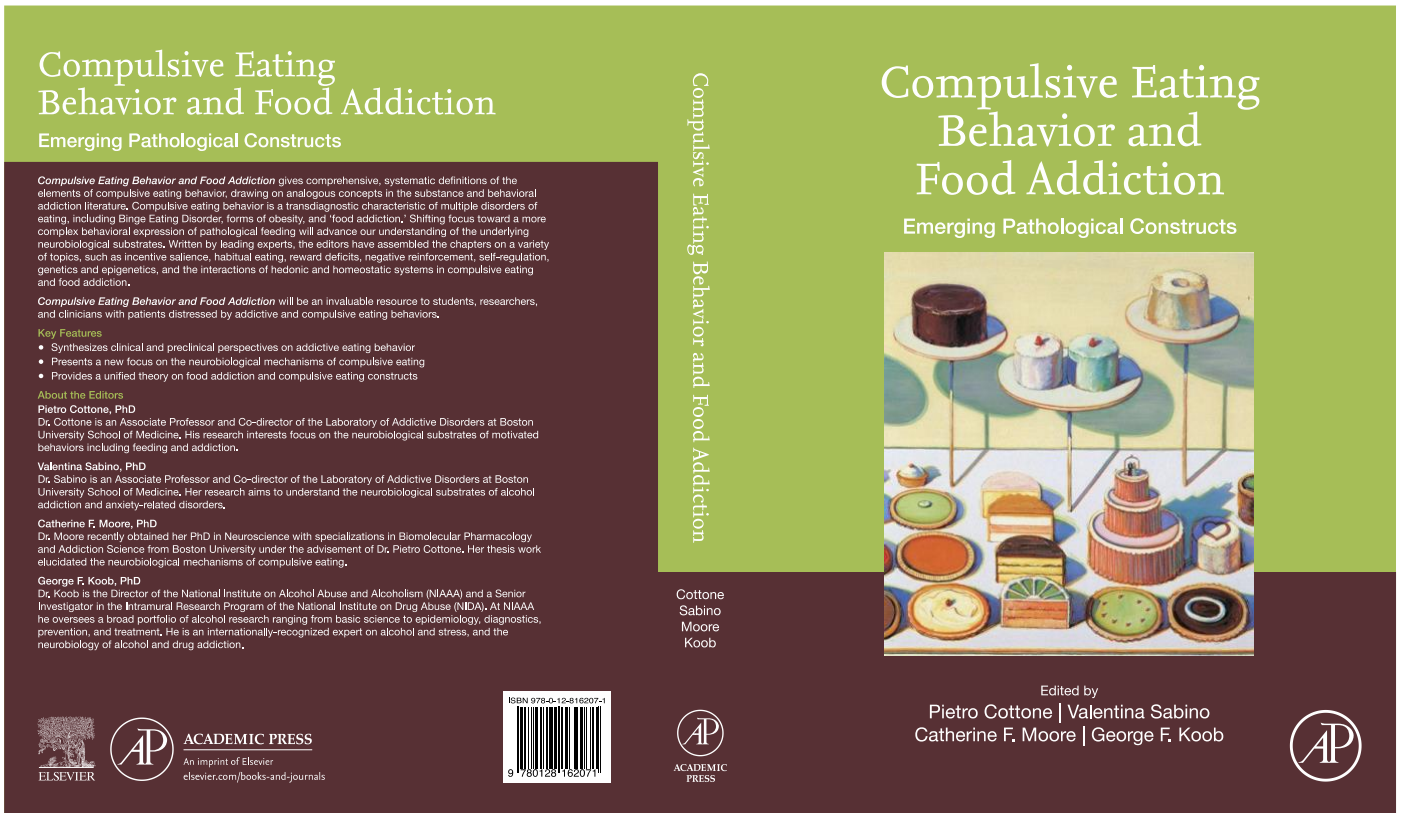
2nd Newsletter: June 12, 2019

# GPN Newsletter

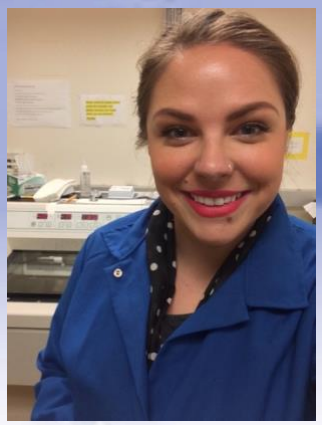
## STUDENT & MENTOR ACCOMPLISHMENTS

**Our recent graduate student, Dr. Catherine Moore worked with Drs. Pietro Cottone and Valentina Sabino on a new book called, "Compulsive Eating Behavior and Food Addiction: Emerging Pathological Constructs," which is set to be released on July 1. Congratulations to our graduate student and faculty members!**



# *Pfizer Summer Internships:*

## *Samantha Shelton & Ashley St. John*



Samantha Shelton
Program: Ph.D. Neuroscience, Biomolecular Pharmacology Specialization
Advisor: Tarik Haydar, Ph.D., Professor, Anatomy & Neurobiology
Research Summary: Samantha is interested in neural stem cells and cortical development.

Internship Summary: *I'm doing a 7 week rotation at Pfizer. My research aims to identify subsets of natural killer cells using flow cytometry, single cell RNA sequencing, and analysis in R. I'll be working as part of the Sequencing Technology Center team in Molecular Systems Immunology. It's the end of my first week and I'm already loving it!*

Ashley St. John
Program: Ph.D. Neuroscience
Advisor: Ian Davison, Ph.D., Assistant Professor, Biology
Research Summary: Ashley is interested in exploring neural underpinnings of emotional behavior, memory, learning and addiction.

*Internship Summary: I am working with Dr. Paul Morgan and Dr. Simeon Ramsey at Pfizer in the Inflammatory and Immunology Unit. A goal of the project involves investigating the contributions of known substrates for peptidylarginine deiminases (PADs) including citrullinated vimentin and histone H3 to the formation of anti-citrullinated protein antibodies (ACPAs) which are thought to have a key role in the pathology leading to rheumatoid arthritis (RA). Potential sources of citrullinated vimentin in RA include activated immune cells, including macrophages and neutrophils. My role in the project involves isolating purified neutrophils, stimulating the neutrophils under different conditions and analyzing neutrophils using Western blot technique.*

