TEXAS WATER RESOURCES INSTITUTE

twri New Waves

Breaking news about water resources research and education at Texas universities

June 14, 2006

1. Graduate students receive water research grants

The Texas Water Resources Institute (TWRI) recently funded 10 water-related research projects for graduate students from Texas A&M University, Texas Tech University, the University of Texas at Austin and West Texas A&M University.

The students were awarded up to $5,000 to begin, expand, or extend water-related research projects. TWRI received more than 30 applications for the 2006-2007 grants.

The institute funds the graduate student projects through money provided by the U.S. Geological Survey as part of the National Institutes for Water Research annual research program. TWRI will publish articles and reports about the progress of each project.

The graduate students, their departments and projects are:

- David Barre, Rangeland Ecology and Management, TAMU - Determining effects of brush clearing on deep drainage using soil chloride; a feasibility study for south Texas rangelands;
- Yongxia Cai, Agricultural Economics, TAMU - Impacts of Texas interbasin water transfers on the water transfers on the water dependent economy and the environment;
- Bassil El-Masri, Range, Wildlife and Fisheries, Texas Tech University - Estimation of water quality parameters for Lake Kemp Texas, derived from remotely sensed data;
- Dongsuk Han, Civil Engineering, TAMU - Arsenic Removal by novel nanoporous adsorbents;
- Mohammad Islam, Civil Engineering, TAMU - Development of a coastal margin observation and assessment system to monitor the water quality in the Corpus Christi Bay;
- Andrew Karonen, Architecture, UT at Austin - A socio-technical case study of sustainable stormwater management in Austin, Texas;
- Megan Meier, Water Management and Hydrologic Sciences, TAMU - Post-restoration evaluation of urban streams in Central Texas;

- Arwa Rabie, Chemical Engineering, TAMU - Property based management and optimization of water usage and discharge in industrial facilities;

- Debabrata Sahoo, Biological and Agricultural Engineering, TAMU - Modeling the effect of urbanization and optimizing land use for estuarine environmental flows;

- Robert Taylor, Agricultural Business and Economics, West Texas A&M University - A pricing model to assess the effects of groundwater availability on land valuation.

For more information and updates about each project visit, http://twri.tamu.edu/usgs.php.

2. TWRI welcomes two project managers

Texas Water Resources Institute recently added two new project managers to its team, **Lucas Gregory** and **Cecilia Wagner**.

Gregory will provide leadership for several projects and will be a team member for directing 319 projects funded by the Environmental Protection Agency through the Texas State Soil and Water Conservation Board and Texas Commission on Environmental Quality. He earned his bachelors of science degree in agricultural systems management and a masters of science degree in water management and hydrologic sciences, both from Texas A&M University.

Wagner will provide leadership for two new Texas Water Development Board projects dealing with agricultural water conservation and assist with management of a Rio Grande Basin Initiative. She earned her bachelors of science degree in plant and environmental soil science and her masters of science degree in agronomy, both from Texas A&M University.

Both will work with TWRI administration and faculty to develop grants for priority research and education issues.

3. Student researches flood alert system for Austin

Former Rice University civil and environmental engineering graduate student **Erin Williford** tested various hydrologic models to create a framework for a real-time, radar-based flood alert system for the Onion Creek watershed in Austin, Texas.

"Emergency personnel and citizens can have advanced warning and accurate lead time during a large storm that will hopefully prevent the loss of life or property," said Williford, a recipient of a $5,000 2004-05 Texas Water Resources Institute research grant.

She began by collecting radar data from the National Weather Service's Next Generation Radar (NEXRAD). She said the Onion Creek model was