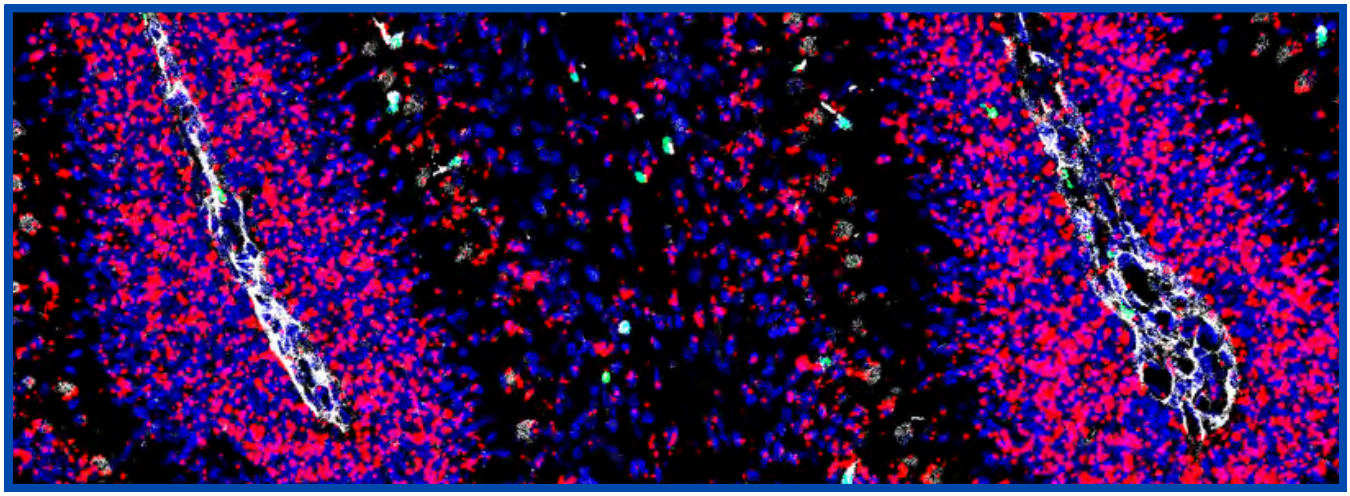
Summer 2024
Newsletter

NEUROSCIENCE INITIATIVE
ADVANCED SCIENCE RESEARCH CENTER



Message from the Director

Summer is here! The academic year has ended, but research continues at the Neuroscience Initiative of the ASRC! The building is lively with so many Undergraduate students joining many laboratories for an outstanding Summer Research experience. We welcome them and wish them to enjoy their time at ASRC. We also look back at the activities and accomplishments of the past several months as we plan activities for the upcoming new academic year.

-Patrizia

In this issue...

NEW INITIATIVE MEMBERS

Jihyun Kim

Jihyun is an MRI tech who recently joined the MRI core. After relocating to the United States from Korea, Jihyun studied MRI and worked at various hospitals. Wanting a new experience, he joined the Neuroscience Initiative and is thrilled to be part of the field researching the human brain.

Before moving to the United States, Jihyun served in the Korean Air Force for 10 years!

Gurleen Hothi

Gurleen holds a Bachelor of Science from City College of New York and is currently pursuing a Master's degree in Behavioral Neuroscience at Queens College. Originally from Punjab, India, she is part of Mingote lab at ASRC working on the Mouse City project. Her current focus lies in investigating the behavioral effects of social and environmental stressors linked to urban ecosystems in a novel mouse city setup.

Beyond her academic pursuits, she enjoys traveling, exploring diverse cultures, and cherishing moments with her baby niece.

Jack Mechler

Jack is a biochemistry PhD student who recently joined the Ayata Lab. Originally from Vermont, he received his undergraduate degree in biochemistry from Saint Lawrence University. Jack's research focuses on the structural underpinnings of Alzheimer's disease in brain immune cells. At the ASRC he can often be found at the electron microscope.

Outside of the lab he enjoys writing, music, and games.

INITIATIVE ACHIEVEMENTS

Congratulations to Faculty Grant Recipients!

Ye He, *Research Associate Professor*, is a recipient of a subaward of a **NIH R01** grant entitled *"Mechanical regulation of intestine stem cell-mediated tissue homeostasis in Drosophila."* Together with the PI of the grant Dr. Yang Xiang from UMass' Chan School of Medicine, they aim to understand how the homeostasis of gut is regulated by mechanical force mediated though the mechanosensitive ion channel TrpA1.