# Diversity Initiative

## Luis Ramirez & Michael Rosario

BU Underrepresented Graduate Student Organization (UGSO)

**ACADEMIC SYMPOSIUM**

for minority graduate students of all disciplines

September 26, 2019 | 4-8 pm

Metcalf Trustee Center
1 Silber Way

**Please save the date for a celebration of cross-disciplinary graduate student research at BU.**

**Registration and abstract submission information coming soon!**

***UGSO academic symposium mission statement:***

*Diverse life experiences create unique perspectives. To bridge and promote cre-*

*Michael and I, along with a committee of other graduate students, have been working on various diversity initiatives. First, a NGSO diversity branch where we would provide underrepresented neuroscience undergraduates the mentorship towards becoming successful neuroscience PhD applicants. The second is an event hosted by the Underrepresented Graduate Student Organization (UGSO) on September 26th 2019, designed to bring together graduate students across different schools. The event is an academic symposium where all underrepresented students from both STEM and Humanities are invited to socialize and network with other students and faculty, and a select of these students will present their research. Our vision/mission for this symposium is as follows: Diverse life experiences create unique perspectives. To bridge and promote creative thought across fields, we provide a venue for underrepresented students to share their scholarly work and strengthen relationships with each other and faculty.*

**Save the date: September 26, 2019, from 4 pm – 8 pm!**

# BU Arts Initiative – The NeuroArts Forum:

## Shen Ning & Jenny Klein awarded the interdisciplinary arts grant

**The NeuroArts forum will take place on Friday, October 11, 2019, starting at noon in CILSE 101 & lobby of 610 Commonwealth Avenue. We look forward to seeing you all there!**

