

In This Issue

Introducing Our Newest Class of 13 Students!

New Faculty Joining the NGP

Award Updates and Student Fellowships



Image Credit: Rianne Stowell, PhD

URMC NEUROSCIENCE

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You're invited!

4[™] Annual University of Rochester Neuroscience Graduate Program Social at S∱N

Sunday, November 12th ● 6:30 pm – 8:30 pm Brasserie Beck ● 1101 K St. NW Washington, DC

Join University of Rochester Neuroscience faculty, alumni, and students for an evening of networking and celebration.

Everyone interested in learning more about the Program or Institute is welcome to attend.

For more information, please contact victoria_dagostino@urmc.rochester.edu.



Please join us as we honor our 2023 NGP Alumni Award recipient



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Notes From the NGP Director

Dear students, faculty, alumni, staff, and friends,

Hello everyone. The last year has certainly gone by in a flash. Unlike in the years past, this last year really has flown – I feel like I just updated my portion of this very newsletter months ago. Yet here we are, another year down with two years under my belt and well on my way into year three as Director of the Neuroscience Graduate Program (NGP). The last year has certainly felt more normal than the years before and I feel like we are returning to much of our pre-pandemic weekly routine. Although we are all aware that COVID continues to infiltrate our daily lives, we



continue to adapt and have learned how to navigate things. We have grown more comfortable coming together for in-person academic and social gatherings, and it is really nice to see all of us out and about. I continue to learn about what it takes to be a program director – some things have gotten easier while others continue to test me. Our program is thriving and with growth comes challenges that require us all to put our heads together to hopefully make things better for everyone. During the last year, I have had the opportunity to observe just how amazing our students are and how much they care about the program. They are the best at selling our program and singing its praises. The word does get out as comments from prospective students speak highly about many aspects of what we are trying to accomplish here. I also recently joined undergraduates working in NGP labs over at the undergraduate research fair on the river campus, and they are a fantastic bunch. Many of them are applying to NGP this upcoming cycle and we will be fortunate to snag them. As always, I am indebted to all the staff, students, and faculty, in NGP, GEPA, and the broader university community for your flexibility, dedication, and teamwork to just getting things done. There is always so much to celebrate and I want to express my gratitude to all those that give to our program and keep it on track.

Thanks to Farran Briggs for her role as our Admissions Chair. She is sadly stepping down but we are grateful that the super-abled Madalina Tivarus will be taking over – I have no doubt she will continue to lead our admission efforts with grace and purpose. I also want to recognize the hard work of our faculty and student admissions committees who volunteer such huge swaths of time to ensure our admission efforts continue to evolve and remain successful. As a nod to the success of the NGP, nearly 200 students applied for entry into our program for Fall 2023. The admissions committee, through many, many hours of review and discussions, had the challenging task of selecting our newest cohort from an incredibly-talented and competitive applicant pool. Our incoming 2023 NGP class is represented by thirteen unique and spectacular students who all showed up mid-August, two weeks before classes, ready for our NGP bootcamp, a new rigor and experimental design workshop, and a palpable frenzy to get rotations lined up and the semester on its way. Thanks to the Boot Camp Committee and all the NGP students who pitched in to make this opening bid successful for our new students – it is the first opportunity for them to feel like they are really part of the NGP community. Our second and third year students were and are in the throes of completing their Part I and Part II qualifying exams and at least four to five of our senior

Notes From the NGP Director

students hope to defend their dissertation research work in the next year. Four NGP students and four NGP faculty were recently recognized at the recent GEPA awards held in the Flaum Atrium. Although I really can't take any credit for their accomplishments, it is so satisfying to hear "from Neuroscience" called out so many times. Thanks to our NGP students for doing what you do and our NGP faculty for your great mentorship. I am thrilled to be a part of it all.

In the last year, five of our senior students successfully completed the requirements for their PhD and began their journey towards a host of exciting and new opportunities. Allison Murphy has taken a position as a postdoctoral associate in Kristina Nielsen's lab at Johns Hopkins, Kate Andersh is now working as a Scientific Project Manager at NIH, Garrick Salois is a postdoctoral fellow here in the the EHS Toxicology Training Program, Berke Karaahmet is a postdoctoral associate at Columbia University, and Anjali Sinha accepted a postdoctoral appointment in Maria Geffen's lab at the University of Pennsylvania. We miss them all but we wish them many welldeserved successes in their new roles. Hopefully, like so many of our alumni, they will continue to reflect fondly upon their time here and inspire emerging neuroscientists that cross their paths to consider calling our NGP home. They are certainly welcomed back anytime they want to visit and we look forward to hearing about their successes in the months ahead.