She is also the co-Pi for three 2024 **ASRC SEED** grants with PIs from multiple campuses. Together with Dr. Rinat Abzalimov from the Structure Biology Initiative at the ASRC, they will work with Dr. Maral Tajerian from Queens College and Dr. Carmen Melendez-Vasquez from Hunter College to study pre-clinical models of pathology, chronic pain, and multiple sclerosis using MALDI-imaging. In addition, with PI Yuemei Ye from Lehman College, and co-PIs Tong Wang and Tai-De Li from the Nanoscience Initiative, they will work towards the development of Novel Nanomaterial-based Methods Innovation for PFAS Degradation.

Lastly, with PI Ankit Jain from Brooklyn College and co-PIs Shana Elbaum-Garfinkle from Structural Biology Initiative and Dr. Tong Wang from Nanoscience Initiative, they will aim to develop stimuli responsive domains in liquid condensates.

Duke Shereen, *Research Associate Professor*, is a recipient of a **NIMH R01** award entitled *"The Evolutionary Basis of the Developmental Course and Etiologies of Anxiety and Disruptive Behaviors during Early Adolescence."* Dr. Shereen (Co-I) is collaborating with Dr. Yoko Nomura (Queens College, PI) and Dr. Sarah O'Neill (CCNY, Co-I) to examine the effects of prenatal exposure to natural disaster-related stress and the postnatal psychosocial environment on trajectories of clinical and adaptive neurobehaviors and neural development during early adolescence.

Congratulations...

Emily Prentice, *(Doctoral Student, Casaccia Lab)* for being selected as an awardee of *Academia Sinica Fellowship International Doctoral Students* (the first category) of TIGP-X program for 3 months, under the co-advisorship of Dr. Patrizia Casaccia and Dr. Keng-hui Lin at the Institute of Physics (IoP), Academia Sinica.

Alexandra Bilder, *(Undergraduate Student, Mingote Lab)* received the prestigious *Young Scholar Prize for Outstanding Research Project* from the Barnard Neuroscience Department for her project titled "The Impact of Dopaminergic Projections to the Lateral Entorhinal Cortex on Age-related Cognitive Deficits."

INITIATIVE ACHIEVEMENTS

Publications

Dhwanit R. Dave, Salma Kassem, Mona Tayarani-Najjaran, Maeva Coste, **Lele Xu**, Sheng Zhang, Darjan Podbevsek, Luis Ortuno Macias, Deborah Sementa, **Muniyat A. Choudhury**, Kelly Veerasammy, Selma Doganata, **Cory Weng**, Jorge Morales, Tong Wang, Mateusz Marianski, Tai-De Li, Xi Chen, Raymond Tu, **Ye He#**, Rein Ulijn# . Adaptive and Space-Filling Peptide Self-Assembly Upon Drying. ***ChemRxiv*** 2024 DOI: 10.26434/chemrxiv-2024-cmwjx.

Yijing Zhou, Vanessa B. Sanchez, Peining Xu, Thomas Roule, Marco Flores-Mendez, Brianna, Ciesielski4, Donna Yoo, Hiab Teshome, Teresa Jimenez, **Shibo Liu**, Mike Henne, Tim O'Brien, **Ye He**, Clementina Mesaros, Naiara Akizu. Altered lipid homeostasis is associated with cerebellar neurodegeneration in SNX14 deficiency. ***JCI Insights***, 2024 In Press

Sprinzen L, Garcia F, Mela A, Lei L, Upadhyayula P, Mahajan A, Humala N, Manier L, Caprioli R, Quiñones-Hinojosa A, **Casaccia P**, Canoll P. EZH2 Inhibition Sensitizes IDH1R132H-Mutant Gliomas to Histone Deacetylase Inhibitor. ***Cells***. 2024 Jan 25;13(3):219. doi: 10.3390/cells13030219. PMID: 38334611; PMCID: PMC10854521.

Priyasha Deshpande, **Emily Prentice**, Alfredo Vidal Ceballos, **Patrizia Casaccia**, Shana Elbaum-Garfinkle. Epigenetic marks uniquely tune the material properties of HP1α condensates.,***Biophysical Journal*** 2024, ISSN 0006-3495, https://doi.org/10.1016/j.bpj.2024.04.020.

