative organizational Chart for the Neural Engineering Institute



**Appendix D:**

**Neural Engineering Institute Members: Multidisciplinary Participation**

Agarwal, Ashutosh	Biomedical Engineering/Pathology
Andreopoulos, Fotios	Biomedical Engineering/Surgery
Barrientos, Anthony	Neurology
Bhattacharya, Sanjoy	Ophthalmology
Bixby, John	Pharmacology/Miami Project
Bohorquez, Jorge	Biomedical Engineering
Britton, Jennifer	Psychology
Brothers, Shaun	Therapeutic Discovery
Bullock, Ross	Neurological Surgery/Miami Project
Bunge, Mary Bartlett	Cell Biology/Miami Project
Caicedo, Alejandro	Diabetes Research Institute
Cardenas, Diana	Rehabilitation Medicine/Miami Project
Cheung, Herman	Biomedical Engineering
Chiba, Akira	Biology
Cowan, Rachel	Neurological Surgery
Dallman, Julia	Biology
Dalton, Dietrich	Neurological Surgery/Neurology/Miami Project
Dauer, Edward	Biomedical Engineering
De Rivero Vaccari, Juan Pablo	Physiology & Biophysics/Miami Project
Flores, Abigail	Pediatrics
Gosh, Mousumi	Neurological Surgery/Miami Project
Green, Barth	Neurological Surgery/Miami Project
Guest, James	Neurological Surgery/Miami Project
Heller, Aaron	Psychology
Hentall, Ian	Neurological Surgery/Miami Project
Hoffer, Michael	Otolaryngology/Neurological Surgery
Hotz, Gillian	Neurological Surgery/Miami Project
Huang, Charles	Biomedical Engineering
Jackson, Alicia	Biomedical Engineering
Jagid, Jonathan	Neurological Surgery/Miami Project
Jha, Amishi	Psychology
Johnson, Neil	Physics
Kaplan, Lee	Sports Medicine
Keane, Robert	Physiology & Biophysics
Kirk-Sanchez, Neva	Physical Therapy
Lee, Jae	Neurological Surgery/Miami Project
Lemmon, Vance	Neurological Surgery/Miami Project
Levi, Allan	Neurological Surgery/Miami Project
Levin, Bonnie	Neurology
Losin, Liz	Psychology
Luca, Corneliu	Neurology
Manns, Fabrice	Biomedical Engineering/Ophthalmology
McCabe, Phil	Psychology
McIntosh, Roger	Psychology

Messinger, Daniel	Psychology
Monje, Paula	Neurological Surgery/Miami Project
Moraes, Carlos	Neurology
Nash, Mark	Neurological Surgery/Rehabilitation Medicine/Miami Project
Nemeroff, Charles	Psychiatry & Behavioral Medicine
Noga, Brian	Neurological Surgery/Miami Project
Oudega, Martin	Neurological Surgery/Miami Project
Ozdamar, Ozcan	Biomedical Engineering/Ophthalmology
Park, Kevin	Miami Project
Pattany, Pradip	Psychology
Pearse, Damien	Neurological Surgery/Miami Project
Pelaez, Daniel	Ophthalmology
Perez, Monica	Neurological Surgery/Miami Project
Perez-Pinzon, Miguel	Neurology
Porciatti, Vittorio	Ophthalmology
Prasad, Abhishek	Biomedical Engineering
Rajguru, Suhrud	Biomedical Engineering/Otolaryngology
Sacco, Ralph	Neurology
Salas, Nelson	Biomedical Engineering
Sanchez, Justin	Biomedical Engineering
Santamaria, Andrea	Neurological Surgery/Miami Project
Sarkar, Dilip	Computer Science
Schwartz, Odelia	Computer Science
Skromne, Isaac	Biology
Song, Chaoming	Physics
Telischi, Fred	Otolaryngology
Thomas, Christine	Neurological Surgery/Miami Project
Tomei, Alice	Biomedical Engineering
Tse, David	Ophthalmology
Tsoulfas, Pantelis	Cell Biology/Miami Project
Uddin, Lucina	Psychology
Wahlestedt, Claes	Therapeutic Discovery
Widerstrom-Noga, Eva	Neurological Surgery/Miami Project
Ziebarth, Noel	Biomedical Engineering
Zhao, Weizhao	Biomedical Engineering

**Year 1**

	Quantity	Hours(per week)	% effort	Total
<b>1. Salaries &amp; Benefits</b>				
1a. Director	2	4	10	\$52,000.00
1b. Administrative Assistant	1	40	100	\$42,000.00
<b>Total Salaries &amp; Benefits</b>				<b>\$94,000.00</b>
<b>2. Physical Space</b>				
2a. Rosential Medical Science Building (8th Floor )	1,000 sqt	(39.75/sqt)		\$39,750.00
<b>Total Space</b>				<b>\$39,750.00</b>
<b>3. Supplies</b>				
3a. Office Supplies (\$250 * 12 months)				\$3,000.00
3b. Training and event material				\$10,000.00
<b>Total Supplies</b>				<b>\$13,000.00</b>
<b>TOTAL COSTS (per year)</b>				<b>\$146,750.0</b>

While subsequent years, pending financial support, will include an educational administrator and core administrator, in years 1 and 2, the administrative assistant may assist in supporting these initiatives.