The NGP continues to grow in many ways. We are in the fourth year of our T32 which will continue to support the training for four of our students. We also welcomed six new faculty into the program this year (see page 14-15) with several others in the pipeline. Amazingly, we are a few faculty short of hitting the 100-faculty mark. To learn more about all the exciting research here in the NGP and support our amazing students, consider joining us for the student seminar series held every Monday at 4pm. Special thanks to Yanya Ding, Erin Murray, Benjamin Suarez-Jimenez, and Gabriella Sterne for keeping our student seminar up and running, and to Gail Johnson, Lauren Hablitz, and Ian Fiebelkorn for maintaining our Journal Clubs, and to all the NGP faculty that participate to make our courses successful. Thanks to Julian Meeks for taking over NSC512 and navigating that first block without Dr. Shrager at the helm – a formidable task for any of us. Thanks again to our retreat committee for organizing another fantastic Neuroscience Retreat at the Memorial Art Gallery in April. Much thanks to the Neuroscience Office for keeping me and frankly most of us out of the deep end - I really appreciate everything you do. Special thanks to my coordinator Tori D'Agostino who in all fairness should be the NGP Director - I am grateful to have you on my team and to keep this train moving. If I look like I know what I am doing, it all because of Tori. Ask the students and they will tell you who really is in charge. Last but certainly not least, the true reach of our program is captured in our Alumni Directory at the end of this newsletter. We are proud to call all of you family and enjoy hearing from you, so please continue to help us update this directory. While I have acknowledged only a fraction of the people that make this all possible, there are so many more whose efforts deserve recognition. So, in closing, I want to thank each and every member of our NGP community for all that you do. I look forward to working with you in the year ahead.

Warm Regards, Chris Holt, PhD

Notes From the NGP Admissions Committee Chair

2023 was an amazing recruitment year for the NGP! Of the almost 200 applications that we received, we interviewed 45 applicants virtually and then invited all accepted applicants to visit UR for an in-person recruitment weekend. Of the 27 applicants to whom we offered admission, 13 joined the NGP this Fall. Our incoming class is once again a unique group with wide-ranging scientific interests and backgrounds. We can't wait to welcome our incoming NGP first year class to boot camp in just a few days. A huge factor in our success this recruitment season was the incredible Tori D'Agostino, who returned as NGP coordinator just prior to the start of recruitment. THANK YOU, TORI!!!!!



Also critical to our recruiting success was our outstanding and dedicated student admissions committee: Andrea Campbell, Mike DuHain, Alexis Fiedler, Leslie Gonzales, Mariah Marrero, Lelo Shamambo, Caitlin Sharp, and Tori Popov - without all of you, we could never recruit these bright young scholars. I also cannot overstate my gratitude to our faculty admissions committee for their significant commitment to NGP and their hard work. Thank you to Chris Holt, Marissa Sobolewski, Jude Mitchell, Gail Johnson, Nathan Smith, Liz Romanski, Madalina Tivarus, Julian Meeks, Michael Telias, and Ben Suarez-Jimenez.

NGP continues to lead graduate programs across UR at attracting and recruiting the best applicants and our incoming NGP 2023 class again showcases this trend. As admissions chair, I continue to be inspired by the commitment among NGP students and faculty to our holistic and student-focused model of graduate education. We continue to evolve and adapt in the face of challenges and our program will thrive because of this foundation that we have built. As always, we welcome your feedback on our admissions process and we are always looking for students and faculty to join in our recruitment efforts.

Farran Briggs, PhD NGP Admissions Committee Chair

Notes From the Neuroscience Department Chair

As we near the end of 2023, I cannot help but reflect on our students, their incredible contributions to science, and their own academic accomplishments. We have congratulated five newly minted PhDs and have four on the docket for the next few months. This August, we welcomed 12 PhD students and one MD/PhD student into the Neuroscience Graduate Program after receiving a record-breaking number of applications.

Our faculty and students never cease to amaze me. The breadth of research investigated by our labs, led by many of our students, and



published in peer-reviewed journals brings each hypothesis closer to the ultimate questions we aim to answer—how does the brain work, and how to prevent, treat, and care for neurodegenerative and neuropsychiatric disorders. It is a true honor to witness the tenacity of the people at the heart of our labs.

The Neuroscience Diversity Commission continues its mission to provide equitable access to neuroscience. Its newest outreach program, NEURO2ALL, completed a new course within the School of Medicine and Dentistry and developed modules for community outreach opportunities for UR and URMC students at all levels. The group held its first community event at the Rochester Museum and Science Center this spring. Aiming to impact the access and opportunities for aspiring neuroscientists at all academic levels, the Commission hosted its first postdoctoral fellows as part of the NEUROYES program. Its NEUROEAST program, which provides research opportunities to local high school students, is expanding. And NEUROCITY, its program aimed at undergraduates, led two alumni to the University to continue their neuroscience research journey. More about these programs can be found at <u>Your paragraph text</u>

I hope to see many in our neuroscience community at the Society for Neuroscience Conference in Washington D.C. Please join us on Sunday evening as we host a social event to spark collaborations, reunite old friends, and celebrate the success of our peers and colleagues.

In Science,

John J. Foxe, PhD



Incoming Class of 2023

45 prospective student virtual interviews over two days, each with **4** faculty interviews and **3** student interviews, followed by two in person visits, we are exceptionally proud to introduce our class of 12 PhD and 1 MD/PhD candidates!



<u>Aiesha Anchan</u> - Aiesha Anchan graduated from Marquette University with a B.S. in Biomedical Sciences with a minor in Neuroscience. During her undergraduate career, she worked in the lab of Dr. Jennifer Evans, where she investigated the mechanisms that guided circadian development, as well as understanding the cell subpopulations within the SCN. After her undergrad, she continued to work in the Evans lab, mentoring undergraduate students and further growing her understanding on the circadian clock and sex differentiated behavior. At URMC, Aiesha plans to explore neuroscience and further her interests in environmental toxicology, neurodegeneration, and development.

