



# FIFTH ANNUAL BRAIN Initiative<sup>®</sup> Investigators Meeting

## Meeting Program

### THURSDAY, APRIL 11, 2019

- 8:30 am - 9:30 am **Plenary Address** – Understanding Human Brain Development and Disease:  
From the Embryo to Brain Organoids  
*Speaker: Paola Arlotta*
- 9:30 am - 12:30 pm **Poster Session 1**
- 10:30 am - 11:30 am **BRAIN Science Communication Workshop** - How to Talk to the Public about BRAIN Science  
Room: Delaware  
*Speaker: Jon Hamilton*
- 11:45 am - 1:00 pm **Lunch**
- 1:00 pm - 2:15 pm **RESEARCH HIGHLIGHT TALKS, SESSION 1**
- TRACK 1: Cells & Circuits**  
Room: Salon 1
- Multi-Site Non-Invasive Magnetothermal Excitation and Inhibition of Deep Brain Structures**  
*Speaker: Polina Anikeeva*
  - PESCA: A Scalable Platform for the Development of Cell-type-specific Viral Drivers**  
*Speaker: Sinisa Hrvatin*
  - Second-generation Monosynaptic Tracing**  
*Speaker: Lei Jin*
- TRACK 2: Recording, Modulating, and Imaging Technologies**  
Room: Virginia
- Tools for Noninvasive Brain Imaging, Decoding, and Modulation**  
*Speaker: Walter Besio*
  - Extending Multiphoton Microscopy to Deep Brain Imaging in Freely Moving Mice**  
*Speaker: Emily Gibson*
  - Customized Computing for Calcium Image and Electrophysiological Signal Processing in Closed Loop**  
*Speaker: Jason Cong*
- TRACK 3: Understanding the Brain**  
Room: Washington 1 & 2
- Dynamically Relevant Motifs in Inhibition-dominated Neural Networks**  
*Speaker: Carina Curto*
  - Development of Preconfigured and Replay Sequences in the Hippocampus**  
*Speaker: George Dragoi*
  - Functions of Time and Space (and their Laplace Transforms) in the MTL**  
*Speaker: Marc Howard*

2:20 pm - 3:35 pm

## RESEARCH HIGHLIGHT TALKS, SESSION 2

### TRACK 1: Cells & Circuits

Room: Salon 1

#### **Characterizing Area Specific Cortical Cell Types in the Developing Human Brain**

*Speaker: Aparna Bhaduri*

#### **Engineering Photoactivatable Toxins for Long-term Synapse Silencing**

*Speaker: Matthew Kennedy*

#### **Viral-Assisted Circuit Mapping of Cell-Specific Output Pathways of the GPe**

*Speaker: Aryn Gittis*

### TRACK 2: RECORDING, MODULATING, AND IMAGING TECHNOLOGIES

Room: Virginia

#### **Focused Ultrasound and Functional MRI for Combined Neuromodulation and Imaging of Non-human Primate Brain Circuits**

*Speaker: Charles Caskey*

#### **Early Feasibility Study of a Visual Cortical Prosthesis for the Blind: The Orion Visual Prosthesis System**

*Speaker: Jessy Dorn*

#### **Neuroroots as Ultra-low Damage, Scalable Neural Interfaces**

*Speaker: Nick Melosh*

### TRACK 3: Understanding the Brain

Room: Washington 1 & 2

#### **Discovering Dynamic Computations from Large-scale Neural Activity Recordings**

*Speaker: Tatiana Engel*

#### **PESCA: Reverse Engineering the Brainstem Circuits that Govern Exploratory Behavior**

*Speaker: David Kleinfeld*

#### **LFADS-PBT: A Large-scale Deep Neural Network Training Framework for Generalized Inference of Neural Population Dynamics**

*Speaker: Chethan Pandarinath*

3:45 pm – 5:15 pm

## SYMPOSIA SESSIONS

### **Bridging Animal and Human Brain Research with fMRI**

Room: Washington 1 & 2

*Speakers: Anna Devor, Jonathan Polimeni, Dora Hermes, Thomas Naselaris*

### **Emerging Technologies in Studying Spinal Cord Circuitry and Dynamics**

Room: Virginia

*Speakers: Ariel Levine, Chris Schaffer, Lucy Vulchanova, John Gore, Carl Saab*

### **Optical Recording of Released Neurotransmitters, Membrane Voltage Changes, and Second Messenger Cascades**

Room: Salon 1

*Speakers: Lin Tian, Joshua Berke, Eric Schreiter, Na Ji, Tianyi Mao, Loren Looger, Ryohei Yasuda*