Physical space includes rent.

Pascal J. Goldschmidt, M.D.  
*Dean*  
*University of Miami Miller School of Medicine*

March 8, 2016

Dalton W. Dietrich, Ph.D.  
Scientific Director, Miami Project to Cure Paralysis  
Senior Associate Dean for Discovery Science  
Professor of Neurological Surgery, Neurology and Cell Biology

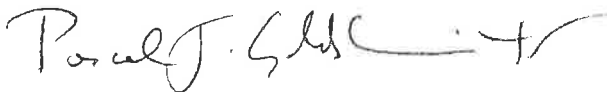
Ozcan Ozdamar, Ph.D.  
Chair, Department of Biomedical Engineering  
Professor for Otolaryngology, Pediatrics and Neuroscience

Dear Dalton and Ozcan,

I am writing to express my enthusiastic endorsement for the establishment of the Institute for Neural Engineering at the University of Miami (INEM). The Miller School of Medicine will commit \$125,000 in FY17 to support the establishment of the organizational structure of the institute. Subsequent support, to for instance, facilitate the recruitment of faculty who will engage in active research in the program areas of INEM, will be negotiable. I also want to emphasize that the development of a central neural engineering facility will provide much needed infrastructural resources and a unique opportunity to integrate Engineering into our biomedical research. The Miller School of Medicine is planning to provide physical space in the Life Science and Technology Park to provide such a unique interdisciplinary research space. This infrastructure is critical in positioning ourselves to provide the best healthcare of the future, creating patentable, innovative technologies along the way.

I strongly support the efforts that you and your colleagues have put into establishing the Institute for Neural Engineering at UM, and wish you all the best as you move forward.

With warmest regards,



Pascal J. Goldschmidt, M.D.  
Dean, Leonard M. Miller School of Medicine  
University of Miami

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

April 29, 2016

Ozcan Ozdamar, PhD.  
Chairman  
Professor of Biomedical Engineering,  
University of Miami

W. Dalton Dietrich, PhD  
Scientific Director, The Miami Project to Cure Paralysis  
Senior Associate Dean for Discovery Science  
Professor of Neurological Surgery, Neurology and Cell Biology  
University of Miami Miller School of Medicine

Dear Ozcan and Dalton,

Over the past several months I have followed closely the development of a proposal for a neural engineering center at the University of Miami. Faculty members from the Biomedical Engineering Department, the Miami Project to Cure Paralysis, and the Neurology Department have all worked diligently to garner support for a center that has the potential for University-wide collaborations and will allow for greater success in securing federal funding.

It is with great pleasure and enthusiasm that I write this letter to support the establishment of the Institute for Neural Engineering at the University of Miami (INEM). To aid in this endeavor, the College of Engineering pledges \$125,000 for the 2017 fiscal year.

This initiative will not only create a much needed centralized center for the diverse and integral field of neural engineering, it will also facilitate new and strengthen current partnerships within the University of Miami and our surrounding community. While the Department of Biomedical Engineering and the Miller Medical School of Medicine already have numerous fruitful collaborative efforts in place, I foresee INEM enabling many more relationships within our College and the rest of the university.

I strongly support and fully endorse the establishment of Institute for Neural Engineering at the University of Miami (INEM) and wish you all the best as this initiative comes into fruition.

Warm regards,

A handwritten signature in black ink, appearing to read 'JP Bardet'.  
Jean-Pierre Bardet

August 10, 2016

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 the Establishment of the Institute for Neural Engineering.

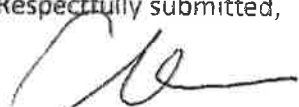
Dear Dr. Tomas Salerno,

This is to inform the Faculty Senate that the Medical School Faculty Council met on August 9<sup>th</sup>, 2016 to review the **Proposal for the Establishment of the Institute for Neural Engineering**.

Over the last several years, there has been a growing interest in strengthening existing productive collaborations between the neuroscience community at the University of Miami School of Medicine and the Department of Biomedical Engineering to facilitate the development of new clinical technologies for the assessment of neurological function and the treatment of neurological diseases.

The council members voted to *approve* the proposal.

Respectfully submitted,



Carl Schulman, M.D., M.S.P.H., Ph.D.

