2021 ANNUAL CONFERENCE

IEM

Monday, September 27, 2021
McNamara Alumni Center
Welcome to the 9th Institute for Engineering in Medicine (IEM) Annual Conference!

As you know, the Mission of IEM is to turn science and engineering into medical practice. We fulfill this mission by fostering collaborations between engineering and biomedical faculty at the University of Minnesota and between University faculty and industrial colleagues. We have the privilege to represent more than 290 IEM faculty members from over 85 academic departments on campus, along with their students and collaborators.

Today’s event opens with welcome remarks from the Deans of the Medical School and the College of Science and Engineering followed by an overview of IEM from Director John Bischof. The Conference will continue with keynote talks by three distinguished University of Minnesota faculty who are highly invested in IEM’s mission.

After an acknowledgement of key industrial partners, we will break shortly to pick up lunch and then head either to our first-ever “hybrid” breakout sessions led by IEM pillars (for faculty) or the Student Career Development session (for students and postdocs). Faculty from Morgan State University in Baltimore and University of California Riverside will be joining some of these hybrid breakouts as a way to foster new collaborations. The Student session will feature a Q&A with a panel of scientists representing academia, industry, and other career paths.

A student poster session and competition highlighting research of IEM members and other University faculty will conclude the Conference. Winners of the poster competition will be announced at a later date.

This Conference is designed to offer rich opportunities to learn about IEM and cutting-edge work that advances medicine and engineering together. We hope that you enjoy the event, and we look forward to your continued interest and support. Please contact us at iem@umn.edu with ideas for improving IEM.

David Odde, Ph.D. (2021 IEM Annual Conference Chair)
Medtronic Endowed Associate Director, Strategic Research Initiatives, Institute for Engineering in Medicine

John Bischof, Ph.D. (2021 IEM Annual Conference Co-Chair)
Director, Institute for Engineering in Medicine
ABOUT IEM

The Institute for Engineering in Medicine is an interdisciplinary organization that creates and supports research collaborations between engineers, scientists, and medical professionals at the University of Minnesota and provides research and partnership opportunities to the wider medical industry. With over 290 affiliated researchers representing 85 departments across the Twin Cities campus, IEM provides University faculty, students, and external partners with world-class resources to drive innovation in medicine and to find solutions for the great medical challenges of today and tomorrow.

ORGANIZATION

The new IEM Organizational Chart below captures the broad vision for the Institute’s engagement with the University, industry, and students in grades 6–12.
IEM EXECUTIVE COMMITTEE

John Bischof, Ph.D.
Director, Institute for Engineering in Medicine, Distinguished McKnight University Professor, Carl and Janet Kuhrmeyer Chair, Mechanical Engineering, Medtronic-Bakken Endowed Chair for Engineering in Medicine

Paul Iaizzo, Ph.D.
Associate Director, Professional Education and Outreach, Institute for Engineering in Medicine, Medtronic Professorship for Engineering in Medicine, Director, Visible Heart Laboratory®, Professor of Surgery

David Odde, Ph.D.
Associate Director, Strategic Research Initiatives, Institute for Engineering in Medicine, Medtronic Professor for Engineering in Medicine

Arthur Erdman, Ph.D.
Richard C. Jordan Professor, Morse Alumni, Distinguished Teaching Professor of Mechanical Engineering

Michael Garwood, Ph.D.
Associate Director, Center for Magnetic Resonance, Research, Professor of Radiology; Malcolm B. Hanson Endowed Chair in Radiology

Tom Hays, Ph.D.
Professor and Head, Department of Genetics, Cell Biology, and Development

David Largaespada, Ph.D.
Director of Brain Tumor Program at Masonic Cancer Center; Associate Director for Basic Sciences at Masonic Cancer Center; Distinguished Faculty Chair, Hedberg Family/Children’s Cancer Research Fund, Chair in Brain Tumor Research, Professor of Pediatrics, Professor of Genetics, Cell Biology, and Development

Tay Netoff, Ph.D.
Director of Center for Neuroengineering; Professor of Biomedical Engineering

Brenda Ogle, Ph.D.
Professor and Head, Biomedical Engineering, Director of the Stem Cell Institute

IEM SCIENTIFIC ADVISORY BOARD

Guillermo Aguilar, Ph.D.
Professor and Chair, Mechanical Engineering, University of California Riverside; Professor and Department Head, Mechanical Engineering, Texas A&M University