Nayeem, N., **S. Sauma**, A. Ahad, R. Rameau, S. Kebadze, M. Bazett, B. J. Park, **P. Casaccia**, S. Prabha, K. Hubbard and M. Contel (2024). "Insights into Mechanisms and Promising Triple Negative Breast Cancer Therapeutic Potential for a Water-Soluble Ruthenium Compound." ***ACS Pharmacology & Translational Science,*** 2024, doi: 10.1021/acsptsci.4c00020

Anna Flury, **Leen Aljayousi**, **Siaresh Aziz**, **Hye-Jin Park**, Mohammadparsa Khakpour, Colby Sandberg, Fernando González Ibáñez, Olivia Braniff, Pragney Deme, Jackson D. McGrath, **Thi Ngo**, **Jack Mechler**, **Denice Moran Ramirez**, **Dvir Avnon-Klein**, John W. Murray, **Jia Liu**, Norman J. Haughey, Sebastian Werneburg, Marie-Ève Tremblay, **Pinar Ayata**. Integrated stress response associated with dark microglia promotes microglial lipogenesis and contributes to neurodegeneration. ***bioRxiv*** 2024.03.04.582965; doi: https://doi.org/10.1101/2024.03.04.582965

Etemadpour R, Shintree S, **Shereen AD**. Brain Activity is Influenced by How High Dimensional Data are Represented: An EEG Study of Scatterplot Diagnostic (Scagnostics) Measures. ***J Healthc Inform Res.*** 2023 Dec 12;8(1):19-49. doi: 10.1007/s41666-023-00145-2. PMID: 38273981; PMCID: PMC10805893.

Fleury S, **Kolaric R**, Espera J, **Ha Q**, **Tomaio J**, Gether U, Sørensen AT, **Mingote S**. Role of dopamine neurons in familiarity. ***Eur J Neurosci.*** 2024 Apr 23. doi: 10.1111/ejn.16326. Epub ahead of print. PMID: 38650479.

Nayeem N, **Sauma S**, Ahad A, Rameau R, Kebadze S, Bazett M, Park BJ, **Casaccia P**, Prabha S, Hubbard K, Contel M. Insights into Mechanisms and Promising Triple Negative Breast Cancer Therapeutic Potential for a Water-Soluble Ruthenium Compound. ***ACS Pharmacol Transl Sci.*** 2024 Apr 5;7(5):1364-1376. doi: 10.1021/acsptsci.4c00020. PMID: 38751641; PMCID: PMC11092013.

Sprinzen L, Garcia F, Mela A, Lei L, Upadhyayula P, Mahajan A, Humala N, Manier L, Caprioli R, Quiñones-Hinojosa A, **Casaccia P**, Canoll P. EZH2 Inhibition Sensitizes IDH1R132H-Mutant Gliomas to Histone Deacetylase Inhibitor***. Cells.*** 2024 Jan 25;13(3):219. doi: 10.3390/cells13030219. PMID: 38334611; PMCID: PMC10854521.

Huang D, Mela A, Bhanu NV, Garcia BA, Canoll P, **Casaccia P**. PDGF-BB overexpression in p53 null oligodendrocyte progenitors increases H3K27me3 and induces transcriptional changes which favor proliferation. ***bioRxiv*** [Preprint]. 2024 May 14:2024.05.14.594214. doi: 10.1101/2024.05.14.594214. PMID: 38798631; PMCID: PMC11118351.

Dansu DK, **Sauma S**, **Huang D**, Li M, Moyon S, **Casaccia P**. The epigenetic landscape of oligodendrocyte progenitors changes with time. ***bioRxiv*** [Preprint]. 2024 Feb 6:2024.02.06.579145. doi: 10.1101/2024.02.06.579145. PMID: 38501119; PMCID: PMC10946295.

Faculty SPOTLIGHT

Jia Liu, *Director Epigenetics Core Facility & Rodent Behavioral Analysis Suite, ASRC*

Dr. Jia Liu is the Director of the Epigenetics Core Research Facility and the Rodent Behavioral Analysis Suite at the CUNY Advanced Science Research Center. A pioneering researcher, Jia's work in the field of epigenetics explores the relationship between the environment and mental health. Using mouse models alongside cutting-edge molecular tools, Jia's work probes how stressful experiences reshape the genetic and epigenomic landscape of our brain cells, particularly glia. She is also interested in understanding the profound, long-term effects stress can have on our mental health at the cellular level, and identifying processes that underpin our ability to withstand and adapt to stress. This is crucial, as it opens the door to developing targeted interventions that not only help individuals build resilience but also offer relief from anxiety and depression.

