

## Working to Restore Panther Hollow Lake

BY SHERRY STOKES

Across from the Carnegie Mellon campus, in Schenley Park, is Panther Hollow Lake. About 100 years ago, it was an idyllic spot for boating and picnicking, but today, the lake is contaminated with microorganisms. CIT students, with support from the National Science Foundation (NSF) and local conservancy and environmental groups, are studying the sources and extent of this contamination, and how regulators can use the data that they and others collect. This work is being done in an effort to make the lake safe again for recreational use.

"We have collected samples in Panther Hollow for years as part of the sophomore introduction to engineering laboratory," says Jeanne VanBriesen, a professor in civil and environmental engineering. "It was a nice place to go because students could see the environment, and their samples would always have pathogens." Clarifying that statement, she says that students do not test directly for pathogens, but instead they look for indicator organisms, which denote fecal contamination. "The two we measure are fecal coliforms and *E.coli*. Concentrations of those organisms indicate that there has been contamination with feces from warm-blooded organisms, like deer or dogs," says VanBriesen. The high levels of these organisms in Panther Hollow Lake render it unsafe for recreational activities, especially swimming.

The lake's contamination is no secret, and in 2006, the Pittsburgh Parks Conservancy brought together people from the scientific community and citizen watch groups to discuss ideas for restoring the lake. "We talked about doing standard water-quality testing for chemicals as well as indicator organisms," says VanBriesen. The NSF and WaterQUEST, the Carnegie Mellon research center that VanBriesen directs, funded a small group of students to develop a water-quality monitoring program. And the results of their work? "Last year, 2006, was pretty wet, and almost all of the samples violated water-quality standards," states VanBriesen. Although those findings were expected, there was an unforeseen offshoot from the research. The students became interested in the work performed by citizen monitoring groups, and they wanted to learn if regulators could use the data these groups collect.

"A lot of people collect data in their backyards, retiree groups and school kids, and most of it doesn't end up anywhere because you don't trust it," says VanBriesen. These people care enough to gather samples, but they lack scientific training, and concerns arise about the reliability of their data. "So we started to look at what would it take for someone to accept the data. We asked, if you didn't think the quality of their data was high, could you still use the data despite the uncertainty?"

Here is an example of the types of scenarios being explored. Say, for one watershed, there are three locations where data is professionally collected, four times a year. Then for this same watershed, there are 100 locations where nonprofessionals have collected data every week. "What you have is low-density, low-frequency, high-quality data versus high-density, high-frequency, less certain data," says VanBriesen. Her students are researching methods for integrating these two data sources so that regulators can take advantage of citizen monitoring. Using citizen data could save money, heighten public interest in Pittsburgh's watershed, and more. "Understanding how different types of data

with different levels of uncertainty are integrated is a huge question, and not just in this field, but in many fields," says VanBriesen.

### And What about the Park?

"One of our objectives for going into the park was to look for direct sources of contamination. We thought maybe a drainpipe or sewer overflow was the problem. Then, if we stopped it, we'd stop the problem. But that is not what we found. There is no smoking gun," states VanBriesen.

There is, however, a great deal of wildlife and urban runoff in the park. "This is a park that sits in the middle of a golf course, a parking lot, and a road. During a storm, water just races down the street and into the park," she says. Whatever is in the streets is carried by storm water. "It's not at sewage level, but runoff from urban areas is usually quite contaminated."

Reflecting on her students' research, VanBriesen says, "The Park Conservancy was hoping that we would identify the cause of the contamination, and then we could implement a restoration. We did identify the cause—urban runoff is the cause, but that is not something that's easy to solve."

"We have computer models of the Panther Hollow region now, and that allows us to do forward-looking thinking: If there were changes in the conditions of the watershed, what might the water quality look like?" says VanBriesen. She states that at this point, however, the park may have to have an engineering analysis performed to learn what it will take to bring the lake back to its former glory.

