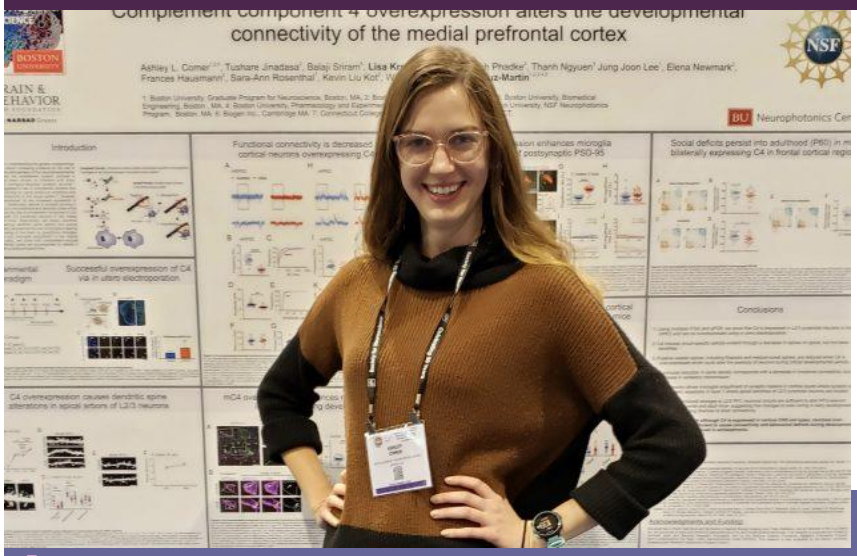
3rd GPN NEWSLETTER May 2020

Message to our GPN community: Amidst Covid-19, we sincerely hope that everyone is able to stay safe and healthy during these difficult times.

For this newsletter, thank you to those who have contributed this year. We would like to recognize the accomplishments from our wonderful GPN students and faculty.

GPN STUDENT ACCOMPLISHMENTS



Congratulations to Ashley Comer on her recent achievements!

Ashley has made many great accomplishments this year! *In December she received the 2019 I. Alden Macchi Award for excellence in the field of regulatory biology.*

Soon after in January, she published her first author paper in Plos Biology titled "Increased expression of schizophrenia-associated gene C4 leads to hypoconnectivity of prefrontal cortex and reduced social interaction." In this publication, she collaborated with a fellow GPN student and labmate, Lisa Kretsge who is a contributing author. Both students are part of the Cruz-Martin Lab.

Ashley et al showed that overexpression of the SCZ-associated gene C4 causes aberrant circuit wiring in the rodent medial prefrontal cortex (mPFC), a neuronal circuit relevant to neuropsychiatric disorders. Our results established for the first time a causal link between overexpression of C4, mPFC hypoconnectivity and deficits in social behavior – Her mentor: Dr. Alberto Cruz-Martin.

In addition to her award and publication she has been accepted for a competitive internship at Biogen! She will be interning in the Emerging Neuroscience Research Unit from September to December.

Ashley, we are so proud of all your hard work and accomplishments!

+ Student Accomplishments

Award Winner Margaret Minnig

We are pleased to announce that Margaret Minnig's application "Involvement of prelimbic cortex Pituitary Adenylate Cyclase Activating Polypeptide in alcohol consumption" has been judged to be highly meritorious, and that she has been selected for a Research Society on Alcoholism (RSA) Graduate Student Small Grants AWARDEE for 2020!

Even more exciting, Margaret received the Research Fulbright Award entitled "Addiction Neuroscience and Treatment in Germany," where she will investigate the effects of chronic alcohol drinking on the pituitary adenylate cyclase activating polypeptide (PACAP) system using electrophysiology and optogenetic techniques. This work will take place at the Max Planck Institute for Metabolism Disorders in Cologne under Dr. Henning Fenselau starting January 2021.

Beverly Setzer Receives an Honorable Mention from NSF

Beverly is a second year PhD student who has received an honorable mention from the coveted National Science Foundation's Graduate Research Fellowship Program (NSF GRFP)!

Lisa Kretsge Accepted to a Competitive Summer School

Lisa was accepted to the Frontiers in Neurophotonics Summer School. We would like to celebrate her accomplishment even though this Summer School was cancelled due to Covid-19.