<u>Siddharth Chittaranjan</u> - Siddharth Chittaranjan is an MD/PhD student who graduated from the University of California, Berkeley in 2020 with a BA in Molecular and Cell Biology (Immunology/Infectious Disease emphasis) and a BA in English. His undergraduate research investigated host-pathogen interactions for chlamydial infections of human primary cells. Lessons from infectious disease inspired his interest in understanding the biological dynamics that govern the progression of healthy states into diseased states for neurological conditions, with particular interest in brain cancers. He hopes to further develop his interest in the dynamics of neurological disease by studying glial cells and neuronglia interactions at URMC. In his free time, he enjoys cooking and inviting people over for tea.





<u>Amelia Hines</u> - Amelia Hines graduated in 2022 from Colorado State University with a B.S. in Microbiology. She worked under Drs Ronald Tjalkens and Julie Moreno as an undergraduate researcher and after graduation as a research associate. Her research in the lab focused on Canine Cognitive Dysfunction, a disease sharing many characteristics clinically and pathologically with human Alzheimer's Disease. At CSU, she also became involved with the human anatomy program and found a passion for both gross anatomy and neuroanatomy through cadaver dissection courses. While at University of Rochester, Amelia hopes to continue exploring research in neurodegeneration and would like to become involved with translational and clinical research in the future.

Incoming Class of 2023



Aaron Huynh - Aaron Huynh received a B.S. in Brain and Cognitive Sciences with Distinction from the University of Rochester in 2022. His undergraduate research career began with Dr. Martina Poletti in the Active Perception Lab, looking at perceptual deficits associated with crowding in foveal vision. Later, he joined Dr. Duje Tadin's lab, where he worked on various projects involving lifespan categorical decision-making, binocular rivalry under naturalistic conditions using virtual reality (VR), and an ECG-based personalization engine for speed of processing cognitive training in older adults in collaboration with Dr. Feng Vankee Lin at Stanford University. He ended his undergraduate research journey with Dr. Elise Piazza, where he investigated prosodic prototypes and adaptation in interpersonal human communication. Following graduation, he spent a year as a Postbaccalaureate Research Education Program (PREP) trainee at the University of Rochester Medical Center (URMC). During his time as a PREP trainee at URMC, he worked under Dr. Michelle Janelsins and Dr. AnnaLynn Williams within the Division of Supportive Care in Cancer in the Department of Surgery. There he completed a project looking at the changes in S100 calcium binding protein β (S100 β) and cognitive function from pre- to post-chemotherapy among women with breast cancer. At URMC, Aaron plans to learn about various neuroimaging techniques and their translational implications in the clinical setting as well as associations with patient outcomes and treatment.

<u>Aishwarya Jayan</u> - Aishwarya graduated from the University of Maryland, College Park in 2021 with a degree in Neurobiology and Physiology. During her undergraduate studies, she conducted research at UMD to determine quantitative diagnostic measures for attention-deficit hyperactive disorder (ADHD) and Parkinson's disease. In 2021 Aishwarya joined the lab of Dr. Yeka Aponte at the National Institute of Drug Abuse, a part of the National Institutes of Health, as a postbaccalaureate IRTA research fellow. During her time in the Aponte Lab, Aishwarya explored hypothalamic circuits in mice as they pertained to survival behaviours such as feeding and threat response. Her goal for her time at URMC is to use techniques in computational neuroscience to explore cognition, perception, and psychiatric disorders.



Incoming Class of 2023



Niki Lam - Niki Lam graduated from SUNY Geneseo in 2020 with a B.A. in Psychology. As an undergraduate, she conducted research in Dr. Vincent Markowski's lab looking at the social-behavioral effects of tetrahydrocannabinol in a rodent model. Additionally, she worked in the Sibling-Peer Research Group headed by Dr. Ganie DeHart examining sibling and peer relationships in the context of observed aggression and rough-and-tumble-play behaviors in children. After graduation, she began a postbaccalaureate fellowship under the mentorships of Dr. Dante Picchioni and Dr. Jeff Duyn in the National Institute of Neurological Disorders and Stroke. Her main project examined the role of region size on seed-based functional correlations in sleep fMRI. During her time in the NGP, she hopes to explore how human neuroimaging techniques can be used in finding biomarkers for early diagnosis of neurodegeneration.

<u>**Gavin Magill</u></u> - Gavin Magill received a B.S. in Biology from Willamette University. As an undergraduate, he participated in Oregon Health and Science University's Equity Research program through the Knight Cancer Institute where he worked under mentorship from Dr. Joshua Saldivar, Dr. Michael Brasino, and Dr. Carlos Origel Marmolejo to genetically engineer E. coli for accessible early cancer detection. At URMC, Gavin plans to research the mechanisms of neural plasticity and psychoplastogens, such as ketamine and other psychedelic-like compounds, to treat mood disorders such as depression and anxiety, as well as chronic pain.</u>**





Stacey Pedraza – Stacey Pedraza recently graduated with honors from Boise State University with a B.S. in Biology (Cellular, Molecular, Biomedical emphasis) and a Psychology minor. During her time at Boise State, she conducted research in biochemistry, biophysics, microbiology, and sociology. Her first mentorship was alongside Dr. Leonora Bittleston where she analyzed the wheat seed microbiome and the digestive fluid of the pitcher plant. Here, Stacey earned authorship for a paper that is currently pending publication. During her biochemistry research, alongside Dr. Lisa Warner, she modeled a protein-enzyme interaction to identify structural changes. In her last year at Boise State, she joined Dr. Daniel Fologea in analyzing the effects of mechanical stress on artificial lipid membranes. Despite having no neuroscience research, Stacey's passion for the field persisted. At URMC, Stacey aims to explore the cellular and molecular mechanisms involved in neuroplasticity and/or mental illnesses.

