

Interdepartmental collaboration leads to student success in BioMaPS



Dr. Renee Fister

They develop a proposal detailing the research they will do in the field and the laboratory. The research is primarily performed during the summer followed by analyzing the results, preparing the findings, and presenting at local, regional and national meetings throughout the school year.

“The idea behind the research is that we want to affect change,” says Fister. “There are many areas in biology and mathematics that will change a lot of people.”

She recalls a recent article that connected nutrition to IQ. One of the teams researched this theory in mice. By suppressing their immune system through nutrition, they observed what effect it had on learning. “We look at things we can get our hands on, but they are things that help to make projections to be used by other researchers,” Fister explains.

Students not only have the opportunity to conduct research alongside faculty members, but to also gain experience that will catapult them into a brighter future. “Recently, two of our students have gone on to

The Biology and Mathematics in Population Studies (BioMaPS) program at Murray State University demonstrates the success of college departments joining forces. Faculty from the department of mathematics and statistics and the department of biological sciences partnered to form the BioMaPS program, aimed at allowing undergraduates majoring in mathematics and biology the opportunity to research environments and perform fieldwork with faculty members from each department. The results of the collaboration include mentoring over 175 undergraduates, 75-plus presentations at professional conferences, more than 40 peer-reviewed publications, 15 additional research grants, and multiple faculty and student awards.

Dr. Renee Fister, a professor of the department of mathematics and statistics and principal investigator of the program, explains that the “solid records” of the faculty involved and their demonstration of prior work together provided the credibility needed to secure funding for the BioMaPS program.

The group originally started working together in 2004 on an EPSCoR (Experimental Program to Simulate Competitive Research) grant guided by Dr. Maeve McCarthy. As a result, a BioMath conference was held at MSU with universities across the state invited to discuss biomathematics. Speakers from organizations such as St. Jude, Harvey Mudd College and Mississippi State University presented in concurrent workshops.

“We wanted to see if we could encompass people in the state around the topic of biomathematics,” Fister says. “Our history of working together led us to eventually submit a proposal to the National Science Foundation for BioMaPS I, which was funded for five years totaling \$594,000,” she explains. “At the end of the grant period, the program was funded for an additional three-year grant, also awarded totaling \$240,000.”

Eight MSU faculty have been involved in the program since its inception. Their commitment is not about monetary rewards, but their belief in the program. They receive two weeks of summer salary for their involvement — “minimal for the work they do,” Fister says.

Drs. Howard Whiteman, Claire Fuller, Kate He, Terry Derting, Renee Fister, Maeve McCarthy, Donald Adongo and Chris Mecklin are all participating faculty in BioMaPS II. Dr. David Roach and Dr. Emily Croteau were faculty in the BioMaPS I.

“The professors who offer so much of their time and energy for the program are amazing. I learned so much from them and I’m so thankful for their willingness to teach,” says Sarah Hargis, BioMaPS senior student.

To be accepted in the program, students must have a 3.0 grade point average, prerequisite courses in both biology and mathematics, and letters of recommendation from professors on their ability to do research. Fister explains, “There are many more applicants than positions. Currently, there is an approximate 20 percent acceptance rate.”

Students can request specific research topics such as ecological projects, medical research, laboratory intensive techniques and immunological aspects.

A four-person team consisting of a math student, biology student, math faculty and biology faculty is designated for each research topic. As a team, they formulate the specific question they are going to address. “The research teams seek to find answers to the problem they are working on that is found at the intersection of the two disciplines,” Fister notes.



biology graduate programs. Because of their ability to mathematically model situations, they were granted the top research fellowships at Texas Tech University,” Fister shares.

Jeffrey Young, junior BioMaPS student says, “This legitimate undergraduate research gave a shot in the arm to my college career and my professional career down the road.”

“I realized that I loved doing research and I rediscovered my passion for math. I will be attending Virginia Tech in the fall to start a Ph.D. program in genetics, bioinformatics and computational biology,” Hargis says.

All of the students who have been a part of BioMaPS have gone on to pursue further degrees or careers directly related to their work in the program. In addition, a baccalaureate area has been developed as a result of the program allowing future students to continue the discovery of biomathematics.

As the principal investigators, the professors and students have given much time and effort to the success of the program. Fister believes students and faculty can learn and work together effectively within and across disciplines. “We can make a difference in each other’s work,” she says. “I want to foster research experiences for students because they open minds and doors for them that they may not have believed were possible.”