

MARQUETTE RESEARCHERS

Discoveries with Disney

By Joe Cockrell

Incorporating the help of undergraduate and graduate students in high-profile research initiatives, Marquette faculty like Dr. Mike Johnson give life to the teacher-scholar model that is integral to a Marquette education.

Most people return from vacation with fond memories, photographs and souvenirs. When Johnson, assistant professor of electrical and computer engineering, and his wife, Patricia, returned from a trip to Walt Disney World Resort near Orlando, Fla., he brought back an e-mail address and a lot of questions. Johnson was captivated by the Animal Kingdom's research on elephant vocalizations, which he thought could have implications on his own research as director of the speech and signal processing laboratory in the College of Engineering.

Johnson's resulting research in bioacoustics (the study of acoustic communication and vocalization patterns in animals) has become the basis for a new study on animal communication and vocalizations of a variety of species including elephants, tigers, rhinoceroses and Beluga whales. Johnson is collaborating with researchers from Disney, the University of Connecticut's animal science program and Fauna Communications, a private research institute.

In addition to benefiting from the technology and data-gathering system in place at the Animal Kingdom, Johnson has been able to work with the world's largest captive animal herd. "Elephants are very social creatures and because the Animal Kingdom has 12 elephants, the environment is much more realistic than in most zoos," he says.

The project brings together experts from many disciplines, including animal behavior specialists, bioacoustics specialists, engineers and biologists. Johnson is involved with analyzing vocalization data to determine the ovulation cycles of the female elephants, which will be used to develop breeding techniques for endangered species. Advanced "voice print" technology will be designed to help keep track of wild animal herds as a means to possibly improve habitat management. The project provides researchers with clues on understanding social structure and behavior – information that can be used to enhance the treatment of wild and captive animals.

While Johnson's research is attracting national attention (he was recently awarded a National Science Foundation grant for \$1.2 million over four years), he knows the strength of the speech and signal processing program also depends on the

experiences it offers students. And he has earned a reputation for exposing his students to substantial research opportunities.

Patrick Clemins, Eng '98 and Grad '00, a doctoral candidate working on Johnson's research team says: "It's important as a student to get that hands-on experience, and Mike does that well. He treats his students as his equals — like we are all in this together — and that gives me a great sense of responsibility for what we are doing."



TIM EVANS

Dr. Mike Johnson, assistant professor of electrical and computer engineering, with Brittany, an African elephant at the Milwaukee County Zoo.