Incoming Class of 2023

Nicole Popp –Nicole graduated from Allegheny College in 2020 with a BS in neuroscience and a minor in French. While at Allegheny, she worked in the lab of Dr. Lauren French and completed her senior thesis studying the affect of an anesthetic compound on a voltage-gated calcium channel to better understand the anesthetic's potential to cause seizures in pre-clinical models. After graduating, she worked as a research technician in the lab of Dr. Kristi Streeter at Marquette University. In that position, she used in-vivo electrophysiology techniques to study respiratory neuroplasticity and recovery from spinal cord injury, and was able to publish her research in the journal Respiratory Physiology & Neurobiology. While Nicole aims to broaden her knowledge in all aspects of neuroscience during her time at the University of Rochester, she would like to focus her research on understanding mechanisms of neurodegeneration.





<u>Staci Rocco</u> - Staci Rocco earned her B.S.in Cellular and Molecular Biology from California State University, Sacramento in 2023, with a minor in Chemistry. As an undergraduate, she engaged in research under the mentorship of Dr. Andrew Reams. Her research efforts were dedicated to unraveling the origins of gene amplification mutations and elucidating their underlying molecular mechanisms. Notably, her findings have played a role in advancing our knowledge of potential cancer treatments and the advantages of early detection. Now, at URMC, Staci aspires to bridge the scientific fields of neuroscience and epigenetics. Her goal is to deepen our knowledge of the intricate changes that transpire in the brain following trauma exposure, which can contribute to the development of neuropsychiatric disorders. Staci is dedicated to advancing our knowledge of these complexities and playing a role in the progress toward more effective treatments.

Thomas Scudder – Thomas Scudder graduated from the University of Massachusetts Amherst with a B.Sc. in Biochemistry and Molecular Biology, double-minoring in Mathematics and Physics, in 2021. He continued on at UMass to graduate with a M.Sc. in Cellular and Molecular Biology, with a focus in Biochemistry and Molecular Biophysics, in 2023. As an undergraduate he worked as a research intern for WHOI in the lab of Dr. Julie Huber, identifying and metabolically characterizing novel extremophilic prokaryotes harvested from hydrothermal vents. For his Master's thesis, he worked with Dr. Peter Chien, investigating the domain interactions between bacterial AAA+ protease adaptors and their role in regulating protein degradation. Specifically, his work identified, in Caulobacter crescentus, the exact domain and residues of the PopA adaptor that were responsible for binding to the RcdA adaptor and delivery of the master regulatory protein, CtrA, to the protease for degradation. His research interest at URMC is in elucidating the biochemical and molecular biophysical regulators of memory, cognition, and various neuropathologies.



Incoming Class of 2023

Leah Sheppard – Leah Sheppard graduated from the University of Alabama at Birmingham in 2023 with a B.S. in Neuroscience. As an undergraduate, she conducted research on the role of Semaphorin 6D (SEMA6D), an axon guidance molecule, in Attention-Deficit Hyperactivity Disorder (ADHD) onset and symptomatology in young adult mice under the direction of Dr. Qin Wang. She also joined Dr. Farah Lubin's lab where she focused on how DNA hydroxymethylation influenced activity-dependent genes in Temporal Lobe Epilepsy using the Kainic Acid rat model. At URMC, Leah hopes to explore the cellular and molecular mechanisms involved in neurodegenerative and neurodevelopmental disorders. She also hopes to take steps towards using her research to help shape public policy or the law.





Erica Squire - Erica Squire received a B.S. in Biochemistry from the University of Oregon in 2018. As an undergraduate, she worked with Dr. Jeff McKnight to design fusion proteins capable of targeted nucleosome repositioning as a tool for studying chromatin dynamics. Upon graduating, she joined a postbaccalaureate training fellowship at the Food and Drug Administration in the laboratory of Dr. Ronald Rabin. Here, she studied the role of innate immune signaling in airway epithelial cells in response to viral infection. She then joined the lab of Dr. Daniele Piomelli at University of California, Irvine as a research associate. Her main project was in exploring the persistent impact of low-dose delta-9-tetrahydrocannabinol on microglia, the resident immune cell of the central nervous system. In the Neuroscience Graduate Program, Erica hopes to explore the impact of immune signaling in both neurodevelopmental and psychiatric disorders.

Student Fellowships & Awards

2023 GEPA Awards



Aiesha Anchan is the recipient of the Graduate Alumni Fellowship.

Ania Majewska, PhD is the recipient of the Graduate Student Society Advocacy Award.



Amelia Hines is the recipient of the Merritt and Marjorie Cleveland Fellowship.

Nathan Smith, PhD is the recipient of the Graduate Student Society Advocacy Award.



Linh Le is the recipient of the Outstanding Student Mentor Award.

Marissa Sobolewski, PhD is the recipient of the Outstanding Graduate Student Teacher Award.



Nicole Popp is the recipient of the Irving L. Spar Fellowship.

Pat White, PhD is the recipient of the Outstanding T32 Program Director Award.







