

Sunday, October 16

3:00 pm Check-in

6:00 pm Reception (*Lobby*)

7:00 pm Dinner

8:00 pm Session 1: Welcome & Opening Talks

8:00 pm **Michael N. Nitabach**, Yale School of Medicine
Pre-optogenetics history of genetic manipulation of neuronal activity

8:30 pm **Edward S. Boyden**, Massachusetts Institute of Technology
Towards ground-truth analysis of neural circuit computations

9:00 pm Refreshments in the Pub

NOTE:
Meals are in the Dining Room
Talks are in the Seminar Room
Posters are in the Lobby

Monday, October 17

Talks are 15 min + 5 min for Q&A

- 7:30 am Breakfast (*service ends at 8:45am*)
- 9:00 am Session 2: Light I**
Chair: Peter Hegemann
- 9:00 am **Chandra Tucker**, University of Colorado School of Medicine
Light control of protein activity using engineered plant photoreceptors
- 9:20 am **Alexander Gottschalk**, Johann Wolfgang Goethe University
*Optogenetic tool development and application in *Caenorhabditis elegans**
- 9:40 am **Ute Hochgeschwender**, Central Michigan University
Bioluminescence-driven optogenetics
- 10:00 am **Andrew Woolley**, University of Toronto
Optical control of protein synthesis with a designed LOV-4EBP chimera
- 10:20 am **Viviana Gradinaru**, California Institute of Technology
On brain circuits and tools: Switches for locomotion, reward, and a viral-based approach to non-invasive whole-brain cargo delivery
- 10:40 am Break
- 11:10 am Session 3: Magnets I**
Chair: Jessica Cardin
- 11:10 am **Alex Jones**, The University of Manchester
Magnetic field effects in proteins
- 11:30 am **Ali D. Guler**, University of Virginia
Remote control of animal behavior via genetically encoded actuators
- 11:50 am **Polina Anikeeva**, Massachusetts Institute of Technology
Modulating cell signaling with magnetic nanomaterials
- 12:10 pm **Jorg Grandl**, Duke University
Magnetogenetics: Engineering of magnetically-activated Piezo ion channels
- 12:30 pm Lunch (*service ends at 1pm*)

- 2:00 pm** **Session 4: Magnets II**
Chair: Loren Looger
- 2:00 pm **Mladen Barbic**, Janelia Research Campus/HHMI
Magneto-genetics from a magnetic measurement perspective
- 2:20 pm **Can Xie**, Peking University
The discovery of magnetoreceptor (MagR) and the beginning of magnetobiology
- 2:40 pm **Sheng-Jia Zhang**, Shenzhen University
Magnetogenetics: Remote non-invasive magnetic activation of neuronal activity with a magnetoreceptor (MAR)
- 3:00 pm **Arnd Pralle**, University at Buffalo, SUNY
Tetherless magnetothermal deep brain neuronal stimulation and silencing modulation behavior in awake, unrestrained mice
- 3:20 pm Break
- 3:50 pm** **Session 5: Magnets III**
Chair: Ed Boyden
- 3:50 pm **Jeffrey M. Friedman**, HHMI/Rockefeller University
Remote control of blood glucose and feeding using electromagnetic fields
- 4:10 pm **Bai Lu**, Tsinghua University School of Medicine
Calcium changes in MagR-expressing cells
- 4:30 pm **Loren Looger**, Janelia Research Campus/HHMI
tbd
- 4:50 pm** **Discussion**
Moderator: Mike Nitabach & friends
- 5:30 pm Poster Reception
- 7:00 pm Dinner
- 8:00 pm Refreshments available at Bob's Pub

Tuesday, October 18

- 7:30 am Breakfast (*service ends at 8:45am*)
- 9:00 am Session 6: Applications I**
Chair: Julie Simpson
- 9:00 am **Erik M. Jørgensen**, HHMI/University of Utah
Synaptic vesicle acidification is a checkpoint for fusion
- 9:20 am **Hongkui Zeng**, Allen Institute for Brain Science
Cell type-specific transgenic mouse tools for manipulating neuronal activity
- 9:40 am **Ehud Isacoff**, University of California, Berkeley
Spatio-temporal gating of synaptic transmission and plasticity
- 10:00 am **Alipasha Vaziri**, Rockefeller University
Optical tools for unraveling whole-brain neuronal circuit dynamics underlying behavior
- 10:20 am Break
- 10:50 am Session 7: Light II**
Chair: Chandra Tucker
- 10:50 am **Peter G. Hegemann**, Humboldt-Universität zu Berlin
New inhibitory optogenetic approaches
- 11:10 am **Anna Moroni**, Università degli Studi di Milano
Improving membrane expression of a synthetic light-gated potassium channel for optogenetics
- 11:30 am **Vladislav Verkhusha**, Albert Einstein College of Medicine
Near-infrared optogenetic system based on bacterial phytochrome
- 11:50 am **Alla Karpova**, Janelia Research Campus/HHMI
tbd
- 12:10 pm Lunch (*service ends at 1pm*)
- 1:00 pm Tour (*optional – meet at reception*)

2:00 pm **Session 8: Molecules**
Chair: Don Arnold

2:00 pm **Richard H. Kramer**, University of California, Berkeley
Optogenetic control of endogenous ion channels and receptors in the nervous system

2:20 pm **Mihai L. Azoitei**, UNC Chapel Hill School of Medicine
Optogenetic and chemogenetic control of proteins in vivo through engineered allosteric regulation

2:40 pm **Dirk Trauner**, Ludwig-Maximilians-Universität München
Chemical optogenetics (and photopharmacology)

3:00 pm **Michael Tadross**, Janelia Research Campus/HHMI
tbd

3:20 pm **Ines Ibañez-Tallon**, Rockefeller University
The use of membrane tethered Cav channel toxins for long-term silencing of circuits controlling social and emotional behaviors

3:40 pm Break

4:10 pm **Session 9: Applications II**
Chair: Anna Moroni

4:10 pm **Jessica A. Cardin**, Yale University School of Medicine
Targeted manipulation of inhibitory neural activity on multiple timescales

4:30 pm **Yun Zhang**, Harvard University
Circuit mechanisms underlying olfactory learning

4:50 pm **Karl Deisseroth**, HHMI/Stanford University
tbd

5:10 pm **Discussion**
Moderators: Chandra Tucker and Peter Hegemann

6:00 pm Poster Reception

7:30 pm Dinner

8:30 pm Refreshments available at Bob's Pub

Wednesday, October 19

- 7:30 am Breakfast (*service ends at 8:45am*)
- 9:00 am Session 10: Applications III**
Chair: Mike Nitabach
- 9:00 am **Harald Janovjak**, Institute of Science and Technology Austria
Toward sonobiology and synthetic neurotransmission
- 9:20 am **Bianxiao Cui**, Stanford University
Optogenetic manipulation of neurotrophin activities
- 9:40 am **Don B. Arnold**, University of Southern California
An E3 ligase-based method for ablating inhibitory synapses
- 10:00 am Break
- 10:30 am Session 11: Applications IV**
Chair: Alipasha Vaziri
- 10:30 am **Kate O'Connor-Giles**, University of Wisconsin-Madison
Genome engineering tools for understanding neurons and the genes that determine their functional properties
- 10:50 am **Brian Duistermars**, California Institute of Technology
A fly comparison of red-shifted channelrhodopsins
- 11:10 am Closing Discussion**
Moderator: Loren Looger & friends
- 12:00 pm Conclusion / Lunch and Departure
- 12:30 pm First shuttle to Dulles
1:30 pm Second shuttle to Dulles
2:30 pm Last shuttle to Dulles