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# Testing *the* Waters

## *A New Class Studies the World's Waterways*

On a bright and windy day in late May, while barges floated by in the distance, they began their exploration, taking turns disembarking from a rickety Iowa state park pier and heading out across a mile-wide river in an aluminum skiff.

With the completion in May of the College of Engineering's Lucille A. Carver Mississippi Riverside Environmental Research Station (MRERS), students from The University of Iowa are now able to use the nation's largest river to learn field techniques for measuring and maintaining the health of inland waterways around the world.

The first class to use the 7,500-square-foot facility, nestled inconspicuously along the banks of the Mississippi just a few miles east of Muscatine, was under way within weeks of the building's formal dedication. Jerry Schnoor, professor of civil and environmental engineering, had been planning a summer course on water quality for some time, he says, and the opening of the research station—the only university-based river research station in the nation—seemed the perfect opportunity to launch the kind of field study Schnoor had in mind.

"In this course, students learn what is good and bad in terms of water quality and, most importantly, why," he explains. "The chemical, physical, and biological attributes work together to make up a healthy waterway. How do changes in the river affect human health and the ecology of the species that live there? We want to be able to swim in it, drink it, and have healthy aquatic life in it."



*Top:* On the banks of the Mississippi River, Professor Jerry Schnoor shows students how to use a Hydrolab, a probe that measures a number of characteristics that help indicate water quality. These include pH balance, conductivity, depth, and temperature.

*Right:* Teaching assistant Claudia Espinosa Villegas (middle) supervises as students complete a chemistry assignment inside the Lucille A. Carver Mississippi Riverside Environmental Research Station. The building houses state-of-the-art laboratory facilities.



Three days a week during the University's three-week summer session, Schnoor, his teaching assistants, and 14 students piled into University vans for the 45-mile drive to the research station. Masked by trees and thick seasonal vegetation, the river is barely visible from the building, but runs only a few hundred yards away. In addition to a classroom, a laboratory, and a few research offices, the one-story facility houses a display area, where future plans call for interactive displays about river life.

"I suppose you could call the class work, but the Mississippi River is beautiful," says Mark Weldon, a doctoral student in geography. "Being on a river of that scale forced us to have a larger perspective."

Schnoor introduced his students to the river researcher's field tools. The students collected water samples with clear plastic cylinders that dangled a string on one end and a weight on the other. They also learned about the clam digger, a long plastic tube that sucks up organisms from river bottoms, and the Eckman dredge sampler, a mesh windsock-like plankton catcher.

"Identifying the species present in the water tells you a lot about the quality of the water," says Denise Armbruster, a civil and environmental engineering senior. "If, for example, you find no algae in a river, you have to ask the question, what are the fish eating? Learning how to monitor these

characteristics will help us to see trends—and stop the bad ones."

For more than 75 years, University engineers have been studying areas such as sediment transport and riverbed characteristics, and have collaborated on the design and testing of a number of hydraulic struc-

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tures, including the Mississippi River's lock and dam system. Researchers at the College of Engineering's IIHR-Hydrosience & Engineering (formerly the Iowa Institute of Hydraulic Research) plan to hook up MRERS to IIHR through a high-speed communications network. They'll monitor the river and host conferences and workshops, where experts can meet to discuss issues related to river ecosystems. Water quality, soil erosion, sedimentation, and changing fish habitats are just a few areas of concern for both researchers and students.

Schnoor has a personal stake in the health of the Mississippi. He grew up in Davenport, where he and his uncle used to fish for large pallid sturgeon. Soil erosion and wastewater discharges have polluted the river, and the sturgeons, once abundant, have come close to dying out. The good news, Schnoor says, is that such water problems are not completely irreversible.

"The river is our lab," he says, adding that Iowa alone is plagued with 157 impaired waters. "Iowa graduates will be well-prepared to help communities with their water-quality problems."

The concept for the river research station occurred to Tatsuaki Nakato—director

of MRERS and a research scientist at IIHR—seven years ago as he floated along the Mississippi in a johnboat with a group of colleagues hired by the U.S. Army Corps of Engineers to assess the causes of bank erosion along 848 miles of the Upper Mississippi River, between St. Paul, Minn., and Cairo, Ill. Realizing that researchers would need at least 10 to 15 years to observe appreciable differences in the river, Nakato set out to establish a university-based field station. Through a gift from the Roy J. Carver Charitable Trust of Muscatine and the transfer of three acres of state land, his vision became a reality.

"The Mississippi River is one of the most diversified large river systems in the world," he says. "Studying its ecosystem will contribute significantly to our understanding of large river systems across the globe."



Craig Just (left), senior research assistant in civil and environmental engineering, helps a student prepare the Van Dorn water sampler. Students lowered the apparatus into the Mississippi River near the Lucille A. Carver Mississippi Riverside Environmental Research Station to secure water samples for a chemistry lab.