Student Fellowships

MaKenna Cealie - NIH - F31AA030445 - Effects of Developmental Ethanol Exposure on Cerebellar Microglia and Purkinje Cells (6/1/2022-5/31/2025)

Johanna Fritzinger - NIH - F31DC020630 - Physiological and Computational-Modeling Studies of Timbre Encoding in the Inferior Colliculus (9/1/2022-8/31/2025)

John (Jay) Gonzalez-Amoretti - NIH - F31EY035559 - Characterizing Population Dynamics of Prefrontal Cortex which Govern the Modulation of Visual Processing (4/14/2024-3/13/2028)

Emily Przysinda - NIH - F30MH130104 - Neurophysiology of social processing and underlying perceptual deficits in schizophrenia (1/1/2022-3/31/2026)



New NGP Faculty

Ania Busza, MD, PhD

My lab studies post-stroke motor impairment. We have developed a gamified EMG human-computer interface to collect data on how specific motor control abnormalities emerge after a stroke. We then combine this data with information from neuroimaging, transcranial magnetic stimulation, and behavioral assays to learn more about the effect of different stroke locations on motor control. Additional projects in the lab include using using gyroscopic and accelerometer data from wearable sensors to categorize and quantify rehabilitation dose (in collaboration with Professor Gaurav Sharma, Dept of Electrical and Computer Engineering) and using VR technology and finger tracking to study proprioception in patients with cerebellar damage due to stroke (in collaboration with Professor Duje Tadin, Dept of Brain and Cognitive Science). We are also participate in multicenter clinical trials that study social, genetic, and neuroanatomical predictors of post-stroke recovery. By better understanding the relationship between stroke location, rehabilitation practice, and recovery, we hope to ultimately create personalized and more effective therapy for patients with disability from stroke.



Manoela Fogaca, PhD

Research in my lab focuses on understanding the molecular basis of behaviors relevant to stress and the actions of fast antidepressant and anxiolytic drugs, aiming to identify specific circuits, neuronal subpopulations and synaptic mechanisms involved in these responses. Because currently available antidepressants have serious limitations for treating Major Depressive Disorder (MDD), including low response rates, a significant number of treatment resistant patients, and a time-lag before there is a therapeutic response, the lab is interested in exploring new pharmacological strategies to treat MDD, including compounds that target the glutamatergic and/or the GABAergic systems in the brain, such as ketamine, ketamine-like drugs and GABA receptor modulators. To achieve this goal, we combine molecular neuropharmacology, genetic approaches and circuit-level studies of neurobiological systems to investigate how specific subpopulations of GABAergic (notably somatostatin and parvalbumin interneurons) and glutamatergic neurons crosstalk to modulate excitation and inhibition network dynamics that lead to phenotypes relevant to stress disorders and to the actions of fast antidepressants.



Frank Garcea, PhD

The ability to manipulate objects skillfully and accurately is a fundamental motor function supporting activities of daily life. The scientific objective of the Garcea Lab is to advance understanding of the cognitive and neuroanatomic mechanisms underlying human tool use. Our group uses neuropsychological testing, functional MRI, and high definition fiber tractography to test causal hypotheses in persons with brain injury.



New NGP Faculty



Paul Geha, MD

The Pain and Perceptions Lab focuses on pain and hedonic perceptions. We are interested in understanding the neural mechanisms that transform nociceptive input to painful perceptions in humans and how these mechanisms change in chronic pain. Pain and nociception are closely related to somatosensory (e.g., touch) and hedonic perceptions and therefore we also study such experiences with the aim of disentangling pain from non-painful perception and understanding how hedonic perception goes awry in chronic pain patients.



Marius Cătălin Iordan, PhD

Our lab studies how visual and semantic knowledge (e.g., objects, scenes, concepts, categories, events) are learned, organized, and modulated by attention in human behavior, in the human brain, and in artificial neural networks. We take an interdisciplinary approach that uses human experiments involving complex naturalistic stimuli and applied machine learning, together with a diverse array of methods and experimental techniques: neuroimaging (fMRI), psychophysics, CNNs, and real-time neurofeedback (neural sculpting). Current research directions in the lab include: (1) investigating ecologically-relevant aspects of visual and semantic cognition (e.g., categorization, learning, efficient perception) in the brain and in behavior; (2) improving automatic prediction of human behavioral judgments and neural responses from large-scale human-centric data, e.g., by using neural networks; and (3) probing the causal links between human neural representations and behavior and potentially improving human cognitive processes via neurofeedback and neural sculpting.



Gabriella Sterne, PhD

The overarching goal of my lab is to understand how neural circuits generate and shape complex behavior. We study feeding behavior in the fruit fly, Drosophila melanogaster, to reveal general and fundamental principles about neural circuit organization and function. Current projects in the Sterne Lab address how feeding motor sequences are generated, how feeding is properly timed, and how feeding experiences are remembered. We study these questions by combining connectomics, advanced genetic tools, high-resolution analysis of behavior, and imaging in awake, behaving animals. Understanding the circuit mechanisms that govern feeding in the fly will shed light on the general strategies that neural circuits use to compute behavioral decisions, control movement, and store information. An improved understanding of these strategies is essential for the rational design of therapies for human circuitopathies.

Neuroscience Retreat





Memorial Art Gallery, 500 University Ave., Rochester, NY, 14607

Photo Credit: Rick Libby, Ph.D.