*The goal of the NeuroArts Forum is to traverse multiple disciplines to highlight the integration of neuroscience with various artistic mediums. We hope to organize an event that will facilitate crosstalk and collaboration between faculty and students to investigate interdisciplinary topics or create scientifically inspired art/music/movements. Three different guest speakers representing the visual arts, music, and dance will be invited to speak at this event regarding the intersection of neuroscience and an artistic medium. This event will combine expertise from neuroscience and the arts in a unique event to showcase the innovative and interdisciplinary nature of BU's research and educational approach. The invited speakers may cover a range of topics including: the basic neural mechanism underlying a form of art, the benefits of art/music/dance as an alternative therapy for neurological and psychiatric illnesses, and how art/music/dance reshapes the mind and cognition to empower and enrich work and personal life. It will build upon a strong collaboration between the Graduate Program for Neuroscience, which spans the Charles River and Medical Campus, and the College of Fine Arts. The aim is to provide new perspectives and inspiration for budding neuroscientists and artists.*

*This project will introduce BU students in multiple programs and departments that focus on neuroscience, such as the Graduate Program for Neuroscience, Anatomy and Neurobiology, Brain Behavior and Cognition, as well as all others who are interested to their area of expertise through very different mediums. Formal education in the sciences and the arts diverges at a relatively early stage in our current educational system. However, it should be recognized that mastering a scientific field is very much like the arts in that it requires same type of creativity, rigor, and persistence as mastering an art form. Through this event, I hope to help members of the BU community to see the synergy between science and the arts and connect students and faculty members at BU who have similar interests to establish future collaborations on unique and interdisciplinary projects.*

# RUSSEK STUDENT ACHIEVEMENT DAY WINNERS

**The Russek Student Achievement Day was held on Friday, April 26th, 2019 at the Hiebert Lounge of the Medical Campus.**
**The Award Winning Xiaowei Zhuang gave the Keynote Address.**

**First Prize Winner – William Mau**
VISUALIZATION AND MODULATION OF ENSEMBLES IN THE HIPPOCAMPUS AND AMYGDALA DURING FEAR REINSTATEMENT. (Neuroscience, Advisors: H. Eichenbaum & S. Ramirez)


**Second Prize Winner - Ellen Witkowski**
*IN VIVO* NEUROVASCULAR CHANGES IN THE VISUAL CORTEX FOLLOWING CLOSED-SKULL MILD TRAUMATIC BRAIN INJURY (Advisor: I. Davidson)

(Don't forget to check out her new manuscript below)

Witkowski, E. D., Gao, Y., DeWalt, G. J., Eldred, W. D., & Davison, I. G. (2019). Rapid changes in synaptic strength after mild traumatic brain injury. *Frontiers in Cellular Neuroscience*, *13*, 166. https://doi.org/10.3389/fncel.2019.00166

**Third Prize Winner - Elizabeth Spencer**
CHARACTERIZING THE RELATIONSHIP BETWEEN FUNCTIONAL CONNECTIVITY AND NEUROCOGNITIVE DEFICITS IN BENIGN EPILEPSY WITH CENTROTEMPORAL SPIKES (Advisor: M. Kramer)

**Congratulations to our winners! Thank you to all of our students who applied and to our faculty mentors. We look forward to next year's Achievement Day!**