Congratulations to Margaret, Beverly, and Lisa!

Student Awards and Podcast

Madhura Baxi wins an:

Award: 2nd Best Student Poster Award

Abstract Title: **Validation of Diffusion Imaging Measures in Gray Matter using Histology from rhesus monkey**
Conference: *International Society for Magnetic Resonance in Medicine (**ISMRM**) 2019* Given by the diffusion study group
Link for her poster abstract:

http://archive.ismrm.org/2019/3655.html

She also presented this project in the *Multi-Modal Approaches and Histopathological Validation in Tissue Microstructure Imaging, **Gordon Research Conference** (2019)*

Shen Ning's Podcast

I wanted to share my podcast with the GPN community! It is now available on Apple podcast, Google podcast, and Spotify. We debuted our podcast with Dr. Li Huei Tsai and our future podcasts will feature a number of neuroscientists, including Dr. Susan Whitfield-Gabrieli and Dr. Rodrigo Quian Quiroga! We also will be featuring BUSM professors in our upcoming COVID-19 episode so stay tuned!

This is our official website: https://www.sciencerehashed.com/

Spotify: https://open.spotify.com/show/5VmCxQWfndR8jDCHjWAS2V

Apple podcast: https://podcasts.apple.com/us/podcast/science-rehashed/id1483345080

September 2019 Graduates

Scott Kuzdeba, PhD

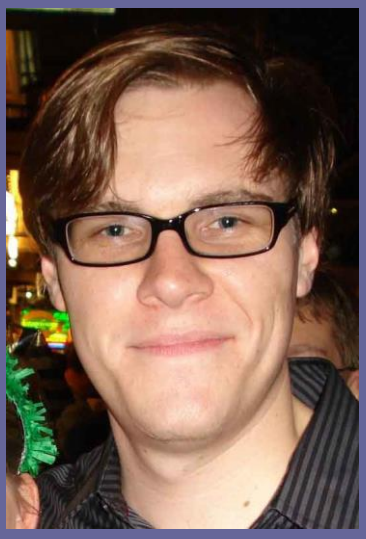
BAE Systems
Chief Scientist

Burlington, MA

William Mau, PhD

Postdoctoral Fellow - Denise Cai Lab
Mount Sinai Medical School

Austin Soplata, PhD



Postdoctoral Researcher
Harvard Medical School and
Massachusetts General Hospital

January 2020 Graduates

Scott Bressler, PhD

Research Engineer - Contract
Walter Reed National Military Medical Center

Research Consultant - Contract
Carnegie Mellon University - Lab in Multisensory Neuroscience (LiMN)

Mary Kate Joyce, PhD

Postdoctoral Fellow
Boston University

Sophie Schwartz, PhD

Postdoctoral Fellow
Boston University

Dante Smith, PhD

Projects in Biomedical industry, Data Analytics, and Human-Computer Interfaces
Lincoln, Nebraska

May 2020 Graduates

Adam Vogel, PhD

Projects related to Investment Management in the Healthcare and Biotechnology Sectors
Wall Street, NY

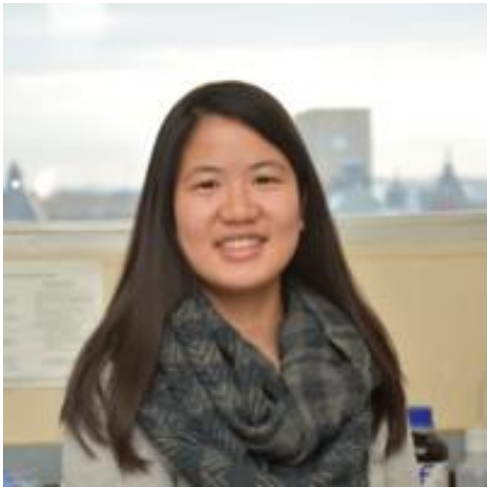
Terri Scott, PhD

Postdoctoral Fellow - Edward Chang Lab

University of California, San Francisco

Dr. Scott also just had a paper accepted in Brain & Language showing using tDCS over ventral premotor cortex can enhance sensorimotor learning in speech production.

