



Department of Biomedical Engineering  
COLUMBIA | ENGINEERING  
2000-2020

*5<sup>th</sup> Annual*  
**ENGINEERING IN MEDICINE  
SYMPOSIUM**

THURSDAY, 02.18.2021 | 10:30AM - 5:30PM EST



COLUMBIA UNIVERSITY  
IRVING MEDICAL CENTER



COLUMBIA | ENGINEERING  
The Fu Foundation School of Engineering and Applied Science

**OPENING** (*Listed times are in EST*)

**10:30 Opening Remarks**



**Mary C. Boyce, PhD**

*Dean, Fu Foundation School of Engineering and Applied Science and Morris A. and Alma Schapiro Professor*



**Shih-Fu Chang, PhD**

*Senior Executive Vice Dean, Fu Foundation School of Engineering and Applied Science and Richard Dicker Professor*



**Anil K. Rustgi, MD**

*Interim Executive Vice President and Dean of the Faculties of Health Sciences and Medicine, Vagelos College of Physicians and Surgeons; Director of the Herbert Irving Comprehensive Cancer Center, Columbia University Irving Medical Center (CUIMC)*

**10:55 Welcome from Symposium Chair**



**Christoph Juchem, PhD** *Associate Professor, Biomedical Engineering and Radiology (Physics); Director, MR SCIENCE Laboratory*

**SESSION 1: HEART & LUNGS**

**11:00 Remarks from the Session Chair**



**Andrew F. Laine, PhD**

*Percy K. and Vida L.W. Hudson Professor of Biomedical Engineering and Radiology (Physics); Director, Heffner Biomedical Imaging Laboratory*

**11:02 “Ex Vivo Repair of Human Lungs for Transplantation”**



**Gordana Vunjak-Novakovic, PhD**

*University and Mikati Foundation Professor of Biomedical Engineering and Medical Sciences; Director, Laboratory for Stem Cells and Tissue Engineering*

**11:14 “Imaging-based Approaches to Cardiopulmonary Disease”**



**R. Graham Barr, MD, DrPH**

*Hamilton Southworth Professor of Medicine, Professor of Epidemiology, Chief, Division of General Medicine*

**11:26 “New Tools from Engineering for Imaging-guided Cardiac Care”**



**Andrew Einstein, MD, PhD**

*Associate Professor of Medicine (in Radiology); Director of Nuclear Cardiology, Cardiac CT, and Cardiac MRI, Director of the Advanced Cardiac Imaging Fellowship, CUIMC*

**11:38 “Functional and Structural Durability of Bioprosthetic Valves”**



**Giovanni Ferrari, PhD**

*Associate Professor of Surgical Sciences, Department of Surgery; Director, Cardiothoracic Surgery Research; Director, Columbia Biobank for Translational Science (CBTS)*

**11:50 SESSION 1 Q&A**

**12:00 Break (10 min.)**

**SESSION 2: BRAIN**

**12:10 Remarks from the Session Chair**



**Elizabeth M. C. Hillman, PhD** *Herbert and Florence Irving Professor at the Zuckerman Institute and Professor of Biomedical Engineering and Radiology (Physics); Director, Laboratory for Functional Optical Imaging*

**12:12 “Neurostimulation in Psychiatric Disorders”**



**Diana Martinez, MD**

*Professor of Psychiatry, CUIMC*

**12:24 “Brain-controlled Assistive Hearing Technologies”**



**Nima Mesgarani, PhD**

*Associate Professor, Electrical Engineering; Director, Neural Acoustic Processing Laboratory*

**12:36 “Controversial Stimuli: Pitting Neural Networks Against Each Other as Models of Human Visual Recognition”**



**Nikolaus Kriegeskorte, PhD**

*Professor of Psychology and Neuroscience; Director of Cognitive Imaging; Principal Investigator at Columbia’s Zuckerman Institute*

**12:48 “Magnetic Resonance Research from Bench to Bedside”**



**Christoph Juchem, PhD**

*Associate Professor, Biomedical Engineering and Radiology (Physics); Director, MR SCIENCE Laboratory*

**13:00 SESSION 2 Q&A**

**13:10 Break (10 min.)**



## SESSION 3: CANCER

### 13:20 Remarks from the Session Chair



**Elham Azizi, PhD** *Assistant Professor, Biomedical Engineering; Herbert and Florence Irving Assistant Professor, Cancer Data Research (in the Herbert and Florence Irving Institute for Cancer Dynamics and in the Herbert Irving Comprehensive Cancer Center)*

### 13:22 “Defining Drug-induced Landscapes with Single-cell Genomics”



**José L. McFaline-Figueroa, PhD**  
*Assistant Professor, Biomedical Engineering; Director, The Chemical Genomics Laboratory*

### 13:34 “Synthetic Biology: From Engineered Bacteria Gene Circuits to Cancer Therapy”



**Tal Danino, PhD**  
*Associate Professor, Biomedical Engineering; Director, Synthetic Biological Systems Laboratory*

### 13:46 “Predicting Response to Immune Checkpoint Inhibitors”



**Simon Tavaré, PhD**  
*Professor, Biological Sciences and Statistics; Herbert and Florence Irving Director, Irving Institute for Cancer Dynamics*