# 2019 GPN STUDENT DEFENSES!

**ELLEN WITKOWSKI, PHD**
**POSTDOCTORAL FELLOW,**
**BOSTON UNIVERSITY**

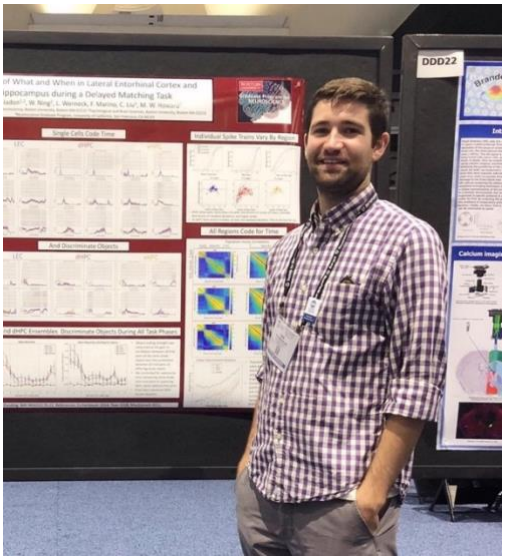
*"RAPID CHANGES IN NEURAL FUNCTION AND CEREBRAL BLOOD FLOW AFTER MILD TRAUMATIC BRAIN INJURY"*

