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Eye research program pays off for students

By **Dawn Pauli**, contributing writer

Kenneth Mitton, assistant professor of biomedical sciences, challenges his student researchers in the Summer Undergraduate Research Program in Eye Research (SUPER) – and they're finding their hard work is paying big rewards.

Former student researchers are being accepted to prestigious graduate programs and this spring grabbed national awards at the Association for Research in Vision and Ophthalmology (ARVO) annual meeting in Ft. Lauderdale, Fla.

"Students often continue to do their fourth year independent research course during the winter and fall terms," Mitton said. "Research students are encouraged to participate in the communication of results at scientific meetings such as ARVO. Submissions of abstracts to this meeting are peer reviewed and rules for acceptance are fairly strict."

Nearly 10,000 researchers and clinicians attended the ARVO meeting, where Mitton and his fellow researchers, including two OU undergraduate students, presented three accepted abstracts.

As OU undergraduate biology students, Danielle Doyle (CAS '04) and Janice Loffreda-Wren (CAS '03) earned an ARVO-National Eye Institute travel meeting award for young investigators for the laboratory's abstract, "Economical Q-PCR Kits for Mouse Retinal Gene Expression: ERI Eye Gene Matched Primer cDNA Kits."

Also at the conference, Mitton presented with biology major Jenae Johnston, CAS '04, and Anand Swaroop, University of Michigan professor, an abstract, "Fiz1: A Novel Zinc-finger Protein Binds the NRL Transcription Factor Using Internal Domains Different from its RTK-Binding Domains."

Mitton is researching human retinal diseases and how genes interact. With his undergraduate student researchers, he is exploring one of the first known repressors that can affect the expression of photoreceptor specific genes. Mitton's laboratory is one of only few in the world using a molecular-biology technique, called the yeast two-hybrid trap, to discover previously unknown interactions between transcription factors that control rod-specific genes.

Mitton discovered four protein interactions involving transcription factors that regulate rhodopsin gene expression. Rhodopsin is the fundamental light-detecting protein of rod-photoreceptors. This method also discovered the repressor protein (called Fiz1) that is the central focus of the lab.

In the laboratory, Mitton provides students with real-world research experience.

"Students are doing lab exercises just as complicated as what they'd do in a graduate lab," Mitton said. "I'm giving them practical experience. I find if you challenge people, they step up to the challenge."

This research experience benefits those students who apply to graduate school. Loffreda-Wren will be attending the University of Michigan this fall as a graduate student in biomedical sciences affiliated with the Department of Human Genetics.

"My experience at the ERI was a major factor in my acceptance into the PIBS program. During my interview process at both the University of Michigan and University of Virginia, where I was also accepted, many professors told me that they were looking for someone like me because of my research experience," Loffreda-Wren said. "Grad schools want to know that their future Ph.D. candidates can be active researchers and there is no better way to prove that than by actually doing research at the undergrad level."

Biology major Afreen Siddiqui, CAS '03, and a 2002 SUPER student, was accepted into the Ph.D. program in cancer research at the Karmanos Cancer Institute at Wayne State University. The program admits only six new students each

year.

Mitton also exposes his students to the other side of research, including grant writing, completing National Institute of Health applications and creating presentations using Photoshop software. The students also learn to accept criticism when their papers are refereed by peers.

"Some people don't like to get the comments back," Mitton said. "You have to have a stiff upper lip. You have to take advice and use it. Sometimes you have to go do another experiment."

The student researchers are also learning that it can take months or even years to get something to work in the laboratory.

"When it works, the data collection might take a short amount of time," explained Mitton. "When you publish, others may not get a feel for the struggle that went into it."

Loffreda-Wren appreciates the well-rounded education she received through the SUPER program.

"My experience will help greatly once I enter the UM program," she said. "I am now aware of general lab techniques and protocol, but more importantly, I have experience writing about my research and presenting it to my peers and superiors. Those skills are vital to the scientific community and will actually put me ahead of some of my classmates."

SUMMARY

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