Originally from Shenzhen, in Southern China, Jia received her Ph.D. in Neuroscience from Wesleyan University in Connecticut with a focus on understanding the molecular mechanisms of DNA repair in neuronal excitotoxicity and epilepsy. Following her graduate study, she joined Icahn School of Medicine at Mount Sinai as a postdoctoral fellow, where she carried out research on the epigenetic mechanisms regulating myelination and oligodendrocyte development in the central nervous system in physiological and diseased conditions, such as Multiple Sclerosis. She later became a Research Assistant Professor at the Friedman Brain Institute at Icahn School of Medicine at Mount Sinai where they were one of the first research teams to report on myelin plasticity. In 2017, Jia joined the CUNY Advanced Science Research Center in and led her own research investigating the glial mechanisms of stress disorders. She also founded the Epigenetics Facility and the Rodent Behavioral Analysis Suite.

Jia's recent publications include *"Serotonergic Modulation of the BNST-CeA Circuit Promotes Sex Differences in Fear Learning"* in bioRxiv, *"Axo-glial interactions between midbrain dopamine neurons and oligodendrocyte lineage cells in the anterior corpus callosum"* in Brain Structure and Function, and *"Associations of one carbon nutrient intake and status with fetal DNA methylation in pregnancies with or without gestational diabetes mellitus"* in Clinical Epigenetics.

When Jia is not facilitating groundbreaking science, she is an active mom who enjoys baking and traveling. Find out more about the Liu Lab here!

Student SPOTLIGHT

Dennis Huang

Dennis Huang is a doctoral student in the Molecular Cellular Developmental Biology program at the CUNY Graduate Center. After graduating with a Bachelor of Science from the College of Staten Island's Biology program in which he minored in Biochemistry, Dennis spent time as a research assistant at his alma mater, and as a research technician at Weill Cornell Medicine. He then joined the Neuroscience Initiative in 2018 under the dual mentorship of Dr. Konstantino Krampis and Dr. Patrizia Casaccia.

Dennis' research interests lie in identifying what happens deep down in the cells as tumors progress over time. When Dennis entered the PhD program, he was interested in computational biology, "a blend of data science and biological science using data driven analyses versus more wet lab driven analyses." Although CUNY does not have many computational biologists or bioinformaticians, collaborative discussions already happening between Dr. Casaccia and Dr. Peter Canoll from Columbia jumpstarted Dennis' PhD journey. A year after the initial meeting, their combined ideas about progressive transformation in cancer cells led to development of a project using Dr. Canoll's inducible glioma models "to break down the timeline of tumor progression to try to identify what happens deep down in the cells the longer the tumor progresses." Since brain cancer is incredibly complex to treat, Dennis' research hopes that "if we can focus on what happens at the beginning and what happens as it [tumor] changes, that sort of information can be pretty valuable when developing new treatment options."

In addition to his research projects, Dennis presented the poster "Noise filtering, exploratory data analysis and trajectory inference from single-cell (scSeq) genomic sequencing using the R / Bioconductor software libraries" at the 2019 Bioconductor Conference, and at Glia Club. He also received the Early Research Initiative's Catalyst Grant (2020) after his research was significantly impacted by the COVID-19 pandemic. Dennis submitted his first author paper earlier this year, a study entitled "PDGF-BB overexpression in p53 null oligodendrocyte progenitors increases H3K27me3 and induces transcriptional changes which favor proliferation."

When Dennis is not in the lab, he enjoys playing tennis and video games. You can check out some of the projects Dennis has worked on during his studies here!

Spring Seminar Series & Summer Research

The Neuroscience Initiative was busy during the Spring & Summer semesters! Beginning with the **Spring 2024 Neuroscience Seminar Series**, targeting the Neuroscience community of the ASRC and surrounding Colleges, including CCNY and CUNY Medical School, we invited a number of innovative interdisciplinary scientists from universities all over the world to discuss their research. They provided valuable insights and perspectives to the current topics in the neuroscience field, making it a fantastic learning experience for everyone. Students and postdoctoral fellows also took the opportunity to interact, engage and network with the speakers. Stay tuned as we will be announcing the speaker schedule for the upcoming Fall Seminar Series!