Poster/Program DesignL PhD Candidate Lia Calcines Rodrigue

8:30am)

A special thank you to the 2023 NGP Retreat Committee

for putting together such a successful event!

Mark Stoessel (President) Lia Calcines Rodriguez (Vice President) Silei Zhu Jingyi Yang Linh Le Krishnan Padmanabhan, Ph.D. Tori D'Agostino

2023 Peter Shrager Award Winner: M. Kerry O'Banion, M.D., Ph.D.



2023 Doty Award Winner: Udaysankar Chockanathan, PhD





2023 Neuroscience Retreat



Student Speaker: Fara Zakusilo, PhD

Fara joined the MD-PhD program at the University of Rochester and in 2018, joined Gorbunova and Seluanov lab under supervision of Dr. Gorbunova and Dr. M. Kerry O'Banion to pursue a PhD in Neurobiology and Anatomy, studying the role of hyaluronic acid in Alzheimer's disease in naked-mole-rat hyaluronan synthase transgenic mice. She is currently back in medical school finishing the clinical portion of her training.

Post-Doctoral Fellow Speaker: Bartosz Kula, PhD

Bartosz has been working as a postdoctoral fellow with Dr. Nathan Smith since 2020, He is working on a project titled "Protecting the Aging Brain: Self-Organizing Networks and Multi-Scale Dynamics Under Energy Constraints". This project aims to establish a model of pharmacologically induced-acute insulin resistance in the brain and to reverse the detrimental effects of insulin resistance via novel ketone ester supplementation in hope of circumventing problems with glucose utilization during insulin resistance.





Faculty Speaker: Julian Meeks, PhD

Dr. Meeks is an Associate Professor of Neuroscience at the University of Rochester. His lab studies the neural circuits of the mouse accessory olfactory system, best known for its role in detecting pheromones, and how these circuits respond to recent chemosensory experience.

Keynote Speaker: Kristina Nielson, PhD

Dr. Kristina Nielsen is an Associate Professor in the Department of Neuroscience and the Scientific Director of the Zanvyl Krieger Mind/Brain Institute at Johns Hopkins University. Dr. Nielsen's lab tackles fundamental questions about the organization of visual circuits across multiple species including how those circuits are formed during development and how that organization contributes to visual perception.



Congratulations To Our Newest PhD Recipients



Anjali Sinha Defense: 8/8/2023 Title: Role of mAChR signaling and Mcurrents in EVS mediated responses of mammalian vestibular afferents



Katherine Andersh Defense: 5/1/2023 Title: The role of proinflammatory cytokines in glaucomatous neurodegeneration



Allison Murphy Defense: 4/11/2023 Title: Structure and Function of Corticogeniculate Feedback



Garrick Salois Defense: 3/29/2023 Title: Iron deficiency alters inhibitory neuron precursor population dynamics in human ventral forebrain organoids



Berke Karaahmet Defense 2/1/2023 Title: Immunomodulatory approaches to Alzheimer's Disease

University of Rochester Brain Awareness Campaign

The UR Brain Awareness Campaign (BAC) is a group dedicated to outreach and education about all things brains! It is a student-led organization, with the committee including graduate students from the Neuroscience and the Brain and Cognitive Science programs. This year's committee included (from left to right in the photo): Paige Nicklas, Kathryn Toffolo, Sanjana Kapisthalam, Olympia Mathiaparanam, Abi Alpers, Evan Newbold, and Cody McKee. The group is passionate about getting children and the general public excited about neuroscience through engaging, hands-on activities and events.

In February, we held our 7th annual Brain Bee fully in person for the first time since 2020! Our competition welcomed 13 high schoolers from 8 different schools in the area. This year we had the most contestants since we started hosting the competition in 2017, and also the highest % correct we've ever had. These students are truly impressive! Our winner was Maureen Zhang! She was unable to attend the national competition, though. So, our runner-up, Cole Jerum, went on to the University of California – Irving to represent us at the National Brain Bee Competition. After nationals, Cole reports "The National Brain Bee was an amazing experience and it has given me a newfound interest in neuroscience and the brain!"

We also organized visits to schools in April for National Brain Awareness Week – again, this was our first year back to doing this fully in-person! This year, our events were themed around movement and motor learning. The kids got a little dizzy, had their vision tricked, and traced their way through mirror mazes – all while discovering how their brains work and learn. Through these visits, we reached over 400 students in the Rochester area!

The committee would like to send a HUGE thank you to everyone that has contributed in some way to the success of BAC. We could not function without our enthusiastic volunteers, those who generously participate in our fundraisers, or those who help us spread the word about BAC! Thank you all for a successful year, and the committee is looking forward to another great year of brain awareness!









PONS

The Pre-doctoral Organization for the Neurosciences (PONS) has served as a bridge for the neuroscience and neurology focused student groups at the University of Rochester. PONS hosts a Luncheon Roundtable Series to expose pre-doctoral students to current topics and research opportunities in interdisciplinary neuroscience. This year's panel discussion topics and presenters included:

Schizophrenia & The Brain: Steve Lamberti, MD + Judy Thompson, PhD + Kuan Wang, PhD Mind Your Brain: Ronald Epstein, MD + Suzannah Iadarola, PhD + Christopher Niemiec, PhD Mental Health & Wellness: Suzanne Haber, PhD + Benjamin Suarez-Jimenez, PhD

All students interested in partaking in PONS or those with suggestions for new activities should visit our websites http://blogs.rochester.edu/pons, http://www.rochestersfn.org/pons, or contact us at urmcpons@gmail.com.

