

U.Va. Engineering Co-op Graduate Program Addressing Water Resources Challenges in the Commonwealth

July 8, 2008 — Access to clean water is a growing concern for populations worldwide. By 2025, it is predicted that nearly 2 billion people will be living in countries or regions with water shortages, according to the World Health Organization. Closer to home, Virginia and its citizens are facing a unique set of problems for ensuring the sustainability of water systems for humans and natural ecosystems.

University of Virginia [School of Engineering and Applied Science](#) graduate students and faculty are helping partner organizations address these challenges.

The Virginia Water Resources Cooperative Graduate Program began one year ago as a partnership with the Virginia State Department of Environmental Quality, Water Resources Division. The program helps partner groups address a growing list of water resources challenges, including water shortages, pollution from salt water intrusion and ecosystem impairment in the Chesapeake Bay and problems associated with development along Virginia's Eastern Shore. With funding from the commonwealth, the Virginia Environmental Endowment and matching funds from the University of Virginia, the VWRCGP program is able to place graduate students in positions that are helping Virginia make the best possible water resources decisions.

“The state regularly faces issues that they have difficulty handling in-house because of the time and expertise required,” said Teresa Culver, associate professor of civil and environmental engineering at U.Va. and director of the VWRCGP. “We recruit graduate researchers who can work on projects of immediate concern to the commonwealth.”

Students are particularly suited for the job because they have more freedom to focus on one problem.

“A lot of people feel like state agencies can answer any question about environmental regulation,” said Robin Patton, a groundwater modeler for the Office of Groundwater Withdrawal Permitting at the Water Resources Division, “In reality, we don't always have the time to answer many research questions because we are charged with answering specific

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questions regarding the evaluation of permits. With this program, I can guide a student to a specific question and they can look at it in more depth.”

Virginia Department of Environmental Quality actually created a part-time wage position for a student to work on projects. Patton facilitates the student’s work by acting as a liaison between the student, Engineering School faculty and U.S. Geological Survey scientists.

Rachel Baker, who has just finished her first year of work toward a master’s degree through the program, is researching the ability of a U.S. Geological Survey computer program to accurately model the hydrogeology of Virginia’s Eastern Shore. Her research will help the state agency further develop computer modeling tools and facilitate more cost-effective monitoring of the region’s groundwater resources. This computer modeling informs the Water Resources Division’s decisions on whether or not it is feasible to grant water usage permits for large development projects and provides critical information to both the agency and the regulated community as additional field work on the Eastern Shore is planned.

“The co-op program allows graduate students the opportunity to communicate freely with WRD staff on issues that can be resolved to benefit the region,” Baker said. “Being able to determine a practical approach and solution to local issues is motivating because you realize how it will immediately affect the local area. Working with the WRD has given me the opportunity to apply theory to problems facing them today.”

While the program is still young, there are other projects and plans under way.

To complement Culver’s research interest in watershed and groundwater systems, the program looks to expand the scope of research opportunities for students by involving other water resources professors in the Department of Civil and Environmental Engineering, such as assistant professor Joanna Curran, who specializes in water resources issues related to rivers and dams and professor Wu-Seng Lung, an expert in modeling estuaries and aquatic ecosystems.

The relevance of this water resources research connects students’ graduate studies to practical solutions for the region.

“This research has been very challenging and has taught me to be patient. It has shown me that even during the toughest times, nothing is impossible,” Baker said. “As I conquer the challenges of the project, I feel more connected to the groundwater issues affecting not only the Eastern Shore but ecosystems all around the world.”

Culver touts the program’s ability to apply students’ knowledge to solving real problems and believes this will serve as inspiration for more students and partner organizations to get involved.

“People can relate to this research because they spend time on the water, whether they are boating in the Chesapeake Bay or fishing along the banks of the Rivanna River. They realize that we can’t take these things for granted,” Culver said. “Graduate students appreciate working on real-world, immediate problems to create sustainable solutions for the millions of people in this region.”

About the University of Virginia School of Engineering and Applied Science

Founded in 1836, the University of Virginia School of Engineering and Applied Science combines research and educational opportunities at the undergraduate and graduate levels. Within the undergraduate programs, courses in engineering, ethics, mathematics, the sciences and the humanities are available to build a strong foundation for careers in engineering and other professions. Its abundant research opportunities complement the curriculum and educate young men and women to become thoughtful leaders in technology and society. At the graduate level, the Engineering School collaborates with the University's highly ranked medical and business schools on interdisciplinary research projects and entrepreneurial initiatives. With a distinguished faculty and a student body of 2,200 undergraduates and 700 graduate students, the Engineering School offers an array of engineering disciplines, including cutting-edge research programs in computer and information science and engineering, bioengineering and nanotechnology.

— *By Zak Richards*