Speaker, Medical Faculty Council



**UNIVERSITY  
OF MIAMI**

Athula H. Wikramanayake, Ph.D.  
Professor and Chair  
Department of Biology  
215 Cox Science Center  
1301 Memorial Drive  
Coral Gables, Florida 33124-0421  
Ph. 305-284-3988  
athula@miami.edu

---

27 April, 2016

W. Dalton Dietrich III, Ph.D.  
Scientific Director, The Miami Project to Cure Paralysis  
Kinetic Concepts Distinguished Chair in Neurosurgery  
1095 NW 14th Terrace (R-48)  
Miami, FL 33136

Dear Dr. Dietrich,

I am writing this letter to express my support for the proposed Neural Engineering Institute. The Department of Biology is pleased to be a part of this initiative, and several of our faculty members will be engaged in Institute activities. In particular, several of our faculty are actively engaged in research collaborations with investigators from the Miller School of Medicine to provide expertise in using animal models to elucidate the molecular basis for human genetic diseases. Our faculty can provide expertise in this area as well as provide resources available in the Department of Biology such as the zebrafish facility. This facility run by Dr. Julia Dallman is the largest of its kind in Florida and has helped generate models of autism spectrum disorders, optic atrophy, retinitis pigmentosa and deafness. Investigators in the new Institute could potentially use the resources in the zebrafish facility to use a proven vertebrate animal model to understand the underlying biology and therapeutic value of a particular intervention.

We look forward to participating in this collaboration between Engineering, the Miller School of Medicine and the College of Arts and Sciences, bringing basic science/engineering concepts to clinical application. This is an exciting proposal and we are pleased to be a part of it. Please let me know if you need anything else from me.

Sincerely,

Athula Wikramanayake, Ph.D.  
Professor and Chair of Biology

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

[www.bascompalmer.org](http://www.bascompalmer.org)  
Phone: 305-326-6303  
Fax: 305-326-6308  
Email: [ealfonso@med.miami.edu](mailto:ealfonso@med.miami.edu)  
Please respond to: P.O. Box 016880, Miami, FL 33101-6880

April 15, 2016

Ozcan Ozdamar, PhD.  
Chairman  
Professor of Biomedical Engineering,  
University of Miami

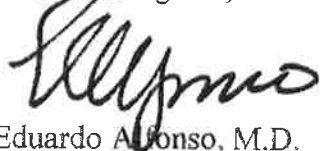
W. Dalton Dietrich, PhD  
Scientific Director, The Miami Project to Cure Paralysis  
Senior Associate Dean for Discovery Science  
Professor of Neurological Surgery, Neurology and Cell Biology  
University of Miami Miller School of Medicine

Dear Ozcan and Dalton,

I am pleased to write this letter of support for the creation of the Institute for Neural Engineering at the University of Miami. The establishment of this Institute is an important step in the evolution of our collaborative programs between the faculty and students in the School of Engineering and the Miller School of Medicine. I am enthusiastic about the opportunity to help promote multidisciplinary research collaborations between the Neuroscience, Clinical and Biomedical Engineering communities as well as enhance our educational programs in the area of neural engineering. I believe this new institute is extremely timely and will help our University successfully compete for new federal funding.

I am fully committed to the success of the Institute for Neural Engineering at the University of Miami and endorse its formal establishment.

With best regards,



Eduardo Alfonso, M.D.



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

March 23, 2016

W. Dalton Dietrich III, Ph.D.  
Scientific Director, The Miami Project to Cure Paralysis  
Kinetic Concepts Distinguished Chair in Neurosurgery  
Miller School of Medicine  
University of Miami

Dear Dalton,

I am writing to convey my support for the proposed Institute for Neural Engineering at the University of Miami (INEM). As you know we are fortunate to have an excellent group of neuroscientists in the College of Arts and Sciences. Housed in the NIH-funded Neuroscience Annex (attached to the Cox Science Building) and distributed over the Departments of Biology, Computer Science and Physics, this group of scientists includes recent additions to our faculty, as a result of a faculty cluster initiative intended to expand our research strengths on "Understanding the Brain." The proposed INEM will provide excellent opportunities for collaborations and inter-disciplinary research, which I am sure our faculty will be happy to seize.

We look forward to increasing interactions with faculty in the College of Engineering and the Miller School of Medicine.

Finally, I would like to thank you for an exciting proposal, in which we are certainly pleased to participate.

With my best regards,

A handwritten signature in black ink, appearing to read 'Leonidas Bachas'.

Leonidas Bachas  
Dean, College of Arts and Sciences  
University of Miami



**THE MIAMI PROJECT TO CURE PARALYSIS**  
AN INTERNATIONAL CENTER FOR SPINAL CORD INJURY RESEARCH

April 14, 2016

**Re: Institute for Neural Engineering at the University of Miami (INEM)**

Dear Colleagues,

For the past several years UM Faculty have initiated collaborative studies between the Medical Campus and the Department of Biomedical Engineering. These collaborations make use of innovative approaches and new technologies to promote protection and repair after brain and spinal cord injury. It is clear from my own experiences and national trends, that there are major advantages to combining biological treatments with emerging engineering approaches to enhance outcomes. Recent studies have reported that engineering is the new frontier for translational medicine and that NIH is steadily increasing funding for Biomedical Engineering in comparison with NIH funding as a whole. We now have a critical mass of interested Faculty across all campuses that want to take these programs to the next level to ask better scientific questions and help train the next generation of scientist in Neural Engineering. It is indeed important that the University of Miami concentrate efforts to compete for new Federal funding opportunities targeting research and training.

