

Faculty Spotlight

UWO
UNIVERSITY OF WISCONSIN
OSHKOSH



Dr. Dana Merriman, Ph.D., Biology

Could you tell us about your research interests?

My PhD work in the 1980s centered on cone photoreceptor cell biology and I'm still at it all these years later. Cone cells provide color vision AND all the highly-detailed central vision that we use when reading, navigating, recognizing faces, *etc.* Diseases such as macular degeneration blind a person by destroying their cones. Unfortunately, there are no good rodent models for addressing cone diseases because most lab rodents are nocturnal and don't depend on their cones like humans do. That's why I have devoted 20 years to the ground squirrel, a day-active, visually-guided, intelligent rodent with a human-like visual system. Squirrels are wild, but I solved that problem by establishing a captive breeding colony here at UW Oshkosh. Since 2007, my lab has conducted squirrel research in collaboration with R1 universities around the US and the world. Ground squirrels hibernate, another fascinating natural phenomenon, so I also study hibernation physiology. Hibernation is relevant to human health in many ways, including but not limited to the problems of fibrosis (scarring) in damaged organs (heart, lung, brain); acute care after brain or spinal cord trauma; obesity and insulin resistance; and enabling long-term human space flight.

What research projects are you currently working on? What would you like your next project to be?

We have a paper in review on the embryonic development of squirrel retinal cones, but more in-depth molecular studies will continue. Other papers in the 2022 pipeline address how squirrel cones age (the eyes of elderly squirrels do show several age-related problems known in humans); using stem cells to correct cone-killing injuries; and hibernation's effects on the central nervous system. We also discovered a natural mutant in a squirrel population in western Wisconsin that has some of the same eye problems that albino persons have, and that's an active study with colleagues at the Medical College of Wisconsin. Also with MCW, we are developing methods to gene-edit squirrels to have human diseases for which there are no animal models and thus no avenues for hope -- yet. For about 7 years now, scientists from other universities have worked on-site in my UWO lab, so I'm never really sure what new projects are around the corner.

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What challenges have you faced in your career to date? What have you learned from those experiences?

I'll pick just one. Because I have a PhD, I've occasionally been told to my face "Oh you aren't a REAL doctor". No, I can't do a surgery or prescribe a pill to treat people's health problems. Instead, my work aims to *advance* medical knowledge to benefit patients whose treatments are not yet cures, as well as patients who have no treatments at all, yet. Expanding medical knowledge base into brand new territory through research is both exciting and filled with uncertainty. One must make peace with long hours of work, with failure, and with seemingly constant trouble-shooting and workarounds. Gratification is always delayed, and I have acquired a great deal of patience and persistence. To close the loop here, through teaching I have learned to be ready at all times to explain and justify my work to anyone who asks, meeting them where they are.

What advice would you give UW Oshkosh faculty applying for grants?

Use all the resources offered by our Office of Sponsored Programs and Faculty Development Program! Beyond that: my research discipline is costly, highly technical, highly regulated, and extremely competitive when it comes to funding. I've had to balance that with a sizable teaching load + committee work + advising (all of which I love to do). What worked for me was to focus on establishing collaborations with colleagues at R1 institutions rather than trying to set up as a "sole practitioner". That approach makes one only responsible for writing a portion of the grant proposals within their own expertise, not the entire thing.