Warren Chan, Ph.D.
Professor and Chair, Institute of Biomaterials and Biomedical Engineering, University of Toronto

Naomi Chesler, Ph.D.
Director Edwards Lifesciences Center for Advanced Cardiovascular Technology University of California, Irvine

Claudia Fischbach, Ph.D.
Director of Physical Sciences Oncology Center on the Physics of Cancer Metabolism, Cornell University

Alexander Revzin, Ph.D.
Professor of Biomedical Engineering, Mayo Clinic

IEM INDUSTRY ADVISORY BOARD

J. Fernando Bazan, Ph.D.
Dean’s Advisory Board, College of Science and Engineering, Principal, 4th & Aspen Life Science Consulting LLC

Matthew M. Cooper, MD MBA FACS
Global Senior Medical Director, Director, Patient Safety, C.O.E., 3M

Dominique Davidow, Ph.D.
Staff Quality Assurance Scientist, Beckman Coulter Diagnostics

Liza Davis
Vice President, Research and Development, Boston Scientific

Sebastian Eriksson Giwa, Ph.D.
Co-founder of Elevian, Ossium Health, Sylvatica Biotech, and the Organ Preservation Alliance (incubated at SU Labs at NASA Research Park)

Ed Hedblom, PharmD
Director, Evidence and Access 3M Health Care

David M. Knapp, Ph.D.
Distinguished Fellow, President, Boston Scientific Foundation, Executive Sponsor, MN LEAD EGR, Boston Scientific

Tim Laske, Ph.D.
Vice President, Research and Business Development - AF Solutions, Medtronic

Angela Panoskaltsis-Mortari, Ph.D.
Vice Chair for Research and Professor, Department, of Pediatrics, Division of Pediatric Blood and Marrow Transplantation

Nikolaos Papanikolopoulos, Ph.D.
McKnight Presidential Endowed Professor, Minnesota Robotics Institute Director, Distinguished McKnight University Professor, Director of the Center for Distributed Robotics and SECTTRA, Department of Computer Science and Engineering

Theresa Reineke, Ph.D.
Distinguished McKnight University Professor, Department of Chemistry

Clarence Shannon IV, MD
Assistant Professor, Department of Anesthesiology; Associate Dean of Strategy and Innovation, Medical School

Jerold Vitek, M.D., Ph.D.
Professor and Head, Department of Neurology

Sean O’Neil
Chief Architect, Optum Health Technologies

Erik Scott, Ph.D.
Director, Quality Engineering, Abbott

Dale Wahlstrom
Founder and CEO, ACT3, LLC Life Science Consulting

Adrienne Watson, Ph.D.
Vice President, Research and Development, Recombinetics
8:30 - 9:00 am  Networking
Continental-style Breakfast available in The Commons

9:00 - 9:05 am  Welcome Remarks
Jakub Tolar, MD, Ph.D. (Dean, Medical School) and Mostafa Kaveh, Ph.D. (Dean, College of Science & Engineering)

9:05 - 9:30 am  State of the Institute for Engineering in Medicine
John Bischof, Ph.D.
Director, Institute for Engineering in Medicine

9:30 - 10:10 am  Distinguished Keynote Talk
Evolution of Deep Brain Stimulation: Role of Technology
Jerrold Vitek, MD, Ph.D.
Professor and Head, Department of Neurology, University of Minnesota

10:10 - 10:50 am  Distinguished Keynote Talk
Innovation + Culture Change = New Opportunities
Carla Pavone, Ph.D.
Associate Director, Gary S. Holmes Center for Entrepreneurship, Carlson School of Management, University of Minnesota

10:50 - 11:05 am  Coffee Break

11:05 - 11:45 am  Distinguished Keynote Talk
Fostering Collaborations between Engineering and Medicine
Timothy Schacker, MD
Vice Dean for Research, Medical School
Director, Program in HIV Medicine
University of Minnesota

11:45 - 12:00 pm  IEM AWARDS
2020-2021 IEM Engineering in Medicine Doctoral Fellowship Recipients
• Mathew Rynes
• Gaura Saini

2021 Industrial Fellows Inductees:
• Farzad Azimpour, M.D., V.P. of Strategic Innovation, Advanced Technology, Edwards Lifesciences
• Roxanne Gil, Engagement and Education Scout, Medtronic

12:00 - 12:15 pm  Lunch Break
Return with your lunch to one of the IEM Pillar Breakout Session rooms
AGENDA

12:00 - 1:30 pm  IEM PILLAR BREAKOUT SESSIONS:

REMOTE ATTENDEES WILL JOIN THE DISCUSSIONS VIA ZOOM LINKS AVAILABLE AT IEM.UMN.EDU.