With the support of Deans Goldschmidt and Bardet, we have drafted a proposal for the new UM Institute currently entitled Institute for Neural Engineering at the University of Miami. Over the last months, Faculty from many departments and centers have been working in developing an exciting proposal that highlights the institutional strengths in research and teaching. As Scientific Director of the Miami Project and Associate Dean for Discovery Science, I enthusiastically support this University wide initiative. I have seen first-hand how clinicians and scientist from multiple campuses are already actively engaged in advancing innovative research questions and developing new technologies that are going to be extremely important as we continue to develop strategies for protecting and promoting functional recovery after CNS injury. I will therefore do all I can to help advance this new initiative and promote this new Institute.

If I can be of any additional help regarding this important topic feel free to contact me.

Sincerely,

W. Dalton Dietrich, PhD  
Professor Neurological Surgery and Neurology  
Scientific Director, The Miami Project  
Senior Associate Dean for Discovery Science

UNIVERSITY OF MIAMI  
MILLER SCHOOL  
of MEDICINE



**Lois Pope LIFE Center**  
Post Office Box 016960 (R-48) | Miami, Florida 33101  
Location: 1095 NW 14th Terrace | Miami, Florida 33136  
[www.themiamiproject.org](http://www.themiamiproject.org)



April 18, 2016

Ozcan Ozdamar, PhD.  
Chairman  
Professor of Biomedical Engineering,  
University of Miami

W. Dalton Dietrich, PhD  
Scientific Director, The Miami Project to Cure Paralysis  
Senior Associate Dean for Discovery Science  
Professor of Neurological Surgery, Neurology and Cell Biology  
University of Miami Miller School of Medicine

Dear Ozcan and Dalton,

I am delighted to write this letter in support of the creation of the Institute for Neural Engineering at the University of Miami.

The establishment of this Institute will augment and accelerate collaborative programs between faculty and students in the School of Engineering and the Miller School of Medicine. I am keen to support multidisciplinary research among the neuroscience, clinical and biomedical engineering communities, and to enhance our educational programs in neural engineering.

I am particularly excited about the new Institute's potential to collaborate with our Institute for Bioethics and Health Policy, especially given our track record in ethics and biomedical informatics. Moreover, the rapidly evolving field of neuroethics could be an additional and rich source of research, clinical and policy insights, not to mention funding opportunities. Indeed, I have no doubt that this extraordinarily timely new Institute will help our University successfully compete for additional federal and other funding.

I am completely committed to the success of the Institute for Neural Engineering at the University of Miami and endorse its formal establishment. I look forward to its success, and the opportunities that such success will afford our further collaborations. Please let me know how I can be of service.

With my best regards,

A handwritten signature in black ink, appearing to read 'Ken Goodman'.

Kenneth W. Goodman, Ph.D., FACMI  
Professor of Medicine and Philosophy  
Director, Institute for Bioethics and Health Policy

UNIVERSITY  
OF MIAMI



**Khemraj Hirani**, PhD, RAC, RPh, CPh, CCRP, CIP, MBA  
Associate Vice Provost of Human Subject Research  
Human Subject Research Office  
1400 NW 10<sup>th</sup> Avenue, 12<sup>th</sup> Floor (M809), Miami, FL 33136  
Ph.: 305-243-3195; Fax: 305-243-3328  
Email [KHirani@med.miami.edu](mailto:KHirani@med.miami.edu)  
Website: [www.hsro.miami.edu](http://www.hsro.miami.edu)

June 9, 2016

Ozcan Ozdamar, PhD  
Chairman  
Professor of Biomedical Engineering  
University of Miami

W. Dalton Dietrich, PhD  
Scientific Director, The Miami Project to Cure Paralysis  
Senior Associate Dean for Discovery Science  
Professor of Neurological Surgery, Neurology and Cell Biology  
University of Miami Miller School of Medicine

Dear Ozcan and Dalton,


I am delighted to write this letter in support of the creation of the Institute for Neural Engineering at the University of Miami (INEM).

On behalf of the Human Subject Research Office (HSRO), I can speak to the University's dedication to innovation and interdisciplinary collaboration to promote and enhance both academic research and clinical care. I am particularly excited about the new institute's potential to collaborate and utilize our Institutional Review Boards with regard to the unique human subject's matters that may arise from the integration of biomedical engineering and medicine; including but not limited to privacy, informed consent, and the need to ensure that technologies and techniques are designed in a manner consistent with and supportive of ethical principles for medical research and practice.

In conclusion, I fully support your efforts as you seek to create a program designed to integrate basic sciences, clinical application and development of new technologies across disciplines.