The ASRC opened its doors to a large number of Undergraduates for our annual Summer Student Research opportunities. From early July to early August, students spend their summer learning about molecular neuroscience and having an opportunity to get a full hands-on experience of life in the lab. At the conclusion of their research experience, students present their findings at the **Undergraduate Summer Symposium** at CCNY, followed by an end of Summer celebration at the ASRC on August 8th. Congratulations to all of our brilliant student researchers!

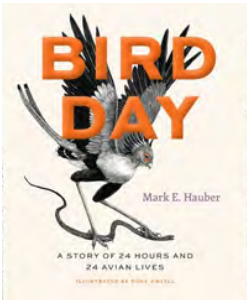
Dr. Orie Shafer, professor of neuroscience and circadian rhythm researcher, gave a seminar entitled “Sleep Regulation in the Drosophila Brain: A Tale of Two Processes” for the **CUNY Neuroscience Collaborative Seminar Series** hosted by Drs. Nesha Burghardt and Asohan Amarasingham. He presented his work on circadian timekeeping and sleep homeostasis in fruit flies and discussed how those processes converge to produce proper timekeeping and amount of sleep.

Spring Seminar Series & Summer Research

Dr. Patrizia Casaccia gave a seminar entitled: “Molecular events regulating oligodendrocyte progenitor proliferation and differentiation” at **St. Jude’s Children’s Hospital** , where she discussed the implications of her research for childhood brain tumors. She also gave a presentation entitled : “Nuclear events modulating the decision of oligodendrocyte progenitors to proliferate or differentiate” at **Northwestern University**, highlighting recent discoveries from the laboratory, related to the decision of progenitors to form myelin. Finally she opened the **Myelin Gordon Research Conference 2024** on Myelin, where also Dr. Jia Liu and Dr. Sami Sauma gave their presentations.

Science Outreach

Dr. Orie Shafer co-hosted a talk with Executive Director of the ASRC and evolution of avian social recognition systems’ researcher Dr. Mark Hauber. They discussed his book “Bird Day” at the Graduate Center as part of the Graduate Center’s **City of Science Series**, a segment of the **GC Presents** series of public programs that aims to bring scientific knowledge and research to the general public.



Dr. Duke Shereen and the MRI Suite were featured on a **Good Morning America (GMA) segment** which used MRI imaging to document the before and after effects of sugar consumption on the brain. After a 24 hour fast, functional MRI was taken from a GMA “sugar addict” volunteer before and after dessert to probe changes in functional connectivity in circuits related to the brain’s pleasure and reward system.

The entire Neuroscience Initiative partnered with the Illumination Space to celebrate **Brain Awareness Week**, an annual global campaign to foster public enthusiasm and support for brain science. We hosted several neighborhood schools, including Drs. Pinar Ayata and Dr. Jia Liu’s outreach activities at schools in their own neighborhoods. Students participated in hands-on, interactive activities like the human-human interface, the claw, and the EEG bands facilitated by Neuroscience Initiative faculty and doctoral students. Additionally, students were taken on a tour of the ASRC.

BRAIN AWARENESS WEEK Dana Foundation

Community Connection & Outreach

During the Winter and Spring 2024 we strengthened our collaboration with the Illumination Space of the ASRC and co-organized two series of events: **Neuroscience Community Night**s and the **Mindfulness Series**.

Neuroscience Community Nights are family events geared towards the introduction of Neuroscience to parents and children from the surrounding community. Attendees participated in hands-on activities (including use of the EEG bands from our Neuroscience Booth revamp!), a tour of the "fruit fly suite" at the Shafer Lab, and a talk from Director of the Neuroscience Initiative Dr. Patrizia Casaccia discussing the ways neuroscience intersects with our daily lives.

The **Mindfulness Series** were adults-only events open to the local community, intended to spread ways to become resilient to everyday stress by cultivating mindfulness. For this Spring series, we invited wellness practitioners to lead members of the Greater Harlem community in experiencing various forms of mindfulness practice: from sound healing sessions to meditation and mindfulness walking and breathing, to experiencing the natural world in the city landscape , and through gentle dance movements. Through these sessions, attendees reported increased awareness, decreased stress, improved inter-person connection and greater sense of well-being. We are grateful to our generous supporters and to all the community participants for making those evenings memorable experiential events. We are hoping to continue to offer these great opportunities for the upcoming academic year!