Professor Plummer's Remarks

Remarks by Jeanine Plummer at Her Installation as the Inaugural Alena and David M. Schwaber Professor of Environmental Engineering

Monday, April 27, 2009

I'd like to thank Alena and David Schwaber for their generosity and support of Environmental Engineering at WPI. I had the pleasure of meeting David last spring when he visited campus. His excitement and enthusiasm for the environmental program matched mine, and I'm so pleased that he and his wife have become part of our program through this professorship.

I am very honored to be the inaugural recipient of the Schwaber Professorship, and hope that I can live up to the hopes and aspirations that they have for this position. This is an exciting time to be in the field of Environmental Engineering—a complex and ever changing field. We are looking to remedy our mistakes from the past that negatively impacted our environment; provide a rich quality of life today while protecting our ecosystems; and look towards a future with a more holistic view of the global environment. We are coming up with strategies not just to preserve or protect the environment, but to improve it while still embracing human progress.

My own work in this field is focused on drinking water quality, with a specific emphasis on monitoring and reducing the transmission of waterborne diseases. The first step in meeting this goal is source water protection. We are working to develop watershed monitoring plans to best identify fecal pollution inputs given resource constraints. We sample water quality through different seasons and rain conditions, and at different locations, often trudging through the snow and ice to collect water. After a year or more of data collection, we statistically analyze the water quality parameters to determine most useful ones—so that a water management agency can obtain the best information with a more limited monitoring protocol.

Another aspect of my work is microbial source tracking. Microbial source tracking is a set of tools to identify sources of fecal contamination, and discriminate between human and non-human animal sources. This is important for assessing public health risk, because non-human animals may not carry pathogens that can infect people. From a remediation standpoint, we need scientific evidence of contaminant problems, especially in compact landscapes like those found in New England, where farms, residential properties, and forested areas are in close proximity. It can be expensive to replace a septic system or install buffer zones—and we want to make sure we are allocating resources to the right strategies.

Our next step is to develop a new indicator to track viral pathogens. Current indicators— the coliform bacteria—have been in use for over a hundred years. However, coliforms do not mimic viral behavior in the environment or through treatment processes. This leads to two problems. The first is false positives, when indicator organism concentrations tell us there may be a pathogen risk, and resources are spent on mitigating this risk, but in fact no risk exists. The second more critical issue is false negatives—when indicators are negative and thus we are not aware that there is a problem, yet public health is at risk. There have been documented cases of waterborne disease outbreaks when coliforms were absent, and no public health outcome when they were present. Therefore, we are looking to validate the use of a commensal virus for tracking human pathogens in water sources, to provide a better indication of health risks (or lack of health risks) in water sources.

I've been fortunate to involve both undergraduate and graduate students in this research, often working side by side to address such complex issues. The Environmental Engineering Program at WPI of course has great breadth beyond water quality. We have expertise in hazardous and industrial wastes, air pollution, design of treatment and remediation systems, green engineering and alternative energy. The most important aspect of the program is our students—who have demonstrated a passion for the environment and for exploring innovative ways to approach environmental challenges. I am continually amazed by the ingenuity that our students bring to their endeavors in environmental engineering, with ideas that started when they were very young. Our students are interested in sustainable farming techniques, water treatment options in villages with no electricity, zero-waste manufacturing techniques, and so many other challenges. I'm proud that our program offers our students so many opportunities. They can study abroad in new project centers in Edmonton and Shanghai, and our newest opportunity next year in Panama City, Panama. They network with professionals in the field at conferences and business meetings throughout the United States, where they can see firsthand the full breadth of the environmental engineering profession. And they are tackling problems that I didn't even know existed when I was in school.

It is my hope that our Environmental Engineering students continue to show their passion for the environment through their careers, and become leaders in the field for future generations. Through the Schwaber Professorship, I hope to be able to play a small part in helping them to achieve their goals.

I would like to close by again thanking Alena and David Schwaber for their generosity, their support, and their dedication to the environment—and for creating such wonderful opportunities for the Environmental Engineering Program at WPI.