News

IEM Industrial Advisory Board Member Among Brain-Computer Interface Investigators Published in New England Journal of Medicine

IEM Industrial Advisory Board Member Dr. Timothy Denison, Vice President of Research and Core Technology, and Technical Fellow at Medtronic, was among investigators whose research, on the use of a fully-implanted brain-computer interface (BCI) for communication by an ALS patient, was published in the New England Journal of Medicine. The patient suffers from "locked-in syndrome," a form of paralysis which prevents her from being able to communicate verbally or in other muscular-based ways, but which does not affect her cognitive ability. By thinking about moving her fingers, the patient generates a brain signal that is identified and converted into a mouse click by the BCI system, allowing her to then select individual letters on a keyboard and type messages. Dr. Denison says that the next objectives are to make the technology operate faster and useable in a home environment. The research was performed at the University Medical Center (UMC) Utrecht, in the Netherlands, and was funded, in-part, by Medtronic.

Fully Implanted Brain-Computer Interface in Locked-In Patient with ALS

Jakub Tolar Speaks at Conference in Cuba to Promote Collaborative Research in Regenerative and Cellular Medicine

IEM Member Dr. Jakub Tolar, Professor of Pediatrics, Director of the Stem Cell Institute and Executive Vice Dean of Medical School, was among the speakers at the inaugural Inter American Regenerative and Cellular Medicine Conference, which was held in Havana, Cuba, October 13th through 15th. The conference, which hosted 180 medical professionals from 14 countries, focused upon the potential standardization of stem cell therapies in medicine. Dr. Tolar says that the conference “was a fine example of how international research starts with human interactions,” and that being “derived in part from shared knowledge of regenerative medicine literature and in part from the shared goal of alleviating human suffering anywhere in the world, the meeting of Cuban and American clinician-researchers offered a blueprint for future interactions.”

First Inter American Regenerative and Cellular Medicine Conference

Theresa Reineke Leads Team that Discovers Method to Improve Effectiveness of Orally-Taken Medications

IEM Member Dr. Theresa M. Reineke, Professor of Chemistry, led a team of researchers who, along with colleagues at the Dow Chemical Company, discovered a method of customizing ingredients to make orally-taken medications more dissolvable, and thus absorbed in the bloodstream more quickly and effectively than existing methods. The team tested the process with an anti-seizure drug and another that treats late-stage prostate cancer. Dr. Reineke says that the method could be broadly applied “by many companies to create other life-saving medicines.” The research has been published in the American Chemical Society’s ACS Central Science and a patent on the technology has been applied for by the University of Minnesota and Dow. The study’s Co-Author, Dr. Frank Bates, a University of Minnesota Regents Professor of Chemical Engineering and Materials Science, says that this breakthrough is “a perfect example of what can happen when industry and academia come together.”

New Discovery Could Help Oral Medicines Work Better
Jerrold Vitek Discusses Innovative Deep Brain Stimulation Procedure to Treat Neurological Disorder

IEM Member Dr. Jerrold L. Vitek, McKnight Professor and Chair of the Department of Neurology, discussed in a November 5th *Star Tribune* article the progress and potential of Deep Brain Stimulation (DBS) to help patients struggling with a variety of neurological disorders, such as Parkinson's Disease (PD). The research uses a method called “closed-loop stimulation” in its DBS procedures, which triggers pulses only when abnormal neural patterns are recognized. This new method also has the potential to reduce post-surgery side effects, such as headaches and dizziness. “This procedure has already gone far beyond what anyone thought it could be,” said Dr. Vitek. “But we believe that we can fine-tune this even more, so people can have a much better quality of life.” Dr. Vitek and his colleagues are also seeking to develop a novel pattern of stimulation called coordinated reset that he says “is a very new and exciting approach.” Both closed-loop stimulation and “coordinated reset” are novel and will provide additional benefits for patients with PD who undergo DBS, says Dr. Vitek.

Twin Cities Father to Undergo Cutting-Edge Brain Surgery at U.

Daniel Duprez Discusses Complexity of Relationship Between Diet and Cardiovascular Health

IEM Member Dr. Daniel Duprez, Professor of Medicine, Donald and Patricia Garofalo Chair in Preventive Cardiology, was featured in an article in the October edition of Minnesota Monthly, “Rethinking Conventional Wisdom on Heart Disease.” Focusing on research about the relationship between a person’s diet and cardiovascular disease, the article described the recent discussion regarding a heart-healthy diet. There are controversial reports that eating more meat and butter would not cause heart disease in everybody. In contrast, studies of the Mediterranean diet have clearly shown that eating more healthy fats from fish, nuts and vegetable oils decreases risk for heart disease. In addition, recent studies show that replacing fats with higher amounts of starches and sugars actually increases the risk of heart disease, which goes against thinking that evolved, in large part, from a study funded by the sugar industry in 1967. “Is it not time to pay more attention what we eat and how we eat, instead of using only drive-in and micro-wave prepared frozen food or canned food with a high sugar drink and dessert? Healthy eating is the corner stone of prevention,” says Dr. Duprez.

