@UIowaNeuro Notes

January 2022

In this frigid time of year, we may be inclined to keep our heads down against the wind and rush to get back inside. But when you're in downtown Iowa City over the next few weeks, I encourage you to take an extra moment to acknowledge and appreciate the Dare to Discover banners overhead. This annual campaign from the Vice President for Research highlights innovation among our students and postdocs and celebrates their incredible accomplishments. The scope of neuroscience research at Iowa is represented by seven different young scientists—three undergraduates, three graduate students and a newly hired assistant professor--whose work is leading us toward a greater understanding of the human brain and nervous system.

Nominated by their faculty mentors, the three undergraduates show tremendous promise for the future of medicine. All three list medical school and continued research in their future plans.

Hend Al-Kaylani (*left*) participates in two different but related cognition research projects in the van der Plas and Nopoulos Labs. In the van der Plas lab, she identifies methods to support people who had childhood leukemia by studying their academic performance. With a 95% survival rate for acute lymphoblastic leukemia, there is a vital need to identify ways to improve treatment so that each patient can thrive. Her second project, in the Nopoulos lab, connects brain development to behavior in children with Huntington's Disease.

Shantelle Graff (*center*) joins the Geerling Lab in its effort to better understand the parabrachial nucleus. She is focused on the neural circuits involved in critical life functions such as sleep, thermoregulation, breathing, appetite, and the maintenance of conscious wakefulness. Mapping these circuits is critical to advancing our knowledge about age-related diseases that affect the brain such as Alzheimer's, Parkinson's, and other Lewy Body Diseases.

Radha Velamuri (*right*) studies stress-related disorders in the Hultman Lab. She aptly notes that while a little stress is a good motivator to be productive, especially for college students, too much stress leads to a multitude of adverse effects that disrupt the complicated circuitry of the brain, including the onset of depressive-like symptoms. By studying the underlying molecular, cellular, neurophysiological, and behavioral bases for vulnerability to chronic stress, she hopes to contribute to a better understanding of how overextension of these normal physiological phenomena causes prolonged problems.

Three neuroscience graduate students highlighted in the campaign exemplify the varying paths research can take after a bachelor's degree.

Sheps King-McAlpin (*left*) earned his PhD in molecular medicine in the Potthoff Lab and is now completing clinical rotations for his MD, anticipating a May 2023 graduation followed by a physician-scientist training program in psychiatry. His research interests are at the crossroads of diabetes and neuroscience, seeking to understand a liver-derived hormone, fibroblast growth factor 21 (FGF21), at a cellular level. FGF21 is able to bypass insulin resistance and restore insulin's function in diabetic animals. He seeks to identify FGF21's mechanism of improving insulin sensitivity in order develop new therapies for diabetic patients.

Lex Gomez (*center*) is on track to graduate this spring with a PhD in neuroscience and then pursue postdoctoral opportunities on her way to starting her own lab. Her work in the Blumberg Lab focuses on how the infant brain processes sensory information. She seeks to understand how sensory processing changes in early development and how it is modulated by behavior. Her work provides important context for understanding how infant brains make sense of the world.

Aysheh Alrfooh (*right*) expects to complete her PhD in Clinical Pharmaceutical Sciences this summer and then pursue research opportunities in the pharmaceutical industry. Her research in the Gaine Lab focuses on determining the DNA methylation profile of individuals with psychiatric disorders in order to discover how alterations in DNA methylation are linked to specific disorders such as bipolar disorder, schizophrenia, and suicidal behavior. Her long-term goal is to launch her own company to develop epigenetic-based biomarkers and drug targets for complex diseases.

Having made his way through the student and postdoctoral stages of training, **Calvin Carter** is now poised for independence, and we're thrilled that he has chosen to establish his lab here, as an assistant professor in our Department of Neuroscience and Pharmacology. Calvin's work intersects with several different fields as he seeks to establish the effect of electromagnetic fields on human biology. Some may be toxic while others could be the key to treating diabetes or curing cancer. While a postdoc in the Sheffield Lab, he discovered beneficial fields that can be used to control blood sugar. The implications are huge and indicate that blood sugar can be managed using a remote control that delivers the right signals.

These seven scientists represent a convergence of varied skills and backgrounds in this moment at Iowa. No matter where their future paths take them, they will have left an imprint that enriches our labs and reminds us that discovery is only possible when we welcome young minds, fresh ideas, and perspectives different from our own.