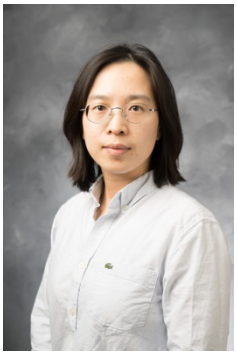
@UIowaNeuro Notes

January 2025

Once again, our neuroscience trainees are well represented in the annual Dare to Discover campaign sponsored by the Office of the Vice President for Research. The wide reach of our work is evident in the profiles presented on the OVPR website--graduate students in eight different programs and undergraduates in three majors.

You can follow the link to read all the profiles. These are our highlighted neuroscientists:

Emmanuel Yeboah Bonsu, a PhD student in chemistry, is mentored by two INI faculty members, **Dave Martin** and **Jonathan Doorn**. He is investigating a family of compounds called limonoids, that are present in nature and shown to protect against a type of neurodegeneration. Bonsu is developing methods to reproduce four limonoid compounds and similar non-natural molecules to investigate how they protect nerve cells.



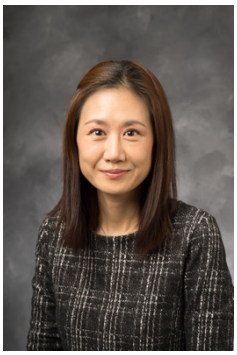
Xitong Chen, a PhD student in psychological and brain sciences, uses advanced techniques including brain imaging, EEG, and patient studies to investigate how humans adapt to changing environments, with a special focus on the thalamus. The prefrontal cortex is often thought of as the brain's control center, but it receives signals from the thalamus that help to shape decision-making and behavior. Understanding how the thalamus contributes to cognitive functions has the potential to lead to better treatments for cognitive disorders. Xitong is mentored by **Kai Hwang**.

Maya Evans, a student in the Interdisciplinary Graduate Program in Neuroscience being mentored by **Hanna Stevens**, researches the striatum, which is strongly linked to multiple psychiatric conditions, including autism spectrum disorder. She is studying how stress during pregnancy affects the development of the striatum in offspring and how changes in the striatum's development may impact behavior throughout life.

Alaa Harb, a PhD student in nursing, mentored by **Juliana Souza-Talarico**, studies the cognitive and emotional well-being of older adults. She examines how stress and resilience impact cognitive decline throughout the aging process with a goal of developing strategies to support mental health and cognitive function, promoting a healthier aging process.

Emese Kovács, a PhD student in pharmacology, is pursuing epigenetics research with **Marie Gaine**, focused on changes to DNA that alter how genes are expressed without changing the sequence of DNA itself. She examines the impact of suicide attempts and lithium treatment on DNA methylation in individuals with bipolar disorder.

Ahmet Kuralay, a student in the Interdisciplinary Graduate Program in Neuroscience being mentored by **Jon Resch**, studies how the brain controls the appetite for salt. His work focuses on the neurons that regulate salt intake and how they communicate with other regions of the brain. His research will contribute to the development of effective treatment strategies for cardiovascular diseases that arise from high salt intake.



Sun Joo Lee, a PhD student in music therapy, is focused on the effects of therapeutic group singing for people with Parkinson's disease, along with their caregivers and family members. For members of her therapeutic singing group, Tremble Clefs, she facilitates vocal exercises, breathing techniques, and movement exercises to address PD symptoms. She is mentored by **Abbey Dvorak**.

Gage Liddiard, an MSTP student pursuing his PhD in neuroscience under the mentorship of **Joseph Glykys**, studies drug-resistant seizures in newborns. He is seeking new alternatives to currently available medications, which are relatively ineffective. He is targeting the brain's innate inhibitory system, assessing poorly understood and underutilized drug targets and measuring how they may affect neonatal seizures.

Phuong Nguyen, a PhD student in informatics, is developing computer programs to identify genetic markers and understand how they influence human diseases and traits. Her programs use advanced methods, such as deep learning, to predict how changes in DNA can affect gene activity, particularly in diseases like cancer. She is mentored by **Erliang Zeng**.

Mallory Shin, a student in the Interdisciplinary Graduate Program in Neuroscience being mentored by **Marco Hefti**, studies how neurons process waste products and how the failure of specific cellular waste systems contributes to the development of neurodegenerative of diseases such as Alzheimer's disease. She is specifically interested in how neurons recycle tau. While the development of Alzheimer's disease involves the buildup of specific proteins, what precedes the accumulation of these proteins is unknown.

Nathan Witmer, PhD student, molecular medicine, is working to understand the molecular mechanisms underlying heart disease. He has been working with **Ryan Boudreau** since he was an undergraduate. The research team in the has discovered several microproteins and Nathan is working to determine their functions, their relevance to heart disease, and if they are targetable for heart disease treatments.

Just as Nathan did, some of these outstanding undergraduates might continue with their neuroscience research at Iowa as they move on to graduate school.

Hannah Franke, an undergraduate studying psychology and linguistics, works on a research project that explores the effects of meaning-based priming of word recognition under the mentorship of **Bob McMurray** in psychological and brain sciences, and Ethan Kutlu in linguistics. She presents participants with a short story to assess if it will speed their recognition of a related word or slow their ability to recognize an unrelated word. The team is currently expanding this project to explore if priming participants to recognize words that have related meanings can impact their ability to recognize words that also share sounds.

Jasmyn Hoeger, an undergraduate studying biology, is part of the team in **Ryan Boudreau's** lab, studying the systems that control gene expression in heart and brain disease. She is investigating a group of genes that share a common control mechanism for producing proteins, which may also generate novel microproteins. Hoeger is working to understand the purpose of these microproteins and how stable they are.

Lydia Karr, an undergraduate studying neuroscience and Spanish, works in **Mark Blumberg**'s Lab, studying sleep and behavioral development. The team studies the role of sleep in brain development, looking at brain activity and infant behavior to understand the impact of premature birth on sleep and brain development. Lydias involvement includes scoring infant behavior, analyzing data, and running EEG sessions. She is also working on an independent project to assess different methods of scoring infant sleep behavior.

Natalie Kehrli, an undergraduate student studying psychogy under the mentorship of **Amanda McCleery**, investigates the relationship between physical activity and schizotypal traits, including odd or eccentric behavior, social anxiety, paranoia, and more. She compares self-reported physical activity and smartphone step counts in a large sample of college students, some with elevated schizotypal characteristics. Her research explores how physical activity measures relate to negative symptoms, mood, and well-being across diverse groups.

Thanks to the faculty mentors who took the time to nominate these outstanding students. You are modeling for them the kind of leadership that recognizes the whole person and prioritizes celebrating achievements along the way. We can only benefit from building pride and confidence in our next generation neuroscience leaders.

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