Student Achievement Day 2020



Hana Yeh – 1st Prize Winner

RENEWAL OF MICROGLIA CORRECTS MATERNAL INFLAMMATION-INDUCED MORPHOLOGICAL AND TRANSCRIPTOMIC MICROGLIAL ABNORMALITIES IN MOUSE OFFSPRING

Gregory Wirak – 2nd Prize Winner

DEVELOPMENTAL ISOFLURANE EXPOSURE IN *C. ELEGANS* CAUSES PERSISTENT CHANGES IN NEURON ACTIVITY DYNAMICS

Jenny Klein – 3rd Prize Winner

IDENTIFYING CHANGES IN EARLY OLIGODENDROCYTE DIFFERENTIATION IN DOWN SYNDROME USING ISOGENIC PATIENT-DERIVED IPSCS

Alumni News

Starting in September 2021, ***Dr. Gabriel J. Cler*** *will be an assistant professor (tenure-track position) in the Department of Speech & Hearing Sciences at the University of Washington. He also received an NIH F32, an inaugural NIH OSNAP award.*

Gabriel is a postdoctoral fellow at the Speech & Brain Research Group and Wellcome Centre for Integrative Neuroimaging at the University of Oxford. His research with Kate Watkins focuses on neuroimaging in people with speech and language disorders. In addition to leveraging large existing datasets, he works in concert with ongoing projects in developmental language disorder (BOLD) and stuttering (INSTEP).

Read more about Gabriel's work here: http://gabrielcler.com

John Bladon – Shantanu P. Jadhav Lab Postdoctoral Fellow

Brandeis University, Waltham, MA
September 2019 – Present

Studying the neural underpinnings of repetitive behavior and social deficits in Fragile X with in-vivo electrophysiology in a transgenic Rat model.

GPN Publications

Luminance potentiates human visuocortical responses - Louis Vinke & Dr. Sam Ling
Vinke, L. N., & Ling, S. (2020). Luminance potentiates human visuocortical responses. *Journal of Neurophysiology*, *123*(2), 473-483.
https://www.physiology.org/doi/abs/10.1152/jn.00589.2019

Lightness induction enhancements and limitations at low frequency modulations across a variety of stimulus context - Louis Vinke & Dr. Arash Yazdanbakhsh
Vinke, L. N., & Yazdanbakhsh, A. (2020). Lightness induction enhancements and limitations at low frequency modulations across a variety of stimulus contexts. *PeerJ*, *8*, e8918.
https://peerj.com/articles/8918/#

Finely tuned eye movements enhance visual acuity - Janis Intoy & Dr. Michele Rucci
Intoy, J., & Rucci, M. (2020). Finely tuned eye movements enhance visual acuity. *Nature communications*, *11*(1), 1-11.
https://www.nature.com/articles/s41467-020-14616-2

Isoflurane exposure in juvenile *C. elegans*causes persistent changes in neuron dynamics - Gregory Wirak & Dr. Chris Gabel
Wirak GS, Gabel CV, Connor CW (2020) Isoflurane exposure in juvenile *C. elegans*causes persistent changes in neuron dynamics. *Anesthesiology*. In press.

Egocentric boundary vector tuning of the retrosplenial cortex - Lucas Carstensen
Alexander, A. S., Carstensen, L. C., Hinman, J. R., Raudies, F., Chapman, G. W., & Hasselmo, M. E. (2020). Egocentric boundary vector tuning of the retrosplenial cortex. *Science Advances*, *6*(8), eaaz2322.
https://doi.org/10.1126/sciadv.aaz2322

Inhibition of colony stimulating factor 1 receptor corrects maternal inflammation-induced microglial and synaptic dysfunction and behavioral abnormalities - Dr. Tsuneya Ikezu & Hana Yeh
Ikezu, S., Yeh, H., Delpech, J. C., Woodbury, M. E., Van Enoo, A. A., Ruan, Z., ... & Yoshii-Kitahara, A. (2020). Inhibition of colony stimulating factor 1 receptor corrects maternal inflammation-induced microglial and synaptic dysfunction and behavioral abnormalities. *Molecular Psychiatry*, 1-24.
https://doi.org/10.1038/s41380-020-0671-2