5:15 pm – 5:30 pm

### **Break**

5:30 pm – 6:30 pm

### **Advisory Committee to the Director BRAIN Initiative Working Group 2.0 Town Hall**

*Speakers: Catherine Dulac, John Maunsell, Jim Eberwine, Jeff Kahn*

*Moderator: Francis Collins*

## **FRIDAY, APRIL 12, 2019**

- 8:30 am - 9:30 am **Plenary Address – Space and Time: Network Dynamics of the Entorhinal Cortex**  
*Speaker: Edvard Moser*
- 9:30 am – 12:30 pm **Poster Session 2**
- 10:00 am – 11:30 am **Neuroethics: An Essential Partner to Enhance Neuroscience**  
Room: Washington 5  
*Speakers: Walter Koroshetz, Khara Ramos, Hank Greely, Christine Grady, Michael Garwood, Francis Shen, Sara Goering, Eran Klein, Darin Dougherty, Gordon Baltuch*
- 10:30 am - 11:30 am **BRAIN Science Communication Workshop - How to Talk to the Media about BRAIN Science**  
Room: Delaware  
*Speakers: Betsy Stark*
- 11:30 am – 1:00 pm **NIH Funding and You: A Trainee's Practical Guide to Surviving and Thriving in Your Research Career**  
Room: Washington 4  
*Speakers: Michelle Jones-London, Michele Rankin, Ashlee Van't Veer*
- 11:45 am – 1:00 pm **Lunch**
- 1:00 pm - 2:15 pm **RESEARCH HIGHLIGHT TALKS, SESSION 3**
- TRACK 1: Cells & Circuits**  
Room: Salon 1
- NeMO Analytics – a Visualization and Analysis Environment for the NeMO Ecosystem**  
*Speaker: Ronna Hertzano*
  - Epigenomic Landscape of Mouse Rostral Brain by Single Nucleus Methylation Sequencing**  
*Speaker: Hanqing Liu*
  - Simultaneous Analysis of Transcription Factor Binding and mRNA Expression in Single Cells**  
*Speaker: Robi Mitra*
- TRACK 2: RECORDING, MODULATING, AND IMAGING TECHNOLOGIES**  
Room: Virginia
- All-optical Electrophysiology Probes E/I Balance in Awake Mice**  
*Speaker: Adam Cohen*
  - Nanosensors for Chemical Imaging of Acetylcholine in the Brain using MRI**  
*Speaker: Heather Clark*
  - Wireless and Programmable Recording and Stimulation of Deep Brain Activity in Freely Moving Humans Immersed in Virtual (or Augmented) Reality**  
*Speaker: Nanthia Suthana*
- TRACK 3: UNDERSTANDING THE BRAIN**  
Room: Washington 1 & 2
- Spatiotemporal Patterns of BOLD Reflect Neuromodulation**  
*Speaker: Shella Keilholz*
  - Task-dependent Changes in the Large-scale Dynamics and Necessity of Cortical Regions**  
*Speaker: Lucas Pinto*
  - PanNeuro: Leveraging a Community-based Approach for Big Data Neuroscience**  
*Speaker: Ariel Rokem*

2:20 pm – 3:35 pm

## RESEARCH HIGHLIGHT TALKS, SESSION 4

### TRACK 1: Cells & Circuits

Room: Salon 1

#### **Development of Genetically-Encoded Multiplex Barcodes for Cell Labeling Under Electron Microscope**

*Speakers: Yulong Li, Rongbo Sun*

#### **Spatially-targeted Optical Delivery of Genes to Central Nervous System**

*Speaker: Samarendra Mohanty*

#### **Single-cell Multi-omic Profiling Uncovers Gene Regulatory Diversity in Human and Non-human Primate Brains**

*Speaker: Chongyuan Luo*

### TRACK 2: Recording, Modulating, and Imaging Technologies

Room: Virginia

#### **Effective Brain Stimulation is Linked to Functional Network Markers**

*Speaker: Mark Halko*

#### **Imaging Deeper, Wider and Faster: Cornell NeuroNex Hub for Large Scale Recording of Neural Activity**

*Speaker: Chris Xu*

#### **Flexible Neural Probe Arrays for Large-scale Cortical and Subcortical Recording**

*Speaker: Ellis Meng*

### TRACK 3: Understanding the Brain

Room: Washington 1 & 2

#### **Using MRI for Pre-symptomatic Prediction: An Ethical Exploration of the Promises and Challenges for Autism Spectrum Disorder**