Ski-U-Mah

STRATEGIC RESEARCH INITIATIVES

Health Disparities and Cancer Research
Valerie Odero-Marah, Ph.D., MSc, Professor, Executive Director of the Center for Urban Health Disparities Research and Innovation (Morgan State University)
David Odde, Ph.D, Associate Director of IEM and lead of Strategic Research Initiatives (University of Minnesota)

Thomas Swain

PROFESSIONAL EDUCATION & OUTREACH

Paul Iaizzo, Ph.D., Medtronic Endowed Associate Director, Professional Education and Outreach, Institute for Engineering in Medicine

Heritage Gallery

INSPIRE
Rhonda Franklin, Ph.D., IEM Co-Director, Inspire Program, Abbott Professor for Innovative Education, Professor of Electrical and Computer Engineering, (UMN)
Chris Pennell, Ph.D., IEM Co-Director, Inspire Program, Abbott Professor for Innovative Education, Professor of Laboratory Medicine and Pathology, (UMN)
Albert E. Sweets Sr., Program Manager/Sr. Advisory Engineer Cybersecurity Assurance & Policy Center, (Morgan State University)

Johnson

INNOVATION
Art Erdman, Ph.D., IEM Co-Director, Innovation Pillar, Richard C. Jordan Professor, Morse Alumni, Distinguished Teaching Professor of Mechanical Engineering
Carla Pavone, Ph.D., IEM Co-Director, Innovation Pillar, Associate Director, Gary S. Holmes Center for Entrepreneurship

Minnesota (ending at 1:10pm)

STUDENT CAREER DEVELOPMENT
Moderators: Suhasa Kodandaramaiah, Ph.D., Benjamin Mayhugh Assistant Professor, Mechanical Engineering
Alexander Opitz, Ph.D., Assistant Professor, Biomedical Engineering

1:30 - 3:00 pm  STUDENT & POSTDOCTORAL POSTER SESSION & COMPETITION*

IMPORTANT NOTE: Posters must be up on the designated poster panel by 1:15pm, and at least one author must be in attendance from 1:30-3:00pm. For posters in the Poster Award Competition, the first non-faculty author must be present 1:30-3:00pm.

* Awards will be announced at a later date.

3:00 pm  ADJOURN
GENERAL INFORMATION

CONNECTING TO FREE WIRELESS NETWORK
Network Name: **U of M Guest**
*(For access and to connect to the wireless network, please enter your email address)*

THE McNAMARA ALUMNI CENTER
200 SE Oak St, Minneapolis, MN 55455
**DISTINGUISHED KEYNOTE SPEAKERS**

**JERROLD VITEK, M.D., PH.D.**  
Professor and Head, Department of Neurology, University of Minnesota  

Dr. Jerry Vitek is the Head of the Neurology Department, Director of the Neuromodulation Research Program, and Center Director of the University of Minnesota Udall Center of Excellence for Parkinson’s Research. He previously served as the Neuromodulation Research Center Director at the Lerner Research Institute of the Cleveland Clinic Foundation developing functional surgery and deep brain stimulation (DBS) techniques for the treatment of neurological disease. Dr. Vitek has also held faculty positions at Emory University and The Johns Hopkins University, where he assisted in the development of the functional neurosurgery programs and conducted research on the pathophysiology of movement disorders and mechanism(s) underlying the beneficial effects of DBS.