Please let me know if I can be of further help in this novel and exciting endeavor.

With best regards,

  
Khemraj Hirani

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

[www.bascompalmer.org](http://www.bascompalmer.org)  
Phone 800-329-7000

April 14, 2016

Ozcan Ozdamar, PhD.  
Chairman  
Professor of Biomedical Engineering,  
University of Miami

W. Dalton Dietrich, PhD  
Scientific Director, The Miami Project to Cure Paralysis  
Senior Associate Dean for Discovery Science  
Professor of Neurological Surgery, Neurology and Cell Biology  
University of Miami Miller School of Medicine

Dear Ozcan and Dalton,

I am pleased to write this letter of support for the creation of the Institute for Neural Engineering at the University of Miami. The establishment of this Institute is an important step in the evolution of our collaborative programs between the faculty and students in the School of Engineering and the Miller School of Medicine. I am enthusiastic about the opportunity to help promote multidisciplinary research collaborations between the Neuroscience, Clinical and Biomedical Engineering communities as well as enhance our educational programs in the area of neural engineering. I believe this new institute is extremely timely and will help our University successfully compete for new federal funding.

I am fully committed to the success of the Institute for Neural Engineering at the University of Miami and endorse its formal establishment.

With best regards,



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



UNIVERSITY OF MIAMI  
MILLER SCHOOL  
of MEDICINE

Chairman  
Allan D. Levi, M.D., Ph.D.

Co-Chair  
Jacques J. Morcos, M.D.

**Neurosurgery Faculty**  
Ronald Benveniste, M.D. Ph.D.  
Sanjiv Bhatia, M.D.  
M. Ross Bullock, M.D., Ph.D.  
Ian Côté, M.D.  
Samy A. Elhamady, M.D.  
Barth A. Green, M.D.  
Roberto C. Heros, M.D.  
Michael Ivan, M.D.  
Jonathan R. Jagid, M.D.  
Sarah C. Jennigan, M.D.  
Ricardo J. Komotar, M.D.  
Howard J. Landry, M.D.  
Howard B. Levine, M.D., Ph.D.  
Glen Manzano, M.D.  
Glenn Morrison, M.D.  
Toba Niazi, M.D.  
Eric C. Peterson, M.D.  
John Ragheb, M.D.  
Luis Romero, M.D.  
Steven Vanni, D.O., D.C.  
Michael Y. Wang, M.D.

Scientific Director  
W. Dalton Dietrich, Ph.D.

**Research Faculty**  
Kim D. Anderson, Ph.D.  
Coleen M. Atkins, Ph.D.  
John L. Bixby, Ph.D.  
Nancy L. Bracklett, Ph.D.  
Roberta Brambilla, Ph.D.  
Helen M. Bramlett, Ph.D.  
Mary B. Bunge, Ph.D.  
Rachel Cowan, Ph.D.  
Mousumi Ghosh, Ph.D.  
James D. Guest, M.D., Ph.D.  
Ian Hentall, Ph.D.  
Gillian A. Hotz, Ph.D.  
Robert W. Keane, Ph.D.  
Jae Lee, Ph.D.  
Vance Lemmon, Ph.D.  
Daniel Liebl, Ph.D.  
Paula Monje, Ph.D.  
Mark Nash, Ph.D.  
Brian Noga, Ph.D.  
Martin Oudega, Ph.D.  
JP de Rivero Vaccari, Ph.D.  
Cyung Park, Ph.D.  
Damien Pearce, Ph.D.  
Monica Perez, PT, Ph.D.  
Jacqueline Sagen, Ph.D.  
Thomas J. Sick, Ph.D.  
Christine K. Thomas, Ph.D.  
Pantelis Tsoufas, M.D.  
Iva W-Noga, D.D.S., Ph.D.  
Patrick M. Wood, Ph.D.

April 28, 2016

Ozcan Ozdamar, PhD.  
Chairman  
Professor of Biomedical Engineering,  
University of Miami

W. Dalton Dietrich, PhD  
Scientific Director, The Miami Project to Cure Paralysis  
Senior Associate Dean for Discovery Science  
Professor of Neurological Surgery, Neurology and Cell Biology  
University of Miami Miller School of Medicine

Dear Ozcan and Dalton,

I am pleased to write this letter of support for the creation of the Institute for Neural Engineering at the University of Miami. The establishment of this Institute is an important step in the evolution of our collaborative programs between the faculty and students in our various UM Schools including Engineering, Arts and Sciences and the Miller School of Medicine. I am enthusiastic about the opportunity to help promote multidisciplinary research collaborations between the Neuroscience, Clinical and Engineering communities as well as enhance our educational programs in the area of neural engineering. I believe this new institute is extremely timely and will help our University successfully compete for new federal funding.

I am fully committed to the success of the Institute for Neural Engineering at the University of Miami and endorse its formal establishment. I whole-heartedly commit the resources within neurosurgery to this important endeavor.

