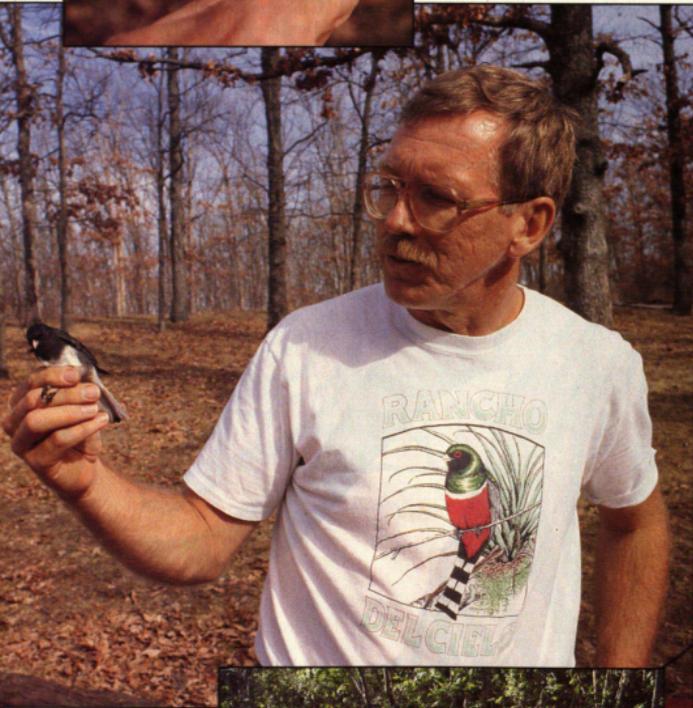




In the oak and hickory forests of Missouri, Dr. John Faaborg, below, trains his students to use mist nets to capture and study native songbirds. The birds, left, are carefully banded to allow researchers to study how they live and reproduce.



Each spring, right, Faaborg takes a group of MU students to El Cielo nature preserve in the mountains of northern Mexico to study tropical ecology.

Ave Fagan photo



Students
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Dr. John
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classes
because his
teaching is

rated Top Flight

Story by JOHN BEAHLER
Photos by ROB HILL

The sun goes down fast in this part of the Caribbean, and that means the nets have to be come down quickly, too. Before the bats come out.

Dr. John Faaborg and a handful of MU students are in Guanica Forest, a dry, scrubby stretch of woods on the southwest coast of Puerto Rico. Faaborg, professor of biology and natural resources, is using mist nets to capture and study the birds that live in this tropical forest. But after dark the bats come looping through the trees. "Bats really chew up the nets, and they chew up fingers when you try to untangle them," Faaborg says.

Before sunrise the researchers hiked up a stony trail through the hills, through stands of pipe organ cactus, mahogany and gumbo-limbo trees. They strung their nets between the trees and spent the rest of the day patrolling the long strands of delicate mesh.

Faaborg has been coming to Guanica each January for 20 years. During a typical three-week stay, he and his crew will band nearly 1,000 birds — cuckoos, finches and warblers — note their age and sex, and then release them unharmed.

It's the sort of nuts-and-bolts research that gives scientists clues about how birds live and reproduce in the tropics. But it also gives his cadre of student researchers an opportunity to put into practice the theories they learn from textbooks. With Faaborg, the line between research and teaching often is intentionally blurred.

Although there are no desks or blackboards in Guanica Forest, the students who come here each winter learn as much as they would in any classroom. From tape recordings they learn to identify the songs of different birds and to pick out their distinct calls from the chattering forest background.

Using a technique called "skulling," they gently separate the feathers on the top of a bird's head. The skin there is nearly transparent, and the color of the skull often tells the bird's age. At night, cooking their dinner around a campfire, Faaborg and his students talk over what they've seen and done that day.

Why such an emphasis on field experience? "Because that's where the action is," Faaborg says. "A chemist takes students into the lab because that's where chemistry happens. An ecologist takes them out of the lab because that's where ecology happens."

That approach to teaching is one reason students flock to his classes and seminars. In 1991, students in the College of Arts and Sciences awarded him the Purple Chalk Award for outstanding teaching. This year Faaborg was named as one of 10 faculty members to receive the prestigious William T. Kemper Fellowship for excellence in teaching. Winning the Maxine Christopher Shutz Award for teaching and research rounded out Faaborg's accomplishments for 1992.

His hands-on approach to science doesn't end at Guanica Forest. Back home in Missouri, you're as likely to find Faaborg's students out in the field as in the classroom. One week they might be performing fish population studies in a small farm pond. The next week they could be walking a fire line on a controlled burn of MU's Tucker Prairie, using fire to rejuvenate the fragile native grasses.

From huge lecture classes like General Biology to small seminars in advanced ecology, students say Faaborg comes prepared and chal-

lenges them to excel. "His interactive teaching style and infectious enthusiasm for ecology makes the subject come alive. Dr. Faaborg goes the extra mile in aiding students," says Dr. Christopher Wilbers, AB '87, a former student and currently a dermatology resident at Dartmouth-Hitchcock Medical Center in Lebanon, N.H.

During spring break each year, Faaborg organizes a field trip to El Cielo nature preserve in the mountains of northern Mexico. Students prepare for the experience with a weekly seminar on tropical ecology. MU doctoral student Therese Donovan remembers the experience. Her group explored the cloud forests, the marshes, ponds and the dry tropical forests of the preserve. They observed exotic birds like the blue-crowned motmot, parrots, macaws and roadrunners.

"Dr. Faaborg knew beforehand where the birding hot spots were, how to get to the cloud forest, and where to find certain rare plants," Donovan recalls. "He has introduced numerous students to the tropics, and as a result, has changed the way students view conservation and ecological issues. In a highly research-oriented field, Dr. Faaborg is one of the few scientists who is truly a dedicated teacher."