*Speaker: Katherine MacDuffie*

#### **Subthalamic Nucleus Activity Encodes Aspects of Speech Production**

*Speaker: Mark Richardson*

#### **Multiscale Dynamic Modeling and Decoding of Spike-field Activity**

*Speaker: Maryam Shanechi*

3:45 pm – 5:15 pm

## SYMPOSIA SESSIONS

### **Advanced Circuit and Cellular Imaging Methods in Non-Human-Primates**

Room: Virginia

*Speakers: Susana Martinez-Conde, Ian Nauhaus, Kristina Nielsen, Shiming Tang, Azadeh Yazdan-Shahmorad, Nicholas Priebe, Stephen Macknik*

### **Advances in Mapping Neural Connectivity**

Room: Salon 1

*Speakers: Ken Hayworth, Wei-Chung Allen Lee, Kwanghun Chung, Fan Wang*

### **Integrative Approaches to the Study of Sensorimotor Pathways**

Room: Washington 1 & 2

*Speakers: Gwyneth Card, Misha Ahrens, Lisa Stowers, Andrew Leifer, Brad Dickerson, Mala Murthy, Michael Dickinson*

5:15 pm – 5:40 pm

## Break

5:40 pm – 6:30 pm

### **Plenary Address – Self-Control, Free Will, and Responsibility: A Neurophilosophical Perspective**

*Speaker: Patricia Churchland*

## **SATURDAY, APRIL 13, 2019**

- 8:30 am - 9:30 am      **Plenary Address** – Dimensionless Numbers in Brain Science  
*Speaker: Markus Meister*
- 9:30 am – 12:30 pm      **Poster Session 3**
- 10:30 am - 11:30 am      **BRAIN Science Communication Workshop**- How to Use Social Media to Promote BRAIN Science  
Room: Delaware  
*Speakers: Rohan Verma*
- 12:30 pm – 1:45 pm      **Lunch**
- 1:45 pm – 3:15 pm      **SYMPOSIA SESSIONS**
- Neuropharmacology at the Age of the BRAIN Cell-Census**  
Room: Washington 1 & 2  
*Speakers: Jim Eberwine, Michael Tadross, Yamuna Krishnan, Henry Lester*
- Tractable and Realistic Models of Cortex: Biophysically Detailed Neuron and Network Modeling in the Identification of Circuit Function**  
Room: Virginia  
*Speakers: Kenneth Miller, Jeanette Kotaleski, Bill Lytton, Brent Doiron, Dieter Jaeger, Krešimir Josić, Andreas Tolias*
- Ultrasound Neuromodulation and Functional Ultrasound Imaging of Brain Activity: from Blood Flow to Molecules**  
Room: Salon 1  
*Speakers: Merrit Maduke, Pierre Pouget, Wynn Legon, Sophie Pezet, Charles Caskey, Kim Butts Pauly, Mikhail Shapiro, Mickael Tanter*
- 3:30 pm – 5:30 pm      **FOCUSED SESSIONS**
- Opportunities through the HEAL Initiative for BRAIN Investigators**  
Room: Salon 1  
*Speakers: Stephanie Fertig, Michael Wolfson, Nick Langhals, Chris Boshoff, Ivan Montoya*
- U19 Data Science Core Consortium Meeting**  
Room: Washington 5  
*Speakers: Raj Bose, Ben Dichter, Adam Mar, Elizabeth Powell, Doug Kim, Grace Peng*
- BRAIN Initiative Informatics Infrastructure**  
Room: Delaware
- Frontiers of Non-Invasive Brain Imaging**  
Room: Virginia  
*Speakers: Larry Wald, Kamil Ugurbil, David Feinberg*
- 5:30 pm                      **Adjourn**