Sincerely yours,

Allan D. Levi MD, PhD, FACS  
Professor and Chairman of Neurosurgery  
University of Miami MILLER School of Medicine  
Chief of Neurosurgery  
Jackson Memorial Hospital  
Robert M. Buck Distinguished Chair  
in Neurological Surgery

Department of Neurological Surgery





UNIVERSITY OF MIAMI  
MILLER SCHOOL  
of MEDICINE

April 19<sup>th</sup>, 2016

**Ozcan Ozdamar, PhD.**

Chairman,  
Professor of Biomedical Engineering  
University of Miami

**W. Dalton Dietrich, PhD**

Scientific Director, The Miami Project to Cure Paralysis  
Senior Associate Dean for Discovery Science  
Professor of Neurological Surgery, Neurology and Cell Biology  
University of Miami Miller School of Medicine

Dear Ozcan and Dalton,

It is with great pleasure that I write this letter of support and commitment for the establishment of the Institute for Neural Engineering at the University of Miami (INEM). The creation of this new Institute represents a cutting-edge next step in the natural progression of our ongoing productive multi-disciplinary collaboration between our programs involving faculty and students in the School of Engineering and the Miller School of Medicine.

As you know, we are committed to supporting a further expansion of ongoing multidisciplinary translational research opportunities between our Departments in the areas of Neuroscience and Biomedical Engineering communities and clinically relevant goals (*e.g., anesthetic action; monitors of consciousness; alarm fatigue and misinterpretation; pain; neural engineering related to anesthetic toxicity and anesthetic actions*); as well as to enhance our joint educational programs to develop the next generation of biomedical engineers ready to address the challenges of neural engineering in the age of precision medicine (*e.g., neural regeneration; neural monitoring; neural reprogramming; etc.*). I believe this new institute is extremely timely and will help our University successfully compete for new federal funding and stay at the cutting-edge of medicine and technology.

I am fully committed to the success of this new Institute for Neural Engineering at the University of Miami and endorse its formal establishment.

With best regards,

A handwritten signature in dark ink, appearing to read 'DLubarsky'.

**David Lubarsky, M.D., MBA**

Emmanuel M. Papper Professor and Chair  
Department of Anesthesiology  
Perioperative Medicine & Pain Management  
University of Miami Leonard M. Miller School of Medicine

UNIVERSITY OF MIAMI  
COLLEGE of ENGINEERING



Biomedical Engineering Department  
P.O. Box 248294  
Coral Gables, FL 33124-0621

Ph: 305-284-2445  
Fax: 305-284-6494  
www.miami.edu/bme

April 29, 2016

Dear colleagues,

Faculty of the Biomedical Engineering Department has been engaged in collaborative research with the faculty on the Miller Medical campus for the past several years. Since brain and neural control is central to the workings of the body, most of these collaborations involved various bioengineering applications of the peripheral (sensory and motor) and central (brain and spinal cord) neural activity. Recent advances in all fronts of engineering and bioscience made this collaboration very effective thus opening new health care developments and innovations previously unheard of. These activities have made many faculty in biomedical engineering, clinical and medical sciences at the forefront of translational medicine. With the strength of the interdisciplinary approach empowering increased federal support, we now would like to organize and formalize our efforts to establish an Institute for Neural Engineering at the University of Miami (INEM). This initiative will concentrate efforts for federal funding for research, training and education in all aspects of neuro-engineering.

With the support of Deans Bardet and Goldschmidt and several department heads involved in neurosciences, we have drafted a proposal for the establishment of INEM. In the past several months, many faculty and committees in many disciplines have shared their thoughts and provided support and vision to this proposal. As a faculty member and chair of the Biomedical Engineering Department with more than 30 years of experience on both campuses, interacting with many researchers, scientists, engineers and physicians involved in neural disciplines, I fully and enthusiastically support this university-wide initiative. Along with my colleague Dr. Dietrich, I am ready to provide support and advance this collaborative initiative in our university. I am writing to express my fullest dedication and most enthusiastic support of the Institute for Neural Engineering at the University of Miami (INEM). I truly believe that it will enrich science, medical, and engineering programs at the University of Miami.

Sincerely,

Ozcan Ozdamar, Ph.D.  
Professor and Chair, Department of Biomedical Engineering  
Professor, Otolaryngology, Pediatrics and Neuroscience

UNIVERSITY OF MIAMI  
MILLER SCHOOL  
of MEDICINE



**Robert M. Quencer, M.D.**  
Chairman, Department of Radiology  
The Robert Shapiro, M.D. Professor of Radiology

P.O. Box 016960 (M-828) Phone: 305 243 4701  
Miami, FL 33101 Fax: 305.243.7635  
Professional Arts Center  
1150 NW 14th Street, Suite #511  
Miami, FL 33136-2116

April 14, 2016

Ozcan Ozdamar, PhD.  
Chairman  
Professor of Biomedical Engineering,  
University of Miami