### 13:58 “Genetics and Mechanisms of Chemotherapy Resistance in Acute Lymphoblastic Leukemia”



**Adolfo A. Ferrando, MD, PhD**  
*Professor of Pediatrics, Pathology and Cell Biology and Systems Biology, Institute for Cancer Genetics*

### 14:10 SESSION 3 Q&A

### 14:20 Break (10 min.)

## SESSION 4: MUSCULOSKELETAL SYSTEM

### 14:30 Remarks from Session Chair



**Clark T. Hung, PhD** *Professor of Biomedical Engineering and Orthopedic Sciences (in Orthopedic Surgery); Director, Cellular Engineering Laboratory*

### 14:32 “Diffusion Tensor MR Imaging for Evaluation of the Growth Plate (Physis) and Adjacent Metaphysis”



**Diego Jaramillo, MD, MPH**  
*Professor of Radiology, CUIMC; Director of MRI at Morgan Stanley Children’s Hospital; Vice Chair of Diversity*

### 14:44 “Inflammation Alters Cellular Mechanobiology in Intervertebral Disc Degeneration”



**Nadeen Chahine, PhD**  
*Associate Professor of Biomechanics (in Orthopaedic Surgery) and Biomedical Engineering*

### 14:56 “Insights into Fracture Risk from New Imaging and Bioengineering Techniques”



**Marcella Walker, MD**  
*Associate Professor of Medicine, Vagelos College of Physicians and Surgeons*

### 15:08 “Decoding Synovial Joint Regeneration in Zebrafish”



**Joanna Smeeton, PhD**  
*H.K. Corning Assistant Professor Rehabilitation and Regenerative Medicine Research (in Rehabilitation and Regenerative Medicine) (in Genetics and Development), CUIMC*

### 15:20 SESSION 4 Q&A

### 15:30 Break (5 min.)

## SESSION 5: DOCTORAL ALUMNI AWARDEE PRESENTATIONS

### 2020 Recipients of the Yuen-huo Hung & Chao-chin Huang Award in Biomedical Engineering

### 15:35 Remarks from Session Chair



**Clark T. Hung, PhD** *Professor of Biomedical Engineering and Orthopedic Sciences (in Orthopedic Surgery); Director, Cellular Engineering Laboratory*

### 15:40 “Focused Ultrasound-induced Blood-brain Barrier Opening”



**Maria Eleni (Marilena) Karakatsani, PhD (Columbia BME PhD ’20)**  
*Associate Scientist, Regeneron Pharmaceuticals*

### 15:50 “Pulsed Electromagnetic Field Stimulation as a Non-Invasive Strategy to Promote Cartilage Repair and Regeneration”



**Robert M. Stefani, PhD (Columbia BME PhD ’20)**  
*Lead Reviewer, U.S. Food & Drug Administration (FDA)*

### 16:00 SESSION 5: Q&A

### 16:05 Closing Announcements



**X. Edward Guo, PhD**  
*Chair and Stanley Dicker Professor of Biomedical Engineering; Professor of Medical Sciences (in Medicine)*

# INTERACTIVE DISCUSSION

## SESSION 6: INTERACTIVE DISCUSSION & NETWORKING (*Attendance by invitation only*)

### 16:10 **Remarks from the Session Chair**



**X. Edward Guo, PhD**

*Chair and Stanley Dicker Professor, Biomedical Engineering; Professor, Medical Sciences (in Medicine); Director, Bone Bioengineering Laboratory*

### 16:15 **Panel Discussion**



**Henry Hess, PhD**

*Chair of Graduate Studies; Professor, Biomedical Engineering; Director, Laboratory for Nanobiotechnology and Synthetic Biology*



**Maria Eleni (Marilena) Karakatsani, PhD (Columbia BME PhD '20)**

*Associate Scientist, Regeneron Pharmaceuticals*



**Aaron Kyle, PhD**

*Senior Lecturer, Biomedical Engineering Design; Director, Undergraduate Studies in Biomedical Engineering*



**Helen H. Lu, PhD**

*Percy K. and Vida L. W. Hudson Professor, Biomedical Engineering; Director, Biomaterials & Interface Tissue Engineering Laboratory*



**Katherine Reuther, PhD**

*Senior Lecturer, Biomedical Engineering; Director, Master's Studies in Biomedical Engineering*



**Paul Sajda, PhD**

*Professor, Biomedical Engineering, Electrical Engineering and Radiology (Physics); Director, Laboratory for Intelligent Imaging & Neural Computing (LIINC)*



**Robert M. Stefani, PhD (Columbia BME PhD '20)**

*Lead Reviewer, U.S. Food & Drug Administration (FDA)*

### 16:45 **Networking**

#### VIRTUAL NETWORKING AREAS

- Coffee Corner
- Biomedical Imaging
- Biomechanics
- Cell & Microbiology
- Neuroengineering
- Systems Biology
- Tissue Engineering

### 17:30 **Adjourn**

Cover image courtesy of Tal Danino, Columbia University / Piper Treuting, University of Washington: Immunohistochemistry staining of T cell populations in colorectal tumor tissue. "Engineered probiotics for local tumor delivery of checkpoint blockade nanobodies" [study](#) published in *Science Translational Medicine* 12 Feb 2020.