Rethinking Conventional Wisdom on Heart Disease

Kathryn Cullen Utilizing Brain Imaging to Study Non-Suicidal Self Injury in Adolescent Girls

IEM Member Dr. Kathryn Cullen, Assistant Professor and Division Chief, Child & Adolescent Psychiatry, Department of Psychiatry, and colleagues are beginning a 5-year study that will examine the relationship between self-harm behavior and certain biological metrics, such as hormones and neurocircuitry, in adolescent girls. The number of these non-suicidal self-injury (NSSI) behaviors has been on the rise in recent years, due in part to the diffusion of these behaviors over social media networks. Citing the current lack of data for biological factors as a cause of NSSI behaviors, Dr. Cullen is seeking to find evidence linking the two, stating, “We hope to uncover a meaningful understanding of the neural mechanisms driving NSSI, paving the way for developing new treatments to address NSSI.” Besides linking these factors to NSSI, Dr. Cullen hopes that this type of research will help reduce the stigma around mental illness, providing people with a new lens through which they can understand these afflictions.

Emerging Methodology May Improve Mental Health Research

Alan T. Hirsch & AHA Request CMS Coverage for Supervised Exercise Therapy for Peripheral Artery Disease

IEM Member, Dr. Alan T. Hirsch, Professor of Medicine, Epidemiology and Community Health, Director of the Vascular Medicine Program, and Co-Director of the Minnesota Heart Health Program, on behalf of the American Heart Association (AHA), has requested coverage from the Centers for Medicare and Medicaid (CMS) to provide all Americans with access to supervised exercise therapy as a first line treatment for peripheral artery disease (PAD). For the more than 8 million people who suffer from PAD in the U.S., leg artery blockages lower the flow of oxygenated blood to the legs resulting in muscle fatigue, discomfort and pain during exercise, a symptom called “claudication”. People with PAD also face a very high short-term risk of heart attack and stroke.

Currently, claudication is commonly treated via invasive procedures, such as stenting or surgery. However, supervised exercise is now recognized as one of the most safe, effective and inexpensive treatments to improve claudication, in part due to a large NIH-supported trial completed by Dr. Hirsch and other University of Minnesota faculty. The exercise setting also lowers cardiovascular risk. “Stenting and medication will continue to be a common way to treat PAD and these approaches may be preferred by some patients,” Dr. Hirsch said. “But now we can offer a program that offers all patients a more therapeutic choice.”

Supervised Exercise to Treat P.A.D.
**Announcements**

**Applications Now Being Accepted for the 2017-2018 Innovation Fellows Program, Medical Devices Center - University of Minnesota**

The Medical Devices Center (MDC), an IEM affiliated center at the University of Minnesota, is looking for dynamic and creative individuals to join a cross-disciplinary team for 10½ months of medical device innovation. Applicants must be dedicated to improving human health and well-being, and committed to working in a collaborative, multifaceted environment.

The Fellows Program has been very successful with 88 patents filed from over 200 invention disclosures from the program since its inception in 2008. The Fellows have partnered with more than 200 entrepreneurs, physicians, investors, global institutions, and executives from leading medical device companies such as Medtronic, Boston Scientific, and St. Jude Medical. The Fellows collaborate with each other, as well as with field experts and industry leaders to solve a variety of healthcare needs, including by designing medical devices to help patients struggling with various diseases go about their lives.

**How to Apply:**

- Complete and submit the online application with supporting documents (cover letter, CV, essay and references) for **Requisition Number 313989** at the [University Employment Opportunities](https://www.emploi.umn.edu) website.

  - Follow the instructions provided on the [Innovation Fellows Application](https://www.emploi.umn.edu) webpage to prepare and supporting documents required for the application.

*Though there is no application deadline, applications are reviewed on a rolling basis and openings are limited, so apply early.*

For more information about the application process, contact [ifpinfo@umn.edu](mailto:ifpinfo@umn.edu).

**IEM Clinical Immersion Spring 2017 Weeks Available for Surgery, Cardiology and Neurosurgery**

The IEM Clinical Immersion Program has space available for its week-long immersions in the Spring 2017 semester in the following areas of focus:

**Surgery:** February 6th to 10th, March 6th to 10th  
**Neurosurgery:** February 20th to 24th  
**Cardiology:** May 8th to 12th

This program has been popular with 11 immersion sessions in 2016 from 5 companies. Private company immersions are available for groups of at least 5 participants.

Please contact Ken Rosen [krosen@umn.edu](mailto:krosen@umn.edu) for additional information.