

7th NTC Symposium
Voltage Imaging: A Next-Generation Technology for Neuroscience
December 13th and 14th, 2018

Jerome L. Greene Science Center 9th Floor Lecture Hall
Columbia University Manhattanville Campus
3227 Broadway (at West 129th Street)
New York, NY 10027

Organizers

Rafael Yuste (Neurotechnology Center)
Darcy Peterka (Neurotechnology Center and Zuckerman Mind Brain Behavior Institute)
Yuki Bando (Neurotechnology Center and Hamamatsu University)

Sponsors

National Science Foundation
Neurotechnology Center
Zuckerman Mind Brain Behavior Institute

WEDNESDAY, DECEMBER 12th

Welcome dinner for Speakers: 8:00 – 10:00 p.m.

CHANGE IN VENUE AND TIME: Silvia's (328 Malcolm X Blvd, New York, NY 10027)

THURSDAY, DECEMBER 13th

Breakfast and Registration: 8:00 – 8:30 a.m.

Welcome: 8:30 – 8:45 a.m.

Rafael Yuste (Columbia Neurotechnology Center)

Steve Siegelbaum (Columbia Zuckerman Mind Brain Behavior Institute)

Session 1: Historical Keynotes: 8:45 - 9:45 a.m.

Moderator: Rafael Yuste (Columbia University)

8:45-9:15 Lawrence Cohen (Yale University): Something old: Spikes in individual neurons.
Something new: The olfactory bulb contribution to perception.

9:15-9:45 Amiram Grinvald (Weizmann Institute of Science): How optical imaging technologies can shed light on concealed fundamental mechanisms underlying higher brain functions

Session 2: Genetic Sensors

Moderator: Pancho Bezanilla (University of Chicago)

9:45-10:15 Thomas Knöpfel (University College, London): Idea, Conceptualization, and Towards Practical Application of Genetically Encoded Voltage Indicators

10:15-10:45 Vincent Pieribone (Yale University): Protein-based optical voltage indicators – state of the art

Coffee break: 10:45 – 11:00 a.m.

11:00-11:30 Michael Lin (Stanford University): Two-photon voltage recordings in awake mice with improved genetically encoded indicators

11:30-12:00 Francois St-Pierre (Baylor College of Medicine): Enabling Multiphoton Voltage Imaging with Designer Probes

12:00-12:30 Yuki Bando (Hamamatsu University): Simultaneous two-photon imaging of action potentials and subthreshold potentials with genetically-encoded indicators *in vivo*

Lunch: 12:30 – 1:30 p.m.

Session 3: Sensors and Chemistry

Moderator: Yuki Bando (Hamamatsu University)

1:30-2:00 Adam Cohen (Harvard University): All-Optical Electrophysiology in Behaving Mice

2:00-2:30 Ed Boyden (Massachusetts Institute of Technology): Evolving and Designing Optical Tools for Observing and Controlling Neural Circuits

2:30-3:00 Evan Miller (University of California, Berkeley): Electrophysiology, Unplugged: Voltage Imaging with Synthetic Fluorophores

Coffee break: 3:00– 3:15 p.m.

3:15-3:45 Eric Schreier (Janelia Research Campus): Chemigenetic Indicators of Neuronal Activity

3:45-4:15 Pancho Bezanilla (University of Chicago): Recording and Stimulation with Light

4:15-4:45 Rafael Yuste (Columbia University): Non-conventional Approaches to Voltage Imaging: SHG, Nanoparticles and Nanodiamonds

4:45 – 5:00 p.m. Summary Day 1 (Pancho Bezanilla and Yuki Bando)

Poster Session and Reception: 5:00 – 7:00 p.m.

*Dinner for Speakers: 7:00 – 9:00 p.m.
Harlem's Floridita (2276 12th Ave, New York, NY 10027)*

FRIDAY, DECEMBER 14TH

Breakfast: 8:00 – 8:30 a.m.

Session 4: Sensors and Optics

Moderator: Rafael Yuste (Columbia University)

8:30-9:00 Mark Schnitzer (Stanford University): Optical voltage studies in behaving mice and flies

9:00-9.30 Dali Sames (Columbia University): Chemical Targeting of Voltage Sensitive Dyes

9:30-10.00 Yamuna Krishnan (University of Chicago): DNA-based fluorescent reporters for quantitative chemical imaging

10:00-10.30 Na Ji (University of California, Berkeley): kHz Frame Rate Imaging of Genetically Encoded Activity Indicators

Coffee break: 10:30 – 10:45 a.m.

10:45-11.15 Darcy Peterka (Columbia University): Controlling sparsity for fast functional imaging

11:15-11.45 Valentina Emiliani (Photonics Institute): Holographic voltage imaging

11.45-12.15 Elizabeth Hillman (Columbia University): High speed imaging of whole-brain activity

Lunch: 12:15 – 1:30 p.m.

Session 5: Computational Approaches

Moderator: Darcy Peterka (Columbia University)

1:30-2:00 Laura Waller (University of California, Berkeley): Single-shot 3D computational microscopy for neural activity tracking

2:00-2.30 Liam Paninski (Columbia University): Denoising, Compressing, and Demixing Voltage Imaging Data

2:30-3:00 Genevera Allen (Rice University & Baylor College of Medicine): Graph
Quilting: Graphical Model Estimation from Non-Simultaneous Neural Recordings

3:00-3:30 Summary Day 2 (Rafael Yuste and Darcy Peterka)

3:30 Meeting Adjourns