@UIowaNeuro Notes

January 2024

This week marks the mind-bending part of winter where we think, “Hey, it’s warming up!” because 32 degrees Fahrenheit is so much warmer than last week’s subzero wind chills. I encourage you to take advantage of the “heat wave” and spend some time exploring the Dare to Discover banners around downtown. Hosted annually by the Office of the Vice President for Research, this campaign celebrates research by undergraduates, graduate students, and postdoctoral scholars, including 11 neuroscientists this year.

In a great example of the layers of mentorship in the Iowa Neuroscience Institute, **Banu Gumusoglu** is both a featured researcher and the mentor of another featured researcher. Banu’s postdoctoral mentor, **Mark Santillan**, nominated her and she nominated her undergraduate mentee, **Mushroor Kamal**, a biology major who anticipates graduating this spring.

In the months since she was nominated, Banu has been promoted to assistant professor of obstetrics and gynecology and psychiatry. She is working to elucidate the mechanisms by which the early pregnancy environment influences offspring brain development, and she is a leader of the Early Career Working Group of the Hawkeye Intellectual and Developmental Disabilities Center. At the same time, she is mentoring Mushroor though his study of prenatal and gestational impacts of maternal SSRI use, a project that also includes Banu’s long-time mentor **Michael Dailey** in the Department of Biology. Overall, this work pursues the mechanisms that prime neurodevelopmental risk in children to enable new avenues for early screening, personalized targeting, and ultimately cures for intergenerational disease.

Undergraduates

Sam Eliasen, works in **Hanna Stevens’s** lab to better understand how pesticides impact fetal development during pregnancy. He is studying household compounds and how common exposure methods can lead to altered brain development and risk of neurodevelopmental diseases. His work studying reproductive and developmental toxicology helps to better illuminate the widespread effects of common chemicals to protect future generations. Sam anticipates graduating in May with a degree in neuroscience and biochemistry and molecular biology along with a Certificate in Clinical and Translational Science.

David Wagner, a third-year neuroscience major in the **Nickl-Jockschat** lab is exploring the neuroscientific basis for creativity. His work analyzes task-based functional brain images (in addition to structural images) of well-known, famous creative geniuses compared to highly intelligent controls. He is using fMRI technology, to measure how creative geniuses' brains are activating compared to non-creatives at the time creativity is happening.

Medical and graduate students

Hazal Arpaci is working toward her PhD in behavior and cognitive neuroscience. She is investigating the relationship between the sleep microstructure, emotional regulation abilities, and brain development in children and adolescents with anxiety disorders. This is part of the overall research program in **Bengi Baran's** lab to discover potential sleep-related biomarkers for psychiatric disorders.

Ben Kreitlow, is an MSTP student in the Interdisciplinary Graduate Program in Neuroscience, who is part of the SUDEP research team in **Gordon Buchanan's** lab. Previous work has shown that SUDEP, sudden unexpected death in epilepsy, happens more during the night, regardless of nighttime activity levels, and Ben is studying how the nighttime may increase risk of death following a seizure. Across all neurological diseases, SUDEP is second only to stroke in the years of potential life lost. There is a critical need to understand why SUDEP happens and what strategies can be used to reduce the risk of death in people living with epilepsy.

Connor Laule is pursuing a PhD in pharmacology under dual mentorship of **Kamal Rahmouni** and **Deniz Atasoy**. His research is focused on understanding brain circuits involved in appetite and stress. Brain activity in these circuits can change under different metabolic states and stressful conditions, influencing feeding and stress response. The goal is to help identify new treatments for people suffering from appetite disorders.

Ti-Ara Turner, a PhD student in immunology, aims to understand how an isoflavone (plant-based) diet can reduce symptoms of multiple sclerosis (MS) through interactions between the gut microbiota and immune system. Previous work in the lab of her mentor, **Ashutosh Mangalam**, has shown that an isoflavone diet can reduce symptoms of MS, but the mechanisms behind these effects are unknown. Ti-Ara is working to identify the immune cells necessary for this protection. Better understanding of the role of the gut

microbiota in human health, may lead to new avenues for therapies in autoimmune diseases, like MS.

Avery Van De Water, a student in the Interdisciplinary Graduate Program in Neuroscience being mentored by **Dorit Kliemann**, studies how the human brain processes multisensory social information from a person's environment. Understanding how the brain integrates such multisensory information to make sense of the social world is key to determining how this process may be altered in autism spectrum disorder. Understanding brain mechanisms better may help find targets for early detection, inform personalized intervention, and help provide better support for autistic people and their families in the future.

Richie Zhang, a medical student who works in **Joel Geerling's** lab, studies a group of neurons in the parabrachial nucleus that express Neuropeptide S. This neuropeptide has been shown to involved in anxiety and sleep, but the function of the neurons themselves remains unknown. The Geerling lab has mapped out the inputs and outputs of these neurons and is interested in their neuronal connectivity and function.

Alexa Zimbelman, is pursuing her PhD in psychology behavioral neuroscience under the mentorship of **Ryan LaLumiere**. Her research focuses on the neurobiology of addiction, seeking to identify the mechanisms that regulate cocaine seeking. The specific brain regions and neural pathways underlying the promotion vs. inhibition of cocaine seeking remain unclear. Alexa's goal is to determine the role of specific pathways in regulating cocaine seeking to inform our understanding of the neural circuits that mediate motivated behaviors like cocaine seeking.

Mentorship and collaboration are hallmarks of the INI. We are all stronger when we work together, and we all benefit both from being mentored and mentoring others. I am gratified to be part of a university that recognizes and honors these key components of discovery and innovation.

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