W. Dalton Dietrich, PhD  
Scientific Director, The Miami Project to Cure Paralysis  
Senior Associate Dean for Discovery Science  
Professor of Neurological Surgery, Neurology and Cell Biology  
University of Miami Miller School of Medicine

Dear Ozcan and Dalton,

I am pleased to write this letter of support for the creation of the Institute for Neural Engineering at the University of Miami. The establishment of this Institute is an important step in the evolution of our collaborative programs between the faculty and students in the School of Engineering and the Miller School of Medicine. I am enthusiastic about the opportunity to help promote multidisciplinary research collaborations between the Neuroscience, Clinical and Biomedical Engineering communities as well as enhance our educational programs in the area of neural engineering. This initiative is particularly germane to the neuroimaging since many of the recent advances and anticipated advances involve both hardware and software implementations in MR, CT and Ultrasound. I believe this new institute is extremely timely and will help our University successfully compete for new federal funding.

I am fully committed to the success of the Institute for Neural Engineering at the University of Miami and endorse its formal establishment.

With best regards,

A handwritten signature in black ink, appearing to read 'R. Quencer'.

Robert M. Quencer, M.D.  
Chairman, Department of Radiology  
The Robert Shapiro, M.D. Professor of Radiology



UNIVERSITY OF MIAMI

April 20, 2016

Ozcan Ozdamar, PhD.  
Chairman  
Professor of Biomedical Engineering,  
University of Miami

W. Dalton Dietrich, PhD  
Scientific Director, The Miami Project to Cure Paralysis  
Senior Associate Dean for Discovery Science  
Professor of Neurological Surgery, Neurology and Cell Biology  
University of Miami Miller School of Medicine

Dear Ozcan and Dalton,

I am pleased to write this letter to express my enthusiastic support for the creation of the Institute for Neural Engineering at the University of Miami. The establishment of this Institute will be critically important for the evolution of our trans-disciplinary collaborative programs between faculty and students of our UM Schools, including Engineering, Arts and Sciences and the Miller School of Medicine. We have very exciting collaborative programs already in place, from transplantation of Schwann Cells for spinal cord injury to the use of biomaterials for tissue engineering, the development of models for human "organ on a chip" technologies, targeted drug delivery systems to treat or prevent the formation of anomalous protein deposits that are similar in diabetes and selected neurodegenerative disease conditions and various immunomodulatory or immunoisolation strategies.

I am therefore very enthusiastic about the opportunity to further promote multidisciplinary research collaborations between the Neuroscience, Clinical and Engineering communities, as well as enhance our educational programs in the area of neural engineering. I believe this new institute is extremely timely and will help our University successfully compete for new federal funding.

I am fully committed to the success of the Institute for Neural Engineering at the University of Miami and endorse its formal establishment without any reservation.

With best regards,

A handwritten signature in black ink, appearing to read "Camillo Ricordi", written over a horizontal line.

Camillo Ricordi, M.D.  
Stacy Joy Goodman Professor of Surgery  
Distinguished Professor of Medicine  
Professor of Biomedical Engineering, Microbiology & Immunology  
Director, Diabetes Research Institute and Cell Transplant Program  
University of Miami

DIABETES  
RESEARCH  
INSTITUTE

1450 NW 10 AVENUE  
MIAMI, FL 33136  
PHONE: 305 / 243-5376  
FAX: 305 / 243-4404

MAILING ADDRESS  
PO BOX 016960 (R-134)  
MIAMI, FL 33103

UNIVERSITY  
OF MIAMI  
LEONARD M.  
MILLER SCHOOL OF  
MEDICINE

UNIVERSITY  
OF MIAMI



Department of Computer Science

POSTAL ADDRESS

P.O. Box 248154  
Coral Gables  
Florida 33124  
USA

TELEPHONE

+1 305 2842158  
+1 305 2842268

FACSIMILE

+1 305 2842264

EMAIL

geoff@cs.miami.edu

February 17, 2016

To: Ozcan Ozdamar, Department of Biomedical Engineering  
Dalton Dietrich, Miami Project

From: Geoff Sutcliffe  
Department of Computer Science

Subject: Institute for Neural Engineering at the University of Miami (INEM)

Dear Ozcan and Dalton,

I am writing to endorse and support the establishment of the Institute for Neural Engineering at the University of Miami (INEM). The Department of Computer Science is pleased to be part of this initiative, and hopes to increase its involvement as the institute develops. My faculty, in particular Drs. Schwartz and Sarkar, look forward to being part of this collaborative group. I expect the framework of the institute will provide us all with opportunities for joint research, funding, and education.