2022-2023 PONS members include Kathryn Toffolo, Luke Shaw, Linh Le, Tori Popov, and Catalina Guzman



LeChase Assembly Room, G-9576

Student and Alumni Publications

Sinha AK, Lee C, Holt JC (2023) Elucidating the role of muscarinic acetylcholine receptor (mAChR) signaling in efferent mediated responses of vestibular afferents in mammals. bioRxiv. 2023 Aug 6:2023.07.31.549902.

Li, H., **Le, L.**, Marrero, M., David-Bercholz, J., Caceres, A. I., Lim, C., Chiang, W., Majewska, A. K., Terrando, N., & Gelbard, H. A. (2023). Neutrophilia with damage to the blood-brain barrier and neurovascular unit following acute lung injury. bioRxiv : the preprint server for biology, 2023.10.16.562508. https://doi.org/10.1101/2023.10.16.562508

Na, D., Yang, Y., Xie, L., Piekna-Przybylska, D., **Bunn, D., Shamambo, M.**, & White, P. (2023). Neuroinflammation in a Mouse Model of Alzheimer's Disease versus Auditory Dysfunction: Machine Learning Interpretation and Analysis. Research square, rs.3.rs-3370200. https://doi.org/10.21203/rs.3.rs-3370200/v1

Wang, X., Delle, C., Peng, W., Plá, V., **Giannetto, M.**, Kusk, P., Sigurdsson, B., Sakurai, S., Sweeney, A., Sun, Q., Du, T., Libby, R. T., & Nedergaard, M. (2023). Age- and glaucoma-induced changes to the ocular glymphatic system. Neurobiology of disease, 188, 106322. Advance online publication. https://doi.org/10.1016/j.nbd.2023.106322

Yang J, Saionz EL, Cavanaugh MR, Fahrenthold BK, Melnick MD, Tadin D, Briggs F, Carrasco M, Huxlin KR, (2023 Sep 02). Contrast sensitivity: a fundamental limit to vision restoration after V1 damage.; medRxiv : the preprint server for health sciences.

Bucklaew A, Coop S, Sarch G, Mitchell J, (2023 Sep 01). Poster Session: Laminar and cell class distinctions for pre-saccadic attention in marmoset MT/MTC.; Journal of vision; Vol 23(11), pp. 39.

Bucklaew A, Coop SH, Mitchell JF (2023 Aug 04). Electrophysiology of Laminar Cortical Activity in the Common Marmoset.; Journal of visualized experiments : JoVE.

Willis HE, Ip IB, Watt A, Campbell J, Jbabdi S, Clarke WT, **Cavanaugh MR**, Huxlin KR, Watkins KE, Tamietto M, Bridge H (2023, Jul 21). GABA and Glutamate in hMT+ Link to Individual Differences in Residual Visual Function After Occipital Stroke.

Whitelaw, B. S., Stoessel, M. B., & Majewska, A. K. (2023). Movers and shakers: Microglial dynamics and modulation of neural networks. Glia, 71(7), 1575–1591. https://doi.org/10.1002/glia.24323

Holstein-Rønsbo S, Gan Y, **Giannetto MJ**, Rasmussen MK, Sigurdsson B, Beinlich FRM, Rose L, Untiet V, Hablitz LM, Kelley DH, Nedergaard M (2023, Jun 1). Glymphatic influx and clearance are accelerated by neurovascular coupling. Nature neuroscience.

Shaw L, Wang KH, Mitchell J (2023, May 30). Fast prediction in marmoset reach-to-grasp movements for dynamic prey. Current biology : CB.

Feng G, Joseph A, Dholakia K, **Shang F**, Pfeifer CW, Power D, Padmanabhan K, Schallek J (2023, May 29). High-resolution structural and functional retinal imaging in the awake behaving mouse. Communications biology; Vol 6(1), pp. 572.

Na D, Zhang J, **Beaulac HJ**, Piekna-Przybylska D, **Nicklas PR**, Kiernan AE, White PM (2023, May 26). Increased central auditory gain in 5xFAD Alzheimer's disease mice as an early biomarker candidate for Alzheimer's disease diagnosis. Frontiers in neuroscience; Vol 17, pp. 1106570.

Bell RD, **Winkler EA**, Singh I, Sagare AP, Deane R, Wu Z, Holtzman DM, Betsholtz C, Armulik A, Sallstrom J, Berk BC, Zlokovic BV (2023, May 5). Author Correction: Apolipoprotein E controls cerebrovascular integrity via cyclophilin A. Nature.

Cealie MY, Douglas JC, Le LHD, Vonkaenel ED, McCall MN, Drew PD, Majewska AK (2023, May 5). Developmental ethanol exposure has minimal impact on cerebellar microglial dynamics, morphology, and interactions with Purkinje cells during adolescence. Frontiers in neuroscience; Vol 17, pp. 1176581.