Increased expression of schizophrenia-associated gene C4 leads to hypoconnectivity of prefrontal cortex and reduced social interaction – Ashley Comer
Comer, A. L., Jinadasa, T., Sriram, B., Phadke, R. A., Kretsge, L. N., Nguyen, T. P., ... & Hausmann, F. S. (2020). Increased expression of schizophrenia-associated gene C4 leads to hypoconnectivity of prefrontal cortex and reduced social interaction. *PLoS Biology*, *18*(1), e3000604.
https://doi.org/10.1371/journal.pbio.3000604

Optoacoustic brain stimulation at submillimeter spatial precision - Ying Jiang
Jiang, Y., Lee, H. J., Lan, L., Tseng, H. A., Yang, C., Man, H. Y., ... & Cheng, J. X. (2020). Optoacoustic brain stimulation at submillimeter spatial precision. *Nature communications*, *11*(1), 1-9.
https://doi.org/10.1038/s41467-020-14706-1

Continued…

A biophysical model of striatal microcircuits suggests gamma and beta oscillations interleaved at delta/theta frequencies mediate periodicity in motor control - Julia Chartove
Chartove, J. A., McCarthy, M. M., Pittman-Polletta, B. R., & Kopell, N. J. (2020). A biophysical model of striatal microcircuits suggests gamma and beta oscillations interleaved at delta/theta frequencies mediate periodicity in motor control. *PLOS Computational Biology*, *16*(2), e1007300.
https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1007300

Common cortical architectures for phonological working memory identified in individual brains - Terri Scott & Dr. Tyler Perrachione
Scott, T., & Perrachione, T. (2019). Common cortical architectures for phonological working memory identified in individual brains. *NeuroImage*, 202, 116096.
https://www.sciencedirect.com/science/article/pii/S1053811919306871?via%3Dihub

Cardiorespiratory fitness predicts effective connectivity between the hippocampus and default mode network nodes in young adults - Matt Dunne
Kronman, C. A., Kern, K. L., Nauer, R. K., Dunne, M. F., Storer, T. W., & Schon, K. (2019). Cardiorespiratory fitness predicts effective connectivity between the hippocampus and default mode network nodes in young adults. *Hippocampus*.
https://doi.org/10.1002/hipo.23169

Improving fitness increases dentate gyrus/CA3 volume in the hippocampal head and enhances memory in young adults - Matt Dunne
Nauer, R. K., Dunne, M. F., Stern, C. E., Storer, T. W., & Schon, K. (2019). Improving fitness increases dentate gyrus/CA3 volume in the hippocampal head and enhances memory in young adults. *Hippocampus*.
https://doi.org/10.1002/hipo.23166

Amyloid-β42/40 ratio drives tau pathology in 3D human neural cell culture models of Alzheimer's disease - Shen Ning
Kwak, S. S., Washicosky, K. J., Brand, E., von Maydell, D., Aronson, J., Kim, S., ... & Bylykbashi, E. (2020). Amyloid-β42/40 ratio drives tau pathology in 3D human neural cell culture models of Alzheimer's disease. *Nature communications*, *11*(1), 1-14. https://www.nature.com/articles/s41467-020-15120-3

Beyond the sleep-amyloid interactions in Alzheimer's disease pathogenesis - Shen Ning
Ning, S., & Jorfi, M. (2019). Beyond the sleep-amyloid interactions in Alzheimer's disease pathogenesis. *Journal of neurophysiology*.
https://journals.physiology.org/doi/abs/10.1152/jn.00118.2019

Self-Reported Exercise Trends in Parkinson's Disease Patients - Shen Ning
Raje, P., Ning, S., Branson, C., Saint-Hilaire, M., de Leon, M. P., & Hohler, A. D. (2019). Self-Reported Exercise Trends in Parkinson's Disease Patients. *Complementary therapies in medicine*, *42*, 37-41.
https://www.sciencedirect.com/science/article/abs/pii/S0965229918304382?via%3Dihub

Faculty Promotions & Achievements

Professor Mark Kramer

Dr. Kramer became full professor. Following graduate and postdoctoral training in physics, dynamical systems, and neuroscience, Professor Kramer joined the Department of Mathematics & Statistics. His research focuses on interdisciplinary topics in mathematical neuroscience with particular emphasis on biophysical models of neural activity and data analysis techniques. He is currently interested in medical applications and networks in neuroscience.