Best regards,

Dr. Geoff Sutcliffe  
Professor and Chair  
Department of Computer Science



UNIVERSITY OF MIAMI  
MILLER SCHOOL  
of MEDICINE

**RALPH L. SACCO, MD, MS, FAHA, FAAN**  
Chairman, Department of Neurology  
Oleberg Family Chair in Neurological Disorders  
Miller Professor of Neurology, Public Health Sciences,  
Human Genetics & Neurosurgery  
University of Miami Leonard M. Miller School of Medicine  
Executive Director, Evelyn F. McKnight Brain Institute  
Chief of Neurology Service, Jackson Memorial Hospital

April 29, 2016

Ozcan Ozdamar, PhD  
Chairman  
Professor of Biomedical Engineering  
University of Miami Miller School of Medicine

W. Dalton Dietrich, PhD  
Scientific Director, The Miami Project to Cure Paralysis  
Senior Associate Dean for Discovery Science  
Professor of Neurological Surgery, Neurology and Cell Biology  
University of Miami Miller School of Medicine

Dear Ozcan and Dalton,

I am pleased to write this letter of support for the creation of the Institute for Neural Engineering at the University of Miami.

The establishment of this Institute is an important step in the evolution of our collaborative programs between the faculty and students in the School of Engineering and the Miller School of Medicine.

As one of the nation's greatest health care problems, affecting millions of Americans, various groups across diverse departments at the University are dedicated to understanding pathophysiological mechanisms associated with damage to the nervous system in an attempt to reduce the detrimental consequences of stroke, neurotrauma, as well as a list of neurodegenerative disorders.

The development of medical devices and systems are extremely important to the current medical research field as it is helping to close the gap between engineering and medicine by translating the design and problem solving skills of engineers into biomedical and healthcare applications that concern medical and biological scientists.

Moreover, brain imaging initiatives that are part of the NIH BRAIN funding would be ripe for further development. Some researchers are developing bioactive hydrogels and novel scaffolding biomaterials to promote angiogenesis for wound healing and other problems. In addition, new approaches for locally administering therapeutic treatments including local cooling for conservation of residual hearing and neuroprotection are also being tested.

The continued rapid development of the fields of Neuroscience and Biomedical Engineering dictates also the need for an identified workforce and trainees capable of performing research in this true interdisciplinary field of science and technology.

The proposed INEM at the University of Miami will collaborate to encourage interactions among investigators in other universities that can utilize the infrastructure and expertise within this Institute.

I am enthusiastic about the opportunity to help promote multidisciplinary research collaborations between the Neuroscience, Clinical and Biomedical engineering communities as well as enhance our educational programs in the area of Neural Engineering. I believe this new institute is extremely timely and will help our University successfully compete for new federal funding.

I am fully committed to the success of the Institute for Neural Engineering at the University of Miami and endorse its formal establishment.

Sincerely,



Ralph L. Sacco, MD, MS, FAHA, FAAN  
Professor & Chairman

April 28, 2016

Ozcan Ozdamar, PhD  
Chairman  
Professor of Biomedical Engineering  
University of Miami

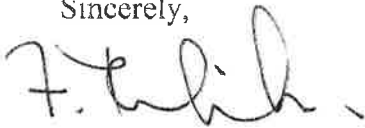
W. Dalton Dietrich, PhD  
Scientific Director, The Miami Project to Cure Paralysis  
Senior Associate Dean for Discovery Science  
Professor of Neurological Surgery, Neurology and Cell Biology  
University of Miami Miller School of Medicine

Dear Drs. Dietrich and Ozdamar,

It is my pleasure to write to you in full and enthusiastic support for the creation of the Institute for Neural Engineering (INEM) at the University of Miami - Miller School of Medicine. The medical and engineering schools at UM have a long history of scientific collaborations among individuals in various clinical subspecialties and academic disciplines. The INEM represents an opportunity to greatly expand and formalize the multidisciplinary research and academic/educational activities among faculty in biomedical engineering and the neurosciences. Combining the advances in technology with an institute which puts engineers, scientists and clinicians together in closer physical proximity should lead to more grant funding from federal and other sources for UM.

I am fully committed to the success of the Institute for Neural Engineering at UM and strongly endorse its formal establishment.

Sincerely,




Fred F Telischi, MEE, MD, FACS  
James R. Chandler Chair in Otolaryngology  
Chairman of Otolaryngology and Professor,  
Neurological Surgery and Biomedical Engineering



MEMORANDUM

October 11, 2016

To: Dr. Tomas Salerno  
Chair, Faculty Senate

From: Thomas J. LeBlanc, PhD   
Executive Vice President and Provost

Subject: Provisional approval of the Institute for Neural Engineering at the  
University of Miami (INEM)

---

W. Dalton Dietrich, Ph.D., and Ozcan Ozdamar, Ph.D. presented a proposal to establish the Institute for Neural Engineering at the University of Miami (INEM) at the October 5<sup>th</sup>, 2016 Academic Dean's Policy Council Meeting (ADPC). At that time, the proposal was approved unanimously. It is being forwarded to the senate for their action.

TJL/bf

Enclosure

cc: Faculty Senate Office  
Dr. DW. Dalton Dietrich  
Dr. Ozcan Ozdamar