**CARLA PAVONE, PH.D.**  
Associate Director, Gary S. Holmes Center for Entrepreneurship, Carlson School of Management, University of Minnesota  

As Associate Director of the Holmes Center for Entrepreneurship and Program Director of MIN-Corps, Carla Pavone facilitates technology commercialization by designing and delivering education and coaching to University of Minnesota STEM students, faculty, and researchers interested in bringing their innovations to the market. She also teaches entrepreneurship, strategy and leadership courses, primarily at the MBA level. Dr. Pavone has a BA in biology from the University of Pennsylvania, an MBA from Harvard Business School, and a PhD in business administration from the Carlson School of Management. She has had three careers: in magazine and software publishing (primarily at start-ups), in financial services (mainly leading internal corporate start-ups and turnarounds) and in academia.
TIMOTHY SCHACKER, M.D.
Vice Dean for Research, Medical School
Director, Program in HIV Medicine
University of Minnesota

Timothy Schacker, M.D. is a professor of Medicine and Director of the Program in HIV Medicine at the University of Minnesota. He joined the faculty in 1996. Dr. Schacker received his M.D. from the University of Minnesota in 1986 and completed a residency in Internal Medicine at the Oregon Health Sciences University and Infectious Disease Fellowship at the University of Washington in 1993. He then joined the faculty of the University of Minnesota.

Dr. Schacker is interested in how HIV causes immune suppression and why antiretrovirals do not fully restore immunity. His group focuses on inflammatory damage in lymphatic tissues (the principal site of HIV infection) that results in fibrosis of the lymphatic structures required to maintain a normal population of CD4 cells. They are testing novel therapies to prevent and/or reverse this process and slow T cell depletion in HIV and improve their reconstitution after antiretroviral treatment has begun. He is also the principal investigator of a federally funded program of projects designed to determine barriers to HIV eradication. In addition, Dr. Schacker has established a collaboration with the Joint Clinical Research Center in Kampala, Uganda to study how constant exposure to common infections like tuberculosis, malaria, and helminthic infections affect rates of HIV transmission and progression.

IEM uses Facebook, Twitter, and LinkedIn to interact with IEM members, the University of Minnesota community, members of industry, and the scientific community.

To connect with IEM through social media:

Facebook: @Institute.for.Engineering.in.Medicine
Twitter: @UMNIEM
Instagram: @umniem
LinkedIn: Institute for Engineering in Medicine - University of Minnesota

If you have any questions, please connect with us at iem@umn.edu.

We look forward to engaging with you and your groups!
**IEM PILLAR LEADERSHIP**

**John Bischof Ph.D.**, Director, Institute for Engineering in Medicine, Distinguished McKnight University Professor, Carl and Janet Kuhrmeyer Chair, Mechanical Engineering, Medtronic-Bakken Endowed Chair for Engineering in Medicine

**Will Durfee Ph.D.**, Interim Director of Bakken Medical Devices Center, Director of Clinical Engagement, Institute for Engineering in Medicine, Professor and Director of Design Education, Department of Mechanical Engineering

**Art Erdman, Ph.D.**, IEM Co-Director, Innovation Pillar, Richard C. Jordan Professor, Morse Alumni, Distinguished Teaching Professor of Mechanical Engineering

**Rhonda Franklin, Ph.D.**, IEM Co-Director, Inspire Program, Abbott Professor for Innovative Education, Professor of Electrical and Computer Engineering

**Paul Iaizzo, Ph.D.**, Medtronic Endowed Associate Director, Professional Education and Outreach, Institute for Engineering in Medicine

**Matt Johnson, Ph.D.**, Bakken MDC Associate Director, Associate Professor, Department of Biomedical Engineering

**David Odde, Ph.D.**, Associate Director of IEM and lead of Strategic Research Initiatives

**Angela Panoskaltsis-Mortari, Ph.D.**, Bakken MDC Associate Director, Vice Chair for Research and Professor, Department of Pediatrics, Division of Pediatric Blood and Marrow Transplantation

**Carla Pavone, Ph.D.**, IEM Co-Director, Innovation Pillar, Associate Director, Gary S. Holmes Center for Entrepreneurship

**Chris Pennell, Ph.D.**, IEM Co-Director, Inspire Program, Abbott Professor for Innovative Education, Professor of Laboratory Medicine and Pathology

**IEM STAFF**

**Katherine Lindsay** - Administrative Director  
**Stephanie Stack** - Administrator (currently on leave till December 2021)  
**Ken Rosen** - Head of Industry & Outreach Programs  
**Teresa Walbon** - Executive Assistant  
**Michael Lotti** - Senior Editor, SRI Program Manager  
**Elica Gardner** - Program Project Specialist  
**Oliver Yackel** - Student Intern - Graphic Designer  
**Eli Wurster** - Student Intern - Director Office Support  
**Emily Baude** - Student Intern - Communications