CARDIOVASCULAR ENGINEERING

1st Place
Similarity score for the identification of active sites in patients with atrial fibrillation
Vasanth Ravikumar 2, Sanket Thakare 1, Xiangzhen Kong 2, Henri Roukoz 3, Elena G. Tolkacheva 1. 
1 Department of Biomedical Engineering, 2 Department of Electrical Engineering, 3 Cardiovascular Medicine; 
University of Minnesota Medical School, Minneapolis, MN

2nd Place
The Effects of LVAD Pump Speed on Coronary Perfusion: Reanimated Heart Studies
Emma Schinstock 1, D'Anne Kudlik 2, Michael Eggen 2, Paul A. Iaizzo 1. 
1. University of Minnesota, USA 
2. Medtronic, USA

3rd Place
Ex Vivo Heart Perfusion: Assessing Vitrification Solution Toxicity
Casey Kraft, Bat-Erdene Namsrai, Zhe Gao, Michael Etheridge, Erik Finger, John Bischof. 
University of Minnesota
CELLULAR AND MOLECULAR BIOENGINEERING

1st Place
Synthetic Cell Lines for Recombinant Adeno-Associated Virus (rAAV) Production
Min Lu 1, Zion Lee 1, Eesha A. Irfanullah 2, Morgan T. Soukup 2, Christopher S. Stach 1, Daniel Schmidt 3, Wei-Shou Hu 1. 1. Department of Chemical Engineering and Materials Science, 2. Department of Biomedical Engineering, 3. Department of Genetics, Cell Biology, and Development; University of Minnesota

2nd Place
Developing Collagen Droplets for Single Cell Culture and ECM Remodeling Studies
Katherine A. Cummins, David K. Wood. Department of Biomedical Engineering, University of Minnesota

3rd Place
Engineered Protein-Small Molecule Hybrids Empower Selective Enzyme Inhibition
Abbigael Harthorn 1, Andrew K. Lewis 2, Sadie M. Johnson 2, Roy R. Lobb 3, Benjamin Hackel 1,2. 1. Biomedical Engineering, 2. Chemical Engineering, University of Minnesota - Twin Cities, USA, 3. Itara Biotherapeutics, London, UK
FRONTIERS OF BIOMEDICAL ENGINEERING

1st Place
Vitrification and Nanowarming of Kidneys
Anirudh Sharma1, Joseph Sushil Rao2, Zonghu Han1, Lakshya Gangwar1, Erik B Finger2, John C Bischof1
1 Department of Mechanical Engineering, 2 Department of Surgery, University of Minnesota

2nd Place
Thermal Modeling of Cryoprotective agents (CPAs) for varied size range (mL to L system) in evaluating success and failure for cryopreservation
Lakshya Gangwar 1, Shaunak S. Phatak 3, John C. Bischof 1,2. 1. Department of Mechanical Engineering, 2. Department of Biomedical Engineering, University of Minnesota, USA, 3. Armorblox, India

3rd Place
Rotator Cuff Compression During Arm Elevation in Individuals with Excessive Scapular Anterior Tilt
Gaura Saini, S. Cyrus Rezvanifar, Paula M. Ludewig. University of Minnesota, USA
MEDICAL DEVICES

1st Place
fM-aM Detection of SARS-COV-2 Antigen by Advanced Lateral Flow Immunoassay with Thermal Contrast Amplification
Yilin Liu(*)1, Li Zhan1, Jesse W. Shen1, Bàrbara Baro2, Andrea Alemany3, James Sackrison4, Oriol Mitjà3,5,6, John C. Bischof1,7.
1 Department of Mechanical Engineering, University of Minnesota, Minneapolis, MN 55455, USA. 2 ISGlobal, Hospital Clínic, Universitat de Barcelona, Barcelona, Spain. 3 Fight AIDS and Infectious Diseases Foundation, Badalona, Spain. 4 3984 Hunters Hill Way, Minnetonka, MN 55345, USA. 5 Hospital Universitari Germans Trias i Pujol, Badalona, Spain. 6 Lihir Medical Centre – International SOS, Lihir Island, Papua New Guinea. 7 Department of Biomedical Engineering, University of Minnesota, Minneapolis, MN 55455, USA