Student and Alumni Publications

Foley, K., Ward, N., Hou, H., **Mayer, A., McKee, C.**, & Xia, H. (2023). Regulation of PP1 interaction with I-2, neurabin, and F-actin. Molecular and cellular neurosciences, 124, 103796. https://doi.org/10.1016/j.mcn.2022.103796

Emerson J, **Delgado T**, Girardi P, Johnson GVW (2023, Mar 23). Deletion of Transglutaminase 2 from Mouse Astrocytes Significantly Improves Their Ability to Promote Neurite Outgrowth on an Inhibitory Matrix. International journal of molecular sciences; Vol 24(7).

Rudy MJ, **Salois G**, Cubello J, Newell R, Mayer-Proschel M (2023, Feb 20). Gestational iron deficiency affects the ratio between interneuron subtypes in the postnatal cerebral cortex in mice. Development (Cambridge, England).

Gomolka RS, Hablitz LM, **Mestre H, Giannetto M**, Du T, Hauglund NL, Xie L, Peng W, Martinez PM, Nedergaard M, Mori Y (2023. Feb 9). Loss of aquaporin-4 results in glymphatic system dysfunction via brainwide interstitial fluid stagnation. eLife; Vol 12.

Vonkaenel, E., **Feidler, A.**, **Lowery, R.**, **Andersh, K.**, Love, T., Majewska, A., & McCall, M. N. (2023). A Model-Based Hierarchical Bayesian Approach to Sholl Analysis. bioRxiv : the preprint server for biology, 2023.01.23.525256. <u>Your paragraph text</u>

Foley, K., McKee, C., Ganguly, A., Barnett, D., Ward, N., **Mayer, A**., Zhang, Y., Nairn, A. C., & Xia, H. (2023). PP1 β opposes classic PP1 function, inhibiting spine maturation and promoting LTP. bioRxiv : the preprint server for biology, 2023.01.26.525737. <u>Your paragraph text</u>

Hu W, **Zhu S**, Briggs F, Doyley MM (2023, Jan 18). Functional ultrasound imaging reveals 3D structure of orientation domains in ferret primary visual cortex. NeuroImage.

Zablotska, L. B., Zupunski, L., Leuraud, K., Lopes, J., **Hinkle, J.**, Pugeda, T., **Delgado, T.**, Olschowka, J., Williams, J., O'Banion, M. K., Boice, J. D., Jr, Cohen, S. S., Mumma, M. T., Dauer, L. T., Britten, R. A., & Stephenson, S. (2023). Radiation and CNS effects: summary of evidence from a recent symposium of the Radiation Research Society. International journal of radiation biology, 99(9), 1332–1342. https://doi.org/10.1080/09553002.2023.2142984

Giannetto, M. J., & Hablitz, L. M. (2022). Reading to the end(foot): translational readthrough of AQP4 increases amyloid- β clearance. Brain : a journal of neurology, 145(9), 2943–2945.

McKee, C., Shrager, P., Mazumder, A. G., Ganguly, **A., Mayer, A., Foley, K.**, Ward, N., Youngman, M., Hou, H., & Xia, H. (2022). Nuclear Inhibitor of Protein Phosphatase 1 (NIPP1) Regulates CNS Tau Phosphorylation and Myelination During Development. Molecular neurobiology, 59(12), 7486–7494. <u>Your paragraph text</u>

Toffolo, K. K., Freedman, E. G., & Foxe, J. J. (2022). Evoking the N400 Event-related Potential (ERP) Component Using a Publicly Available Novel Set of Sentences with Semantically Incongruent or Congruent Eggplants (Endings). Neuroscience, 501, 143–158. https://doi.org/10.1016/j.neuroscience.2022.07.030

Lopez, D. A., Christensen, Z. P., Foxe, J. J., Ziemer, L. R., **Nicklas, P. R.**, & Freedman, E. G. (2022). Association between mild traumatic brain injury, brain structure, and mental health outcomes in the Adolescent Brain Cognitive Development Study. NeuroImage, 263, 119626. https://doi.org/10.1016/j.neuroimage.2022.119626

Foley, K., Altimini, H., Hou, H., Zhang, Y., **McKee, C.**, Papasergi-Scott, M. M., Yang, H., **Mayer, A.**, Ward, N., MacLean, D. M., Nairn, A. C., Stellwagen, D., & Xia, H. (2022). Protein phosphatase-1 inhibitor-2 promotes PP1 γ positive regulation of synaptic transmission. Frontiers in synaptic neuroscience, 14, 1021832. <u>Your paragraph text</u>

Guha, S., Cheng, A., Carroll, T., **King, D**., Koren, S. A., Swords, S., Nehrke, K., & Johnson, G. V. W. (2022). Selective disruption of Drp1-independent mitophagy and mitolysosome trafficking by an Alzheimer's disease relevant tau modification in a novel Caenorhabditis elegans model. Genetics, 222(1), iyac104. https://doi.org/10.1093/genetics/iyac104

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Maria	Diehl	Assistant Professor in Psychological Sciences at Kansas State University
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First Name	Last Name	Position
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Michael	Hanna	Assistant Professor of Practice at University of Texas at San Antonio, TX
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Andrew	Custer	Director, Legal at Merck
David	Logan	Principal Computational Scientist at Pfizer, MA
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Sonia	Carlson	Former faculty at University of Kentucky
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Webster	Pilcher	The Ernest & Thelma Del Monte Distinguished Professor of Neuromedicine and Chairman of Neurosurgery at the University of Rochester Medical Center in Rochester, NY
James	Reese	Retired, Former FDA Health Science Administrator
Ronaldo	Riso	
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Program Information



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