Changes Needed for Research to Make a Significant Impact

by Dr. Gregory D. Reed, Special Guest Columnist

After 26 years in the College of Engineering (20 years of that as department head of civil and environmental engineering), I have moved to the Associate Vice Chancellor for Research position here at the University of Tennessee. In addition, a new Vice Chancellor for Research, Brad Fenwick, arrived September 1 from Virginia Tech. New people in both campus research administration positions open the door to changes in priorities, methods, perspectives, etc. The university administration wants funded research to increase at a rate faster than in recent years. Why? It supports recruiting highly qualified graduate students to work with innovative faculty to produce high impact research results that can be used to increase the quality of life and foster economic development. The university and the College of Engineering want to have a more significant positive impact in this world we live in. Therefore, something needs to change.

Dr. Gregory Reed

In many ways, research was simpler 26 years ago. It was common for research problems to be narrowly focused and conducted by a single faculty researcher working with a small group of his or her own students. When I first came to UT, the prevailing expectation of a young faculty member was that one should conduct research to prove his or her abilities. As life gets more complex, research problems get more complex. The expectation is changing. Today, significant research topics require multi-disciplinary, and even multi-institutional, approaches to produce the best results. Each member of the research team brings their expertise and the combination is a stronger research result.

More multi-disciplinary research has brought more researchers to the research enterprise, and the competition for the same sources of funding has increased considerably. Organizing for success is a necessary element of a process to be more competitive. Recent developments and resource commitments have created expanding opportunities in biological-, computational-, materials- and nuclear-related sciences and engineering, as well as all things energy related. Today's research climate is an incubator for these kinds of initiatives, others currently in place and others yet to be created that need institutional commitment and processes to sustain them for long-term success.

Significant improvement in funded research will not be easy. It will take a lot of work. It will not only take expanding federal and state research agency partners, but also involving more industry and business research partners. The results will be worth the effort because the outcome will be a better future. These are exciting times, and I am glad to be a part of a UT team seeking excellence in research.

Engineers Without Borders Completes Two South American Water Conservation Projects

When Tom Zimmerman came to UT to study civil engineering, he thought he would eventually go into the Peace Corps. However, after graduating in May, Zimmerman's legacy was Engineers Without Borders (EWB).

"I started EWB in 2004 because it was the direction I wanted to go," Zimmerman said. "It is important because it accomplishes a lot of different things. We help people in underdeveloped countries with their infrastructure needs. EWB also helps people here to see how their profession fits in and what kind of good they can do with their education."

EWB is a non-profit humanitarian organization established to partner with developing countries in order to improve their quality of life. The UT chapter of EWB is one of many university chapters across the world involved in implementing environmentally and economically sustainable engineering projects.

Seth Frank *(left)*, senior in civil engineering, and Adam Teg, senior in aerospace engineering, pose for a picture with children from the village while Ryan Ragsdale, a graduate student in soil sciences, continues work on the water tank's concrete foundation.

"We're not just engineering," said Zimmerman. "Sometimes the name intimidates people, but EWB is open to all faculty, staff and students at UT, and we're always looking for people with different backgrounds."

Since its inception, EWB at UT has worked on two projects involving water conservation. In 2006, a group of students took two trips to the Dajabon region of the Dominican Republic with their academic advisor, Dr. John Schwartz. On the first trip in March, students assessed the basic water needs of two communities, Los Cerros de Aminilla and Barrigon, and found they shared one working well that did not produce enough water. The students completed a detailed land survey and collected additional field information, which they used to design a water project prior to the December implementation trip. With the help of villagers and regional government officials, the students installed multiple pumps, storage tanks and 3,000 feet of pipeline to provide communities with the needed water supply.

A second project involved the village of La Fortuna in Guatemala, which had no potable water. Two professors from soil sciences, Dr. Neal Eash and Dr. Forbes Walker, presented their idea for a rainwater-harvesting water tank to EWB and the project took off.

The wooden structure holds rebars, river rocks and mortar in place for it to dry on top of the concrete foundation. Once dried, the wooden forms were raised and the process continued three more times until the structure grew to about seven feet tall.

"I wanted to get involved, so I volunteered," said Erin Byers, a senior in biosystems engineering and project lead for the Guatemala rainwater-harvesting project. "This was the most involved design team project I've ever worked on. We really tried to do everything we could to prove what we implemented in La Fortuna would be a success."

And it was, according to Adam Teg, a senior in aerospace engineering who traveled to Guatemala in 2007. "We completed the project in seven days," said Teg. "The villagers were very happy and high-spirited. They helped out with the project and were excited to see a water storage tank built for the monsoon season."

"We want to do things that are appropriate for the villages, something they can continue to build and own; this way it's not us owning the project, it's them," said Byers. "EWB's approach to helping developing countries is great because the solutions are supposed to be sustainable and simple. Solving resource issues is something we as engineers have a huge responsibility to learn how to do."

–Story by Amanda Womac