**CATHERINE MOORE, PHD**
**POSTDOCTORAL FELLOW,**
**JOHN HOPKINS UNIVERSITY**

*"THE NEUROBIOLOGICAL BASES OF COMPULSIVE EATING"*

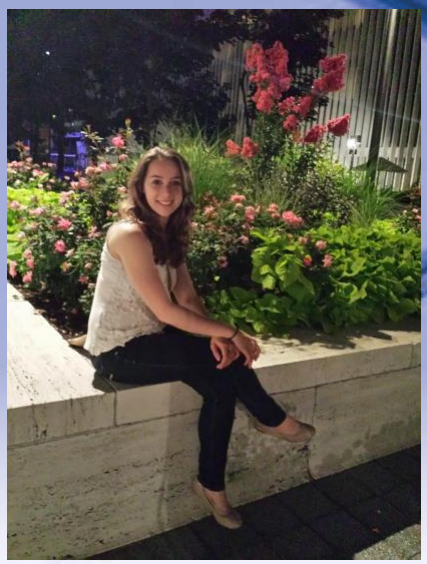
**NATHANIEL KINSKY, PHD**
**POSTDOCTORAL FELLOW,**
**UNIVERSITY OF MICHIGAN**

*"LONG-TERM STABILITY OF THE HIPPOCAMPAL NEURAL CODE AS A SUBSTRATE FOR EPISODIC MEMORY"*




**JOHN BLADON, PHD**
**POSTDOCTORAL FELLOW,**
**BOSTON UNIVERSITY**

*"THE HIPPOCAMPUS AND ENTORHINAL CORTEX MAP EVENTS ACROSS SPACE AND TIME"*



**IRIS TRUTZER, PHD**
**RE-ENTERING MEDICAL SCHOOL,**
**BOSTON UNIVERSITY**

*"POSTNATAL DEVELOPMENT OF EXCITATORY AND INHIBITORY PREFRONTAL CORTICAL CIRCUITS AND THEIR DISRUPTION IN AUTISM"*

**MAREK KOWALSKI, PHD**
**RE-ENTERING MEDICAL SCHOOL,**
**BOSTON UNIVERSITY**

*"LARGE-SCALE NEURAL RECORDINGS AND BIOPHYSICAL MODELS FOR INFERRING NETWORK MECHANISMS OF KETAMINE ANESTHESIA"*

**MICHAEL ROMANO, PHD**
**RE-ENTERING MEDICAL SCHOOL,**
**BOSTON UNIVERSITY**

*"POPULATION ANALYSIS OF THE STRIATUM DURING VOLUNTARY MOVEMENT"*


**KATHRYN HIXSON, PHD**
**POSTDOCTORAL FELLOW,**
**UNIVERSITY OF NORTH CAROLINA**

*"MAPPING THE TRANSCRIPTOME OF NEURONAL JAK/STAT SIGNALING IN RESPONSE TO STATUS EPILEPTICUS"*

**SEAN TOBYNE, PHD**
**CHARLES RIVER ANALYTICS,**
**CAMBRIDGE, MASSACHUSETTS**

*"NETWORK ORGANIZATION OF SENSORY-BIASED AND MULTI-SENSORY WORKING MEMORY AND ATTENTION IN HUMAN CORTEX WITH FMRI"*


**WILLIAM MAU, PHD**
**POSTDOCTORAL FELLOW,**
**MOUNT SINAI MEDICAL SCHOOL**

*"NEURAL PATTERNS OF HIPPOCAMPUS AND AMYGDALA SUPPORTING MEMORY OVER LONG TIMESPANS"*

# Celebrating our outstanding faculty!

## 2019 William Fairfield Warren Distinguished Professors

BU Today 04.30.2019 By Amy Laskowski

It's been a year of professional triumphs for Ann McKee, who does groundbreaking research into chronic traumatic encephalopathy (CTE) and repeated head trauma in soldiers and athletes. In addition to being elected to the National Academy of Medicine, the School of Medicine professor of neurology and pathology also received a lifetime achievement award from the Alzheimer's Association International Conference and was named one of *Time*'s 2018 100 most influential people.

"Through her research and public spokesmanship, Dr. McKee has transformed the national—and international—conversation about sport safety," Brown says. "Like her fellow Warren Professors she reflects the best of Boston University and what we seek to achieve in the world."

McKee is the director of BU's CTE Center, whose brain bank has more than 600 brains donated by professional athletes and their families and by many others. CTE is associated with dementia, mood changes, and aggression.

The director of BU's Center for Systems Neuroscience, Michael Hasselmo uses neurophysiological recording and computer modeling to link the dynamics of cortical circuits to memory-guided behavior. His work is relevant to how memory and cognitive function are impaired in individuals with Alzheimer's disease and schizophrenia.

Last year, Hasselmo was inducted into the American Academy of Arts & Sciences. He is a member of numerous scientific journal editorial boards, including the board of reviewing editors at *Science,* as well as a fellow of the American Association for the Advancement of Science. He is also a principal investigator on two National Institutes of Health R01 grants and a $7.5 million Office of Naval Research Multidisciplinary University Research Initiative Award and is a mentor in the University-wide Graduate Program for Neuroscience.

Click here to read the full article on BU Today!

# BU-led Research Team Wins Competitive $7.5 million MURI Grant to Create Neuro-Autonomous Robots

By Maureen Stanton, CISE

Dream Team of Engineers, Computer Scientists, and Neuroscientists from BU, MIT, and Australia to develop neuro-inspired capabilities for Land, Sea, and Air-based Autonomous Robots

A Boston University-led research team was selected to receive a $7.5 million Multidisciplinary University Research Initiative (MURI) grant from the U.S. Department of Defense (DoD). With this prestigious grant, the researchers will develop a novel category of neuro-inspired autonomous robots for land, sea, and air that the investigators have termed "neuro-autonomous."

"While there are some very exciting computational theories, computational neuroscience has not yet fully accounted for the mechanisms and the function of all these interesting experimental phenomena," says Professor Hasselmo, director of the Center for Systems Neuroscience at Boston University. "This project offers an exciting opportunity to collaborate with engineering in order to provide the mathematical and theoretical framework necessary. Further, this project offers the potential for some major theoretical breakthroughs for understanding cognition. While we will be focusing on navigation, elements of the algorithms we will develop could apply to a broad range of different types of intelligent behavior."

Michael Hasselmo,
Director, BU Center for Systems Neuroscience

"The MURI project is a fantastic opportunity for us to combine knowledge and expertise across disciplines. As a neuroscientist, I find it fascinating to think about the speed and flexibility of human cognition, and I've learned a tremendous amount about what state-of-the-art robotics can and cannot do from my interactions with roboticists on the MURI team. Spatial navigation is an ideal test bed for thinking about spatial awareness and problem solving across animals and humans, and I'm looking forward to working with the engineering and neuroscience faculty here at BU as well as with our robotics colleagues, John Leonard and Nick Roy, at MIT."

