News

Bin He and Colleagues Awarded $1.9 Million NIH Grant to Study Brain-Computer Interface with Mind-Body Awareness Training
Dr. Bin He, IEM director, Distinguished McKnight University Professor of Biomedical Engineering, and Medtronic-Bakken Endowed Chair for Engineering in Medicine, and his multi-disciplinary research team have established a novel approach for improving learning of and performance with brain-computer interface technology. Dr. He’s research investigates Mind-Body Awareness Training for improving learning of and performance with brain-computer interface as part of a 5-year, $1.9 Million National Institutes of Health research grant. Other investigators in the grant are IEM member Dr. Steve Engel, Professor of Psychology, and Dr. Mary Jo Kreitzer, Professor of Nursing and director of the Center for Spirituality and Healing. This cutting-edge technology holds the promise to assist numerous patients suffering from neuromuscular disorders and other systemic and brain diseases. The proposed research will significantly enhance the brain-computer interface use through mind-body intervention, and thus will benefit numerous patients, including disabled patients, and the general population to enhance control over their environment.

Vipin Kumar Receives IEEE Computer Society’s Sidney Fernbach Award
IEM Member Dr. Vipin Kumar, Regents Professor of Computer Science and Engineering, has received the 2016 IEEE Computer Society Sidney Fernbach Award “for foundational work on understanding scalability, and highly scalable algorithms for graph partitioning, sparse linear systems, and data mining.” Dr. Kumar is internationally-known for his work in advancing the fields of high-performance computing and big data. The award was established in 1992 in memory of Sidney Fernbach, a pioneer in high-performance computing, to honor those who make “outstanding contributions in the application of high-performance computers using innovative approaches.” Dr. Kumar will be presented with the award on November 15th at the supercomputing conference SC16 in Salt Lake City, Utah.

IEM Member & Colleagues Discover Cause of Resistance to Breast Cancer Drug
IEM Member Dr. Douglas Yee, Professor of Medicine and Pharmacology and Director of the Masonic Cancer Center, in collaboration with Reuben S. Harris, Professor of Biochemistry, Molecular Biology and Biophysics, and their colleagues, have identified a protein, APOBEC3B, that creates mutations leading to resistance to the breast cancer drug tamoxifen. As reported in Health Medicine Network, the discovery could lead to improvements that would make tamoxifen more effective in treating breast cancer and also to the treatment of other cancers that become drug-resistant. “In the treatment of all metastatic cancer, patients will eventually develop resistance and progress. What are the mechanisms of resistance? [APOBEC3B] is proving to be a major driver of resistance and something we’re continuing to actively investigate,” says Dr. Yee. The results have been published in the journal Science Advances.

FDA Approves New Epilepsy Drug Developed by College of Pharmacy Faculty
IEM Member Dr. James Cloyd, Professor of Experimental and Clinical Pharmacology, and Director of the Center for Orphan Drug Research, and his departmental colleagues, Drs. Angela Birnbaum and Ilo Leppik, have developed a new epilepsy drug product that received FDA approval on October 8. As reported in Epilepsy News Today, the drug, named Carnexiv, can be injected, making it an alternative when patients are unable to take the oral carbamazepine formulations,
as may occur when a patient is unconscious or has a severe gastrointestinal disorder. “This approval is the result of years of work to create a novel and stable injection formulation to support patients who need an alternative to oral carbamazepine,” says Dr. Cloyd. Carnexiv’s development began with NIH funding (Leppik, PI; Cloyd, Co-PI) that resulted in the publication of a pharmacokinetic study. The study laid the groundwork for the design of a Phase II trial that was used as part of the NDA. Development continued through a partnership between the University of Minnesota and a drug company, Lundbeck. A key element in the development plan was submission of an orphan drug designation application (Cloyd co-author) to the FDA, which granted Carnexiv orphan drug status in 2013.