2nd Place
Automated microinjection robotic platform for zebrafish embryos
Amey S. Joshi* 1, Andrew D. Alegria 1, Kieran Smith 2, Kunpeng Liu 1, Daryl M. Gohl 3, 4, Kanav Khosla 1, John Bischof 1, 5, Suhasa B. Kodandaramaiah 1, 5, 6
1. Department of Mechanical Engineering, 2. Department of Fisheries, Wildlife and Conservation Biology, 3. University of Minnesota Genomic Center, 4. Department of Genetics, Cell Biology, and Development, 5. Department of Biomedical Engineering, 6. Department of Neuroscience, University of Minnesota Twin Cities, Minneapolis, USA

3rd Place
Combined On-Chip Spectroscopy and Rheology as a Pre-clinical Drug Screening Tool for Sickle Cell Disease
Scott Hansen 1, John Higgins 2, 3, David K. Wood, 1. 1. University of Minnesota, USA, 2. Massachusetts General Hospital, USA, 3. Harvard Medical School, USA
NEUROENGINEERING

1st Place
Region-Level Functional and Effective Network Analysis of Human Brain During Cognitive Task Engagement

1. Department of Electrical and Computer Engineering, University of Minnesota, Minneapolis, MN 55455 USA,
2. Athinoula A. Martinos Center for Biomedical Imaging, Department of Radiology, Massachusetts General Hospital, Charlestown, MA 02129 USA, 3. Center for Biomedical Engineering, Brown University School of Engineering, Providence, RI 02912 USA, 4. Department of Psychiatry and Behavioral Sciences, University of Minnesota, Minneapolis, MN 55455 USA

1st Place
High-performance, Conformable, Stencil Fabricated Graphene μ-ECoG Array

Jia Hu* 1, Ridwan Fayaz Hossain 1, Zahra S. Navabi1 1, Alana Tillery 2, Suhasa B. Kodandaramaiah 1
1 Department of Mechanical Engineering, University of Minnesota Twin Cities, Minneapolis, MN, USA
2 Department of Bioengineering, University of Maryland, College Park, MD, USA

1st Place
Bayesian Optimization of Closed-Loop Electrical Stimulation Enables Robust Cerebellar-Directed Seizure Control

Bethany J. Stieve* 1, Thomas J. Richner 2,3,4, Chris Krook-Magnuson 4, Theoden I. Netoff 1,3, and Esther Krook-Magnuson 1,4.
1. Graduate Program in Neuroscience, University of Minnesota, Minneapolis 55455, United States, 2. Current: Department of Neurology, Mayo Clinic, Rochester 55902, United States, 3. Department of Biomedical Engineering, University of Minnesota, Minneapolis 55455, United States, 4. Department of Neuroscience, University of Minnesota, Minneapolis 55455, United States
POST DOCTORAL ASSOCIATE

1st Place
Automated Microfluidic Device for Whole Blood Plasma Separation and Biomarkers Analysis in Microliter Samples
Alan M. Gonzalez-Suarez 1, Gulnaz Stybayeva 1 William A. Carey 2, and Alexander Revzin 1
1. Department of Physiology and Biomedical Engineering, Mayo Clinic, Rochester, MN, USA
2. Department of Pediatric and Adolescent Medicine, Mayo Clinic, Rochester, MN, USA

2nd Place
Mechano-transcriptomic analysis of migratory phenotypes of glioblastoma patient cells
Jay C. Hou 1, Mariah M. McMahon 1, Jann N. Sarkaria 2, Clark C. Chen 3, and David J. Odde 1
1 Department of Biomedical Engineering, University of Minnesota – Twin Cities
2 Department of Radiation Oncology Mayo Clinic Rochester, Minnesota, USA
3 Dept. of Neurosurgery, University of Minnesota – Twin Cities

3rd Place
3D printing of organisms for biotechnology, biomedicine, and devices
Guebum Han*1,2, Kanav Khosla1,2, Kieran Smith1,2, John Bischof1,2, Michael McAlpine1,2. 1 University of Minnesota Twin Cities, United States, 2 NSF Center for Advanced Technologies for Preservation of Biological System, United States