Chantal Stern,
Director, BU Cognitive Neuroimaging Center

# NIH New Innovator Award Will Advance Brain Science

## BU biologist Jerry Chen shines a light on brain function

BU Today 01.15.2019

Jerry Chen, a Boston University College of Arts & Sciences assistant professor of biology, has always had a busy schedule. Now, thanks to a major grant from the National Institutes of Health, it's going to get even busier. On October 2, 2018, the National Institutes of Health announced that Chen is the winner of the 2018 New Innovator Award of $2.5 million over the next five years. That money will fund Chen's efforts to crack the neural code of the brain and better understand the relationship between the genetic and electrical influences that control cognitive functions like sensory processing, decision-making, and learning and memory.

Click here to access the full article!

Jerry Chen, Boston University College of Arts & Sciences assistant professor of biology. Photo by Jackie Ricciardi

# 2019 Donald O. Hebb Award

**Dr. Stephen Grossberg is a 2019 Donald O. Hebb Award recipient! He is a Wang Professor of Cognitive and Neural Systems, Professor of Mathematics & Statistics, Psychological & Brain Sciences, and Biomedical Engineering and the Director, Center for Adaptive Systems at Boston University. Congratulations to Dr. Grossberg!**

2019 Donald O. Hebb Award of the International Neural Network Society, or INNS. The Hebb Award recognizes "outstanding achievements in biological learning".

Hebb was a leading neuropsychologist who introduced seminal ideas about learning:

The International Neural Network Society is the largest and most important society that supports research and educational activities across the full spectrum of biological and artificial neural network research:
https://www.inns.org/

# 2019 Jack Spivack Excellence in Neuroscience Awards Announced

Mr. Spivack established these awards in 2013 to recognize and support the research of outstanding BUSM faculty conducting either clinical or basic research in Parkinson's (PD), Alzheimer's (AD), Chronic Traumatic Encephalopathy (CTE) and other neurological disorders.

**Robert Stern, PhD**, is the recipient of the 2019 Distinguished Neuroscientist Award. Dr. Stern, an internationally recognized clinical neuroscience researcher, is professor of Neurology, Neurosurgery, and Anatomy & Neurobiology. Also he is director of the Clinical Core of the NIH-funded BU Alzheimer's Disease Center and co-founder and director of Clinical Research for the BU CTE Center.

## Spivack Emerging Leaders

**Christopher Gabel, PhD**, associate professor, Physiology & Biophysics and Pharmacology & Experimental Therapeutics, studies small neuronal circuit function as well as how individual neurons regenerate.

**Valentina Sabino, PhD,** associate professor, Pharmacology & Experimental Therapeutics and Psychiatry, joined BUSM in 2009 as assistant professor and was promoted in 2015. Her research in neuropsychopharmacology has been critical to improving the understanding of the neurobiology of addiction and stress-related disorders, and is paving the way for the development of new therapeutics.

## Spivack Young Investigators

**Camron D. Bryant, PhD,** assistant professor, Pharmacology & Experimental Therapeutics and Psychiatry, focuses on determining the genetic basis of behavioral and molecular traits relevant to substance use and eating disorders in mammalian models.

**Chandramouli Chandrasekaran, PhD,** assistant professor, Anatomy & Neurobiology, and Psychological & Brain Sciences, is a neuroscientist who combines electrophysiology, statistical techniques and computational modeling to study the neural basis of goal-directed behavior.

Congratulations to our MED GPN Faculty!

# GPN Faculty Accomplishments!

**Here are some of the publications and grants from our GPN Training Faculty!**

Sawyer, K. S., Maleki, N., Urban, T., Marinkovic, K., Karson, S. A., Ruiz, S. M., Harris, G. J., & Oscar-Berman, M. (2019). Alcoholism gender differences in brain responsivity to emotional stimuli. **eLife,** https://doi.org/10.7554/eLife.41723 [bioRxiv 428565; doi: https://doi.org/10.1101/428565]

Wang, M., Montanede, C., Chandrasekaran, C., Peixoto, D., Shenoy, K. V., & Kalaska, J. F. (2019). Macaque dorsal premotor cortex exhibits decision-related activity only when specific stimulus–response associations are known. *Nature communications*, *10*(1), 1793. https://doi.org/10.1038/s41467-019-09460-y

Chandrasekaran, C., Bray, I. E., & Shenoy, K. V. (2019). Frequency shifts and depth dependence of premotor beta band activity during perceptual decision-making. *Journal of Neuroscience*, *39*(8), 1420-1435. https://doi.org/10.1523/JNEUROSCI.1066-18.2018

Dr. Maya Medalla was awarded an R01 from NIH/NIA on “Circuit structure and dynamics in prefrontal-limbic networks”!

