

Columbia Workshop on Brain Circuits, Memory and Computation

Monday and Tuesday, March 13-14, 2017 | Davis Auditorium, CEPSR

Organizer and Program Chair: Aurel A. Lazar (Columbia University)

The goal of the workshop is to bring together researchers interested in developing executable models of neural computation/processing of the brain of model organisms. Of interest are models of computation that consist of elementary units of processing using brain circuits and memory elements. Elementary units of computation/processing include population encoding/decoding circuits with biophysically-grounded neuron models, non-linear dendritic processors for motion detection/direction selectivity, spike processing and pattern recognition neural circuits, movement control and decision-making circuits, etc. Memory units include models of spatio-temporal memory circuits, circuit models for memory access and storage, etc. A major aim of the workshop is to explore the integration of various sensory and control circuits in higher brain centers.

Program Overview

Monday 09:00 AM - 05:30 PM

09:00 AM - 09:45 AM **Gerald M. Rubin** (HHMI Janelia), Circuits for Learning and Memory in the Adult *Drosophila* Mushroom Body

09:45 AM - 10:30 AM **Ann-Shyn Chiang** (National Tsing Hua U.), Long-Term Memory Requires Sequential Protein Synthesis in Discrete Mushroom Body Output Neurons in *Drosophila*

10:30 AM - 11:00 AM Coffee Break

11:00 AM - 11:45 AM **Albert Cardona** (HHMI Janelia), Brain Circuit Maps of Larval *Drosophila*

11:45 AM - 12:30 PM **Andreas S. Thum** (University of Konstanz), The Larval Standard Brain of *Drosophila*: The Mushroom Body Learning and Memory Network

12:30 PM - 02:00 PM Lunch Break

02:00 PM - 02:45 PM **Silke Sachse** (Max Planck Institute for Chemical Ecology), Parallel Olfactory Coding Mechanisms in the *Drosophila* Brain

02:45 PM - 03:30 PM **Dinu Florin Albeanu** (Cold Spring Harbor Laboratory), Understanding the Function and Specificity of Feedforward and Feedback Signals in Olfaction

03:30 PM - 04:00 PM Afternoon Break

04:00 PM - 04:45 PM **Vijay Balasubramanian** (University of Pennsylvania), Cracking the Olfactory Code

04:45 PM - 05:30 PM **Konrad P. Kording** (Northwestern University), Deep Learning and the Unknown Unknowns of Neuroscience

Tuesday 09:00 AM - 05:30 PM

09:00 AM - 09:45 AM **Barry J. Dickson** (HHMI Janelia), Mating Circuits in the *Drosophila* Brain

09:45 AM - 10:30 AM **Adam H. Marblestone** (MIT), How Improvements in Neuroanatomy Could Shed Light on Cognitive Architecture

10:30 AM - 11:00 AM Coffee Break

11:00 AM - 11:45 AM **Jonathan B. Demb** (Yale University), Synaptic Mechanisms for Visual Computation in the Retina

11:45 AM - 12:30 PM **Marion Silies** (European Neuroscience Institute, Göttingen), Motion Vision: From Behavior to Cellular and Circuit Function

12:30 PM - 02:00 PM Lunch Break

02:00 PM - 02:45 PM **Anmo J. Kim** (Rockefeller University), Quantitative Predictions in a *Drosophila* Visuomotor Network

02:45 PM - 03:30 PM **M. Eugenia Chiappe** (Champalimaud Centre for the Unknown), An Internal Representation of Walking Movements in a Visual Area of the *Drosophila* Brain

03:30 PM - 04:00 PM Afternoon Break

04:00 PM - 04:45 PM **Katherine I. Nagel** (New York University), Neural Circuits Encoding Wind Direction in *Drosophila*

04:45 PM - 05:30 PM **Tim P. Vogels** (University of Oxford), TBA

Registration is free but all participants have to register at: <https://bcmc17.eventbrite.com/>