



January 21, 2019 (Mon) 14:00-18:20

Venue : TOKYO ELECTRON House of Creativity, Katahira campus, Tohoku University

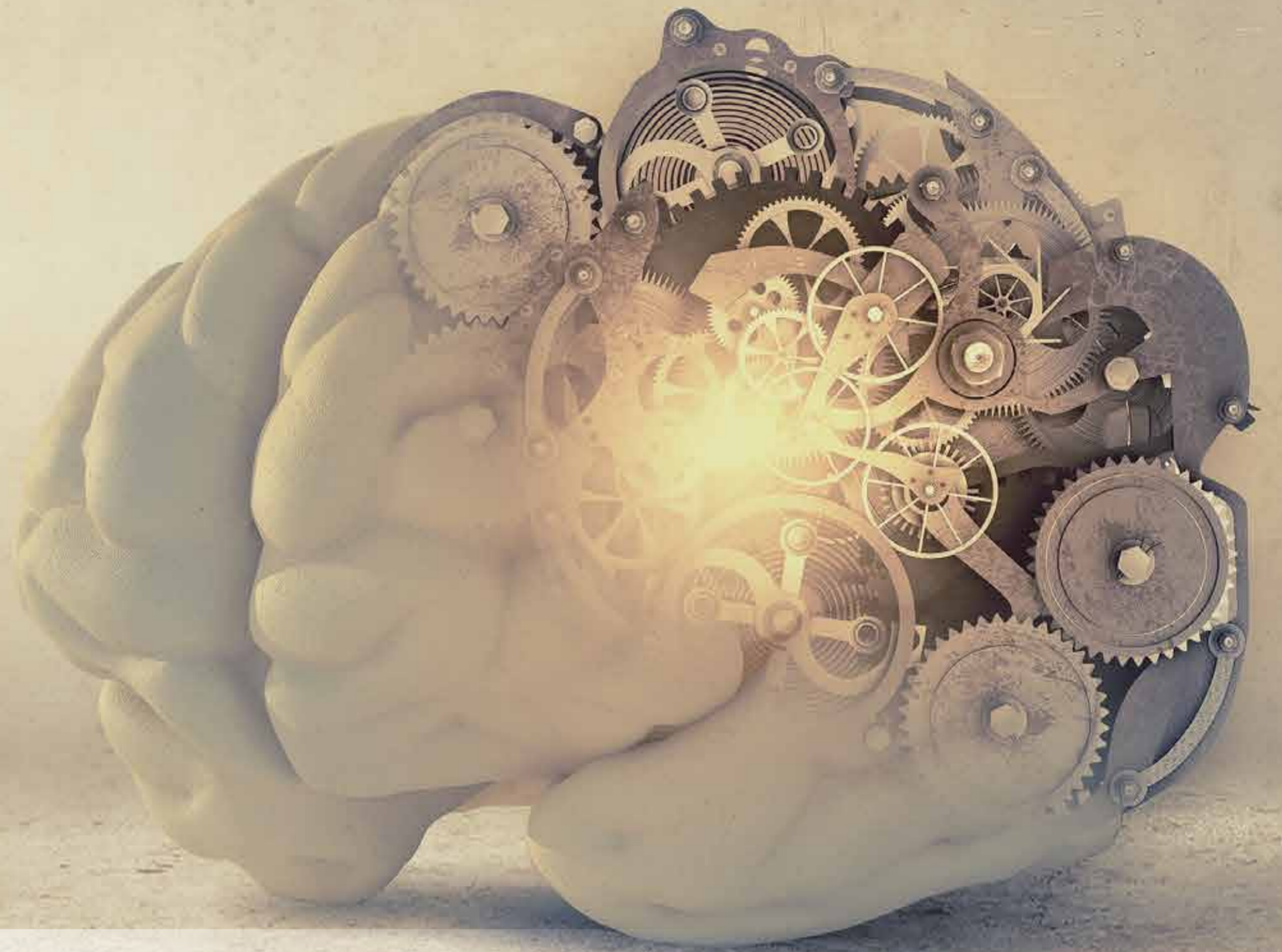
The 2nd FRIS-TFC Joint Symposium

# Unlocking the Brain

## — from Engineering Approaches

**Brain** defines who we are. It is the most complicated system in the universe, the function of which is so delicately performed via each individual neuron and glial cell. Endeavors from generations of enthusiastic neuroscientist have been dedicated to peek into brain, in order to figure out detailed mechanisms underlying their function. Unraveling such mysteries will not be possible if mere biological approach is adopted.

We encourage interdisciplinary effort, across chemistry, physics, material sciences, electronics or engineering at large, work together to untangle such long-standing mysteries. Taking together, this symposium aims to bring people from different fields who endeavor to unlock the brain.



### Keynote Speakers



**Polina Anikeeva, Ph.D.**  
Massachusetts Institute of Technology, MIT  
*Electronic, Optical, and Magnetic Tools to Study the Nervous System*

We develop novel neural interface technologies aimed at mimicking the material properties and transduction mechanisms of the nervous system. Specifically, we create flexible and stretchable multifunctional fiber probes suitable for recording and stimulation of neural activity as well as delivery of drugs and genetic information into the brain and spinal cord. In addition, we develop a broad range of magnetic nanotransducers that can deliver thermal, chemical, and mechanical stimuli to neurons when exposed to externally applied magnetic fields.



**Haruhiko Bito, M.D., Ph.D.**  
The University of Tokyo  
*Rational Engineering of Novel Optical Sensors to Spy on Neuronal Synapse-to-Nucleus Signaling*

We aim to understand how the information encoded in the genome interacts with and modify ongoing neuronal and synaptic activities. Basic insights on the  $Ca^{2+}$  signaling underlying learning and memory helped design next-generation optical probes to illuminate neuronal coding and information processing in active neuronal circuits in vivo.

### Speakers



**Ritchie Chen, Ph.D.**  
Stanford University  
*Profiling molecular, structural, and functional features within intact biological systems*



**Norio Takada Ph.D.**  
Keio University  
*Optogenetic fMRI for investigation of physiological basis of BOLD signal generation*



**Ko Matsui, Ph.D.**  
Tohoku University  
*Multimodal expression and control of brain information*