2022 BIG BRAIN IMAGING WORKSHOP AGENDA

DAY 1: Photonics Center, 906 PHO, 8 St. Mary's St.

8:15 AM Check-in trainees arrive: Manuel Marte, mjmarte@bu.edu , Cara Ravasio, cravasio@bu.edu , Michael Scimeca, mscimeca@bu.edu

8:30-9:00 Breakfast (All Attendees) / Check-in

9:00-9:10 Jerry Chen, Welcome

SESSION 1 What Are the Limits For Optical Imaging? I

Session Chairs: Joseph Green, joeg18@bu.edu, Manuel Marte mjmarte@bu.edu

9:10-9:35 **Adam Charles**. Johns Hopkins University
Consider the data: The computational side of big imaging

10:35-10:00 **Alipasha Vaziri.** Rockefeller University
Towards cortex-wide volumetric recording of neuroactivity at cellular resolution

10:00-10:15 **Gordon Smith.** University of Minnesota
Universality of modular correlated networks across the developing neocortex.

10:15-10:25 Break

SESSION 2 What Are the Limits For Optical Imaging? II

Session Chairs: David Lee dglee3@bu.edu, Xin Ye - xinye@bu.edu

10:25-10:50 **David Fitzpatrick.** Max Planck Florida Institute for Neuroscience
Functional synaptic architecture of visual cortex

10:50-11.15 **Jerome Mertz.** Boston University
Strategies for fast volumetric imaging

11:15-11:40 **David Hildebrand.** Rockefeller University
Progress toward examining populations of marmoset face cells with calcium imaging

11:40-12:00 Discussion (Sessions 1 and 2)

12:00-1:20 Lunch (All Attendees)

SESSION 3 Considering Neuronal and Non-Neuronal Signals

Session Chairs: Bingxue Liu, bliu97@bu.edu, Alanna Carey, aecarey3@bu.edu

1:20-1:45 **Prakash Kara.** University of Minnesota
3-photon imaging in cat visual cortex: An ideal system for determining the neural basis of fMRI across cortical layers

1:45-2:10 **Anna Devor.** Boston University
Imaging of O2 consumption across cortical layers with 2-photon phosphorescence microscopy

2:10-2:35 **Eyal Seidemann.** University of Texas Austin
Toward "reading" and "writing" topographic neural population codes in the primate cortex

2:35-2:50 Discussion

2:50-3:05 Break

SESSION 4 **Wearable Technologies for Freely Moving Animals**

Session Chairs: Antonio Ortega-Martinez, aortegam@bu.edu, De'Ja Rogers, dejar14@gmail.com

3:05-3:30 **Emily Gibson**. University of Colorado Anschutz Medical Campus
TBD

3:30-3:55 **Daniel Aharoni.** University of California Los Angeles
Large-scale imaging of network dynamics in freely behaving animals.

3:55-4:20 **Lei Tian.** Boston University
Towards wearable large-scale neural imaging by Computational Miniature Mesoscope

4:20-4:35 Discussion

4:35-4:45 *Break*

4:45-6:00 *3* Breakout sessions

BREAKOUT SESSIONS

1. Imaging Bigger Brains During Freely Moving Behavior (Room PHO 339)

Moderator: Lei Tian

Note Takers: Gabriela Rodriguez-Morales, grod@bu.edu, Kelton Wilmerding, lwilmerd@bu.edu

- What are the critical neuroscience questions that would benefit from freely moving imaging in larger species?
- What are the technical requirements for freely moving imaging in larger species?
- What are the challenges and potential solutions for achieving these requirements? Are these specific to vs. common across species?
- Are there technologies that are not currently being considered worth exploring?
- What community efforts are needed to accelerate progress?

2. Pushing the Optical Limits in Bigger Brains (Room PHO 901)

Moderator: Prakash Kara

Note Takers: Jacob Norman, jfnorman@bu.edu, Caroline Habjan, cahabjan@bu.edu

- What are the critical neuroscience questions that would benefit from pushing the optical limits in larger species?
- Which optical limits needed to pushed to answer these neuroscience questions?
- What are the challenges and potential solutions for achieving these requirements? Are these specific to vs. common across species?
- Are there technologies that are not currently being considered worth exploring?
- What community efforts are needed to accelerate progress?

3. Overcoming Challenges in Animal Preparation (Room PHO Boardroom)

Moderator: Kristina Nielsen

Note Takers: Eleanor Brown, ehbrown@bu.edu, Naomi Shvedov, naomish@bu.edu

- What are the critical neuroscience questions that would benefit from improving current animal preparation approaches?
- What are the challenges and potential solutions for optical implants? Are these specific to vs. common across species?
- What are the challenges and potential solutions for expressing sensors of neural activity? Are these specific to vs. common across species?
- Should we be considering label-free imaging modalities?
- What community efforts are needed to accelerate progress?

6:00-8:00p Dinner (Speakers and Organizers only)

DAY 2: Hillel House, Bay State/Castle Rooms, 213 Bay State Rd.

8:00 AM Check-in Trainees Arrive: Jaimie Girnis, girnisj@bu.edu, Songyang Wang, songyw@bu.edu, Qianwan Yang, yaw@bu.edu

8:15-8:45 Breakfast (All Attendees) / Check-in

8:45-9:15 **Breakout Session Recap**

SESSION 5 Tools and Applications I
Session Chairs: Sudiksha Sridhar, sudiksha@bu.edu, Songyang Wang, songyw@bu.edu

9:15-9:40 **Chris Xu.** Cornell University
Imaging deep and fast with multiphoton microscopy
9:40-10:05 **Anitha Pasupathy.** University of Washington
Multiphoton imaging in the nonhuman primate.
10:05-10:20 **Xindong Song**. Johns Hopkins University (Online)
A silent two-photon imaging system for studying in vivo auditory neuronal functions in awake marmosets
10:20-10:35 **Timo van Kerkoerle**. NeuroSpin, CEA Saclay (Online)
Reliable and long-term three-photon imaging in macaque monkey cortex
10:35-10:45 Break

SESSION 6 Tools and Applications II
Session Chairs: Qianwan Yang, yaw@bu.edu, Songyang Wang, songyw@bu.edu

10:45-11:10 **Kristina Nielsen.** Johns Hopkins University
Tools for two-photon imaging in ferrets and monkeys
11:10-11:35 **Nicholas Priebe.** University of Texas Austin
TBD
11:35-12:00 **Bijan Pesaran.** New York University
A robotic platform for multiregional calcium imaging in the non-human primate brain
12:00-12:20 Discussion (Session 5 and 6)

12:20-12:25 Closing Remarks

12:25 Lunch (All Attendees) and Departure

MAPS AND DIRECTIONS

DAY 1: Photonics Center, 906 PHO, 8 St. Mary's St.
DAY 2: Hillel House, Bay State/Castle Rooms, 213 Bay State Rd.