Dr. Doug Rosene recently received several grants including an R21 on "White Matter Pathology in Aging" and an R01 on "Mechanisms of myelin damage and cognitive impairment in the aging monkey"

Major Publication:
Stern RA, Adler CH, Chen K, Navitsky M, Luo J, Dodick DW, Alosco ML, Tripodis Y, Goradia DD, Martin B, Mastroeni D, Fritts NG, Jarnagin J, Devous MD Sr, Mintun MA, Pontecorvo MJ, Shenton ME, Reiman EM. Tau positron-emission tomography in former National Football League players. New England Journal of Medicine, 2019; 380:1716-1725 https://doi.org/10.1056/NEJMoa1900757

Two Books:
Hainline, B. & Stern, R.A. (Editors) (2018). Sports Neurology, Handbook of Clinical Neurology Volume 158, San Diego: Elsevier BV.

Alosco, M.L. & Stern, R.A. (Editors) (2019). Oxford Handbook of Adult Cognitive Disorders, a textbook in the series, The Oxford Library of Psychology, New York: Oxford University Press.

Scott, Benjamin B., et al. "Imaging cortical dynamics in GCaMP transgenic rats with a head-mounted widefield macroscope." *Neuron* 100.5 (2018): 1045-1058. https://doi.org/10.1016/j.neuron.2018.09.050

# Breaking Barriers in Neuroscience

Congratulations to Sophie Schwartz on her new research internship at Google Inc. in Palo Alto, CA!

## Memories from this semester!

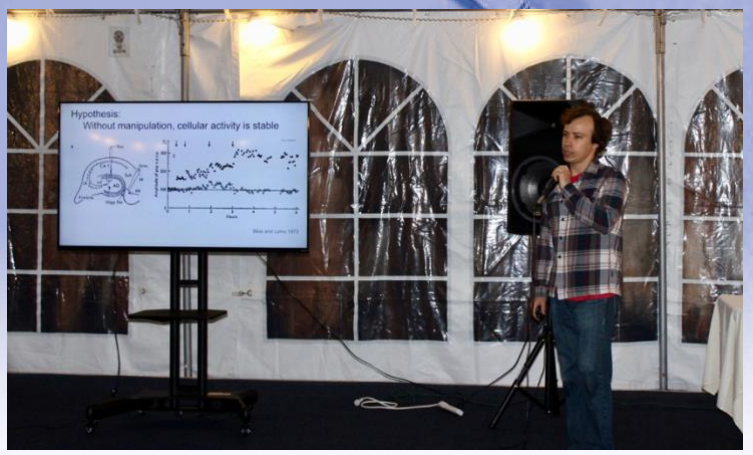

A fun night at Fenway Park

Class of 2019

# Retreat 2019 Pictures!

Dr. Nancy Kopell was awarded GPN Mentor of the Year!


ENVIRONMENTAL RESPONSES
IN RETROSPLENIAL CORTEX


Hypothesis:
Without manipulation, cellular activity is stable


Alzheimer's-in-a-dish


Contributions of
Frontoparietal Control Network
to Abstract Reasoning

A big welcome to our incoming students!

Excited to see you all in the fall!

**Thank you to everyone who contributed to the newsletter! We look forward to next semester and have a wonderful summer!**

Editor: Nazifa Haque

We post these announcements based on your responses to our Newsletter emails. Please keep us in the loop about your contributions so we can celebrate them together!