Dr. Daniel Fulford's Lab

Dr. Fulford's lab received it's first NIH R01 this past fall, examining social isolation and loneliness using digital phenotyping approaches via smartphone.

Read more about it here!

Collaborations - Drs. Karin Schon & Chantal Stern, GPN Student Matt Dunne

Nauer, R. K., Schon, K., & Stern, C. E. (2020). Cardiorespiratory fitness and mnemonic discrimination across the adult lifespan. *Learning & Memory*, *27*(3), 91-103. **http://learnmem.cshlp.org/content/27/3/91**

Kronman, C. A., Kern, K. L., Nauer, R. K., Dunne, M. F., Storer, T. W., & Schon, K. (2019). Cardiorespiratory fitness predicts effective connectivity between the hippocampus and default mode network nodes in young adults. *Hippocampus*. **https://doi.org/10.1002/hipo.23169**

Nauer, R. K., Dunne, M. F., Stern, C. E., Storer, T. W., & Schon, K. (2019). Improving fitness increases dentate gyrus/CA3 volume in the hippocampal head and enhances memory in young adults. *Hippocampus*. **https://doi.org/10.1002/hipo.23166**

GPN Faculty Publications

Dr. Arash Yazdanbakhsh

One book chapter in the Encyclopedia of Computational Neuroscience (Springer Nature):

https://link.springer.com/referenceworkentry/10.1007%2F978-1-4614-7320-6_100660-1

(the above shows the GPN affliction and below is the chapter in the encyclopedia)
http://sites.bu.edu/yazdan/files/2019/02/Arash-Ennio19_FG_Springer.pdf

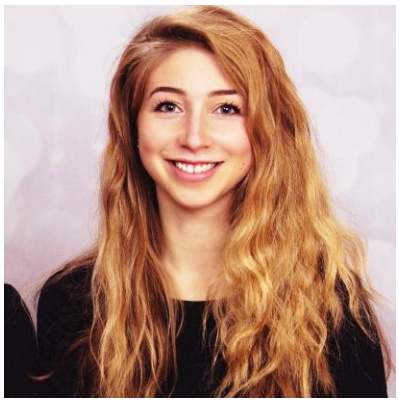
and one paper in Frontiers in Psychology:

https://www.frontiersin.org/articles/10.3389/fpsyg.2019.03000/full

Dr. Camron Bryant Lab

Ruan QT, Yazdani N, Reed ER, Beierle JA, Peterson LP, Luttik KP, Szumlinski KK, Johnson WE, Ash PEA, Wolozin B, **Bryant CD (2020).** 5' UTR variants in the quantitative trait gene Hnrnph1 support reduced 5' UTR usage and hnRNP H protein as a molecular mechanism underlying reduced methamphetamine sensitivity. Accepted, ***The FASEB Journal*** **bioRxiv:** https://doi.org/10.1101/2020.01.11.902908

GPN Student Organized Presentations



GPN student **Kylie Moore,** has identified an exciting workshop on financial planning specifically for PhD students and post-docs. This was a 90 minute online interactive workshop specifically for those on stipends and covered the following.

Outline:

- Values, goals, and strategies
- Budgeting
- Saving
- Emergency funds
- Targeted savings accounts
- Compound interest
- Investing
- Tax-advantaged retirement accounts
- Debt repayment
- Pay types and tax implications

Financial Speaker: Emily Roberts

Science Through the Story

As scientists you need to be able to communicate your science to a variety of audiences. One of our current students, ***Sam Levy*** *has been leading the effort to bring the Science thru the Story Workshop to our community. The focus of the workshop is training in communicating your science through stories using techniques that are adapted from film, improv, and novels. The workshop, presented on Zoom by Sara ElShafie, provides storytelling strategies that can enhance the accessibility of your work and make it adaptable for a variety of audiences.*

Yoga Mondays 12:00 PM - 1:00 PM

During these difficult times, First Year Student ***Nicole Tomassi*** *has been hosting yoga session on Monday's afternoon through Zoom. Here is the link to join the sessions!*

Thank you to Kylie, Sam and Nicole for organizing these presentations to our community!

Hope you all have a nice, safe and healthy summer!