His students take part in science as it unfolds. Take the Guanica Forest research, for instance. Faaborg documented a significant drop in the populations of songbirds that migrate to the islands of the Caribbean. These birds are called "neotropical migrants" because they winter in the tropics, then spend their summers in North America, nesting and raising their young.

"I always was interested in migrants, because there's relatively little known about them. Some birds in Guanica we have caught six years in a row. They come back to that same exact spot in the forest every winter," Faaborg says. "In 1988 we noticed that what had been a fairly gradual trend with winter migrants became steeper. In 1973 we caught 30 neotropical migrants; in 1988 we caught five.

"Things aren't quite that bleak. We think this decline in the mid-80's was caused by drought in eastern North America. Nesting birds had

very low reproductive success because it was so dry. Since the drought ended, things have been climbing back up."

Some of these birds travel astonishing distances each year. The blackpoll warbler weighs just 11 grams, about as much as a ketchup packet from a fast-food restaurant, yet it flies from its summer home in New England to the tropics in a single hop. When a cold front signals the coming of winter, the blackpoll flies out into the Atlantic Ocean and rides the tradewinds down to the Caribbean.

In Missouri, the tiny ruby throated hummingbird weighs in at just four grams, but each year when the summer ends it shoots down the Mississippi River, fattens up along the coast, and makes the jump across the Gulf of Mexico. Many

Gold fever

A modern-day gold rush is taking place deep in the sprawling rain forests of Brazil's Amazon basin. Tens of thousands of miners are at work, digging ore from the ground, then using mercury to separate the precious metal from worthless ore tailings.

In the process, the miners might be poisoning themselves and the environment with mercury. Untreated mercury washes into rivers from thousands of mining sluices. And as a part of the refining process, the mixture of gold and mercury is heated, releasing toxic mercury fumes directly into the atmosphere.

Tom Clevenger, MA '70, PhD '79, associate professor of engineering, is helping Brazilian scientists get a handle on the extent of the pollution. During several trips to the city of Belem in Brazil, Clevenger has trained researchers at the Federal University of Para in the latest methods of detecting water pollution.

No one knows what's happening to the mercury released into the environment from gold mining. "Most developing countries don't have the kind of facilities available where they can do the necessary analysis," Clevenger says.

To meet that need, Clevenger is working on an exchange program that would bring Brazilian water researchers to MU for the training they need. He's also trying to set up a joint laboratory in Brazil, using outmoded scientific equipment from Missouri.

Clevenger accepts that environmental concerns might not be the first priority for a population living in poverty. "The key is to use the natural resources for the good of the economy, and at the same time to minimize the environmental damage to an acceptable point," he says. "It's a difficult decision to make, but if we don't protect the environment the damage is irreversible."



In addition to his own busy class schedule, Faaborg is in demand as a guest lecturer. His 1988 textbook, *Ornithology: An Ecological Approach*, drew rave reviews and is used by students around the country.

other Missouri natives make the flight south each year. Scarlet tanagers, black-and-white warblers, and red-eyed vireos are just a few of the state's songbirds that travel to Central and South America for the winter.

The massive surge of migration

each year poses dozens of puzzles for scientists. One of the most important questions they're trying to answer is why populations of certain songbirds are dwindling. Studies have found that some species of migrant birds are declining by as much as 10 percent a year.

"It's a confusing picture," Faaborg says. "There's so much going on, lots of comings and goings. We just don't know how the system works."

Nearly 10 years ago, Faaborg began a study of how successful certain songbirds are at nesting in the forest remnants that dot central Missouri. When farmers and developers clear out the woodlands they leave behind islands of habitat for wildlife.

The process is called fragmentation, and while it opens the land for crops and subdivisions, it also gives an edge to the natural enemies of birds. In these small patches of forest, Faaborg found that the birds are being destroyed by predators like blue jays, raccoons and skunks. Or parasites like the cowbird invade songbird nests and replace the eggs they find there with their own eggs. In some of the islands of woodland in central Missouri, Faaborg found a nesting success rate of only 10 percent.

For the past two years, a group of Faaborg's students have patiently been piecing together a little more of the picture. Deep in the oak and

hickory forests of the Missouri Ozarks, MU students are stalking the migrant songbirds that summer here.

As part of a larger study, called the Missouri Ozark Forest Ecosystem Project, the student researchers are documenting the effect that different timber cutting practices have on songbird populations in the Ozark glades. The six-year study is sponsored by the Missouri Department of Conservation.

Faaborg's crew of 27 undergraduate students spend 11 weeks in selected forest plots. Each student is assigned a 60-acre section of woods to scour for migrant songbirds. They listen for bird calls, locate the nests or watch the feeding birds, then plot the clusters of bird sightings on a topographic map. "In a few years we'll have a better feeling for what part of the forest these birds use," Faaborg says.

It could take years before that research is put to use in managing Missouri's forests, but some of the early findings are heartening to bird lovers. "Because the Ozarks is the largest forested region in this part of the Midwest, we hoped to find that the populations were fairly large and were producing young in a natural fashion," Faaborg says.

That's just what the student researchers have found so far. "Birds in the Ozarks are producing young at tremendous rates. In some species almost 90 percent of the nests are successful," Faaborg says. ☐

MU FAX

Who taught you the most at MU?

What was the most important thing you learned?

Who was your most unusual teacher? Why?

Help us gather MU facts for this poll of alumni opinions. Fax *Missouri Alumnus* at [314] 882-7290, or mail to MU Fax, 407 Reynolds Alumni Center, Columbia, Mo. 65211. Include your name, degree, graduation date, address and telephone number. Look for the results in the next issue.