**FDA Approves Carnexiv Injection for Epilepsy Seizures as Replacement Therapy**

**IEM Members Part of Team that Discovers Role of Endoglin During Embryonic Development of Cardiac & Blood Cells**

IEM Members Dr. Rita Perlingeiro, Professor of Medicine/Cardiology, Dr. Daniel J. Garry, Professor of Medicine, and Dr. Naoko Koyano-Nakagawa, Assistant Professor of Medicine/Cardiology, are a part of a team of researchers who discovered the role endoglin plays in the development of the blood and cardiac cells during embryonic development. These researchers and their colleagues manipulated primary heart cells from zebrafish and mice and differentiated mouse pluripotent stem cells to identify the effects of endoglin on cellular expression. Dr. Perlingeiro says that “by using multiple model systems, combined with specialized cell sorting technology and sequencing tools, our findings help uncover mechanisms previously unseen in the few cells engaged in these early development decisions.” This research may provide further information in the roles that endoglin plays in congenital heart defects, as well as discovering ways to catalyze the development of blood or heart tissue following an injury.

**UMN Researchers Find Link Between Heart and Blood Cells in Early Development**

**IEM Team Begins Researching Application of 3D Printed Scaffold to Treatment of Spinal Cord Injuries**

A team of IEM members, Dr. Michael McAlpine, Benjamin Mayhugh Associate Professor in Mechanical Engineering, Dr. James R. Dutton, Research Assistant Professor of Genetics, Cell Biology, and Development at the Minnesota Stem Cell Institute, and Dr. Ann M. Parr, Assistant Professor of Neurosurgery, is working on a new research project that is using 3D printing to construct a scaffold to support cells in the reconstruction of an injured spinal cord. Though in the early stages of development, the team hopes to create a technology that will “provide an effective therapy for spinal cord injury,” says Dr. Parr, essentially a “spinal cord on a chip.” The scaffold could potentially be used to treat patients with chronic spinal cord injuries and may lead to other advances in the field of regenerative medicine.

**UMN Doctor Researches New Way to Treat Spinal Cord Injuries**

**Ben Hackel Close to Commercializing Unique Molecular Imaging Probe for Cancer Detection; MN-REACH Funding Playing Key Role**

IEM Member Dr. Benjamin J. Hackel, Assistant Professor of Chemical Engineering and Materials Science, developed a molecular imaging probe detectable by PET scans for imaging of numerous types of cancers, including colorectal and breast cancers. As reported in *Twin Cities Business*, the probe can improve how these cancers are treated. “It’s a way of identifying which patients are likely to respond to a particular type of therapy versus patients who aren’t likely to respond – it’s a personalized medicine approach. Clinics right now don’t have a very good way of differentiating between these two patient populations, so we propose that a PET imaging approach would be able to provide that,” says Dr. Hackel. MN-REACH funding is being used to complete final steps toward commercializing technology, including “making some small but important modifications in the molecule so that it will perform more effectively at human patient level,” according to Dr. Hackel.

**U. of M. Cancer Researchers Readying Intro of New Molecular Imaging Technology**

**David Jacobs is Lead Author in Study Published in the Journal of Pediatrics on Future Benefits of Healthy Eating by Teens**

IEM Member Dr. David R. Jacobs, Professor of Epidemiology & Community Health, was the lead author of a study published in the *Journal of Pediatrics* showing that healthy eating by teenagers leads to less weight gain and BMI during early adulthood. The study, which followed more than 2,500 students at Minneapolis and St. Paul high schools, from when they were 15 years old until they were 25, showed that the benefits were experienced by not only those who had healthy diets at age 15 but also by those who switched to a healthy diet during those years. Dr. Jacobs concludes that “food preferences and attitudes may be established as early as age 15,” and that the “choices adolescents make during that stage establish a lifetime diet pattern, which could influence weight gain over time.”

**Higher Quality Diet in Adolescence and Dietary Improvements Are Related to Less Weight Gain During the Transition from Adolescence to Adulthood**

**How CTSI is Helping One University Investigator Convert Her Idea for Real-World Tool for Diagnosing Infections**