

News from The University of Toledo

RESEARCH

UT team builds mobile cart to collect ecological data

By Deanna Woolf

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The National Ecological Observatory Network (NEON), the first countrywide ecological measurement and observation system, could potentially be the largest U.S. environmental program ever conceived.

If Congress funds the NEON proposal this year, scientists and researchers from 20 regions across the country will compete for millions of dollars and 30 years' worth of NEON funding.

And thanks to the hard work of Dr. Jiquan Chen and other members of UT's NEON team, the University will be ready to apply.

The UT NEON team is made up of 15 faculty members from seven academic units, with Chen and Dr. Hans Gottgens, UT associate professor of earth, ecological and environment sciences, as directors. The team recently unveiled a mobile flux cart — a moving data collection machine — to gauge their readiness and organization.

"As far to my knowledge, the cart is the first of its kind," said Chen, UT professor of earth, ecological and environmental sciences.

The cart can measure temperature, moisture, wind, carbon dioxide, and water moving in and out of the environment. Its data also are accessible through the Internet. "We're moving our fancy data collection into the field — anyone can see the real-time data from anywhere if they're connected," Chen said. "If you can connect to the cart from your office, you can see the numbers and the graphs, so basically you can see what is going on 150 miles away," he explained.



Dr. Asko Noormets, a postdoctoral research associate, left, and Qingin Li, a doctoral student, put together the mobile flux cart designed to collect environmental data.

The cart is important in that it addresses a key need of the NEON program — how to make the most of scarce resources. "No matter how much money Congress will give us, we will never have enough people, money or time to monitor all areas of the United States at all times," Chen said. A cart can be moved into an area and left to collect data, without constant human control. The carts also are relatively cheap to build. "The cart is only a couple hundred [dollars] without the sensors. They have to be easy to make and economical," he added.

Because of their portability, the carts also will allow NEON researchers to quickly converge on an area and collect data. "We can take it to any area of the United States at any time," Chen said. "There may be unusual events — a volcano eruption, a hurricane, outbreaks of insects or diseases — teams have to be ready to go at any time. Many of these events happen fast and on a short timescale. If we miss those opportunities, we will miss those effects."

The cart was tested briefly on the Bancroft campus, and on Jan. 26, the UT NEON team members moved it to Michigan State University's Kellogg Biological Station, the future NEON regional headquarters, for additional testing.

Dr. G. Philip Robertson, MSU professor of crop and soil sciences and chair of the Great Lakes NEON region, suggested a name of "J-Rover" for the mobile cart in honor of its inventor, Jiquan Chen.

Chen said the device is collecting 70 to 80 megabytes of data a day — which is a lot, considering some floppy disks can hold 1.44 megabytes of data. Through the field test, UT NEON team members also are hoping to solicit the opinions of fellow researchers. "We know it needs to be modified, and we want

good feedback from all sorts of people," Chen said.

The cart, worth about \$70,000 with its sensors, and the UT NEON team's organization were funded by an interdisciplinary research grant from the UT Office of Research. Dr. Frank Calzonetti, vice provost for research and associate vice president for economic development, said he is behind Chen's efforts, as receiving NEON funding "would be very big and will give us real national recognition."

"This is one of our premiere areas of research. We are very well-positioned to compete," Calzonetti said.

Chen said the competition will be stiff, though. "There are 20 regions and dozens of university teams that have been working on the self-organization process. I know the University of Washington and the University of New Mexico have been working, back to 1996 or 1997. We have been working and are catching up fast. We have our niche and our strength. Through this exercise and others, I hope UT will be able to compete."

For more information, visit
<http://research.eeescience.utoledo.edu/lees/NEON>.



After being tested on UT's Bancroft campus, the cart was sent to Michigan State University for another trial run.



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