

JUNE 01, 2006

Rice Students Reach Around the World

At Rice University, undergraduates are expanding their horizons from Houston, Texas, to southern Africa and beyond. *Beyond Traditional Borders*, a program created with a new undergraduate science education grant from HHMI, is an innovative curriculum that will prepare students to address global health issues from a multidisciplinary perspective.

"We're trying to help students reach beyond geographic borders, to understand and think about ways to solve global health problems," said program director Rebecca Richards-Kortum, an HHMI professor and chair of the bioengineering department at Rice.

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For example, Baylor College of Medicine—which is collaborating with Rice on the new undergraduate program—works with a pediatric AIDS clinic in Botswana. "We know they don't have enough vital-signs monitors, and that can slow patient flow," said Richards-Kortum. "So an inexpensive monitor would be important. Also, many antiretroviral medications need to be kept cool, and many clinics there don't have refrigeration. So something that could keep medications cool for 30 days and also be accessed by patients discreetly"—due to the continuing stigma of AIDS—"would be helpful technology."

Beyond Traditional Borders offers a four-course undergraduate concentration in global health for science and engineering majors and another series of courses for non-science majors. Instructors from a variety of disciplines, including the sciences, bioengineering, social science, humanities, and public policy, will address global health issues from their unique perspectives. The concentration culminates in a senior course on global health design challenges.

In that course, Richards-Kortum explained, "we will present the students with a real-world health problem. They will analyze the constraints and explore

possible solutions; then they will develop ideas for technology that might help solve the problem." Rice is currently collaborating with Michele Follen at the University of Texas M.D. Anderson Cancer Center to develop novel screening technologies for cancer in Nigeria - one of the first design challenges to be addressed by students is the development of inexpensive microscopes to aid in point-of-care detection.

The new grant also will support funding for selected students to do global health research in the labs of HHMI international research scholars.

The program's multidisciplinary focus takes into account cultural factors that must be considered in designing any effective new technology. Even something as simple as a reminder system to help caregivers give children their medications on time has a cultural aspect: "In Botswana, the meaning of 'time' is not the same as it is in our culture," Richards-Kortum explained.

The new curriculum builds on *Bioengineering and World Health*, a course that Richards-Kortum developed with support from another grant as an HHMI professor. That course, established for non-science majors, is now offered both at Rice and at the University of Texas at Austin. Assessments have shown that the course has significantly improved students' scientific literacy. In the spring 2006 semester, 60 students took *Bioengineering and World Health*, and Richards-Kortum hopes to involve four times that number in *Beyond Traditional Borders*.

HHMI professors are leading research scientists who receive \$1 million grants from HHMI to find innovative ways to improve the ways undergraduates learn science at research universities.

In addition to Rice students and faculty, middle- and high-school students and teachers will also participate in the new program. Richards-Kortum plans to help develop and implement a modified curriculum in the Houston Independent School District, the seventh largest in the United States.

"I don't know of this kind of program being done anywhere else," Richards-Kortum said.