

Research from two UF College of Medicine graduate students published in Nature Communications

The research explores the molecular basis of hearing loss and impact of smell on dopamine receptors

By Jori Rzepecki

March 25, 2025 — Two University of Florida College of Medicine doctoral students recently achieved a rare milestone in their academic careers: publishing first-author papers in one of the scientific community's most prestigious journals.

Ph.D. candidate Zane Moreland, who studies the genetic mechanisms of hearing, and Natalie Johnson, Ph.D. '24, a pharmacology researcher whose work explores smell, both had research published in Nature Communications.

"This achievement is extraordinarily rare for graduate students," said Daniel Wesson, Ph.D., a professor and chair of the UF Department of Pharmacology and Therapeutics. "Having two students from our program published in such a high-impact journal speaks volumes about the quality of our biomedical science Ph.D. program and its ability to attract and retain exceptional talent."



Moreland's research, supported in part by a F31 Fellowship from the National Institutes of Health, explores the molecular basis of hearing loss by studying how hair cells in the ear develop. The study looked at a novel mutation in myosin 15. Myosin 15 is a motor protein involved in hair cell function and mutations in it are linked to hereditary deafness.

His work demonstrated that MYO15A helps shape the tiny hair-like projections in the inner ear that are essential for hearing, suggesting it plays a role beyond just cargo transport.

"The previous model shows myosin 15 as transporting molecules like a delivery truck driver on the road," Moreland said. "But now we're saying in addition to that function, it's more like myosin 15 is one of the construction workers building the road that it moves along, too."

The research provides new insights into how genetic mutations can result in deafness or adult-onset hearing loss by affecting the integrity of these cells.



Johnson's research, supported in part by a F31 Fellowship from the National Institutes of Health, took a different direction, focusing on the relationship between brain motivation systems and sniffing behavior in mice.

"Sniffing is this behavior that's so common, not just in rodents, but humans as well. It's one of the most widely displayed behaviors, and we didn't know before what is initiating that behavior," Johnson said.

Her findings demonstrated that dopamine, a neurotransmitter associated with reward and motivation, plays a critical role in driving sniffing behavior — a fundamental insight that could have broader implications for understanding sensory-seeking behaviors.

For both researchers, the publications represent years of dedicated work. Moreland's paper underwent four years of peer review before acceptance, while Johnson's research involved a year and a half of experimentation.

"Being published in Nature Communications is really rewarding," Moreland said. "I think that the work really adds something interesting and novel and generates a lot of cool discussion in our field, which is, I think as a scientist, the most rewarding thing."

Johnson, who graduated from the UF College of Medicine in spring 2024 before joining West Chester University in Pennsylvania as an assistant professor, echoed these sentiments.

"This is by far the highest-tier journal that I've published in," she said. "The paper was a ton of work over years. It's nice to see it being recognized and published in that journal because it validates all the work that went into it."

Both researchers credit UF's supportive environment for helping them achieve this milestone. While Moreland secured an NIH fellowship that funded his research, Johnson obtained independent funding.

"I think I was able to be as successful as I was because I had such a supportive department," Johnson said. "I had a supportive Ph.D. program, and then I had a supportive mentor, Dr. Wesson, on top of all of that."

According to Wesson, their success highlights the strength of UF's graduate programs in attracting and developing top scientific talent.

"These students could have gone anywhere, and we were lucky to train them here at UF," he said. "Their hard work reflects well upon their scientific mindset and determination, and when merged with our supportive lab environment and college department, it creates the perfect conditions for this level of achievement."

Moving forward, the two researchers have taken different career paths to continue building on their success. Johnson has already secured a tenure-track position at West Chester

University, where she balances teaching with running her own research lab.

“I’m in a position where I teach a lot, but I still have my research lab,” she said. “I’m still focused on sensory-guided motivated behaviors and really interested in the sense of smell and olfaction.”

Moreland, who will defend his dissertation soon, is exploring career paths that build on his expertise in biophysics and molecular mechanisms of hearing.

“I want to find something that combines my expertise in a way that’s useful, and still makes an impact,” he said. “This publication will be very helpful for my career, no matter what I do just because I’ve contributed to something new and interesting in this field.”

SHARE[Tweet](#)[Share on Facebook](#)[Share on LinkedIn](#)

CATEGORIES

[Alumni](#), [College](#), [Featured Article](#), [Research](#), [Students](#)

ABOUT THE AUTHOR**Jori Rzepecki****Communications Intern, UF College of Medicine**

Jori is studying public relations with a concentration in communication studies at the University of Florida. Upon graduating this August, she aspires to begin her career in communications and public relations.

Before joining the UF College of Medicine communications team, Jori gained valuable experience through involvement in multiple on-campus organizations and in-house internships across various industries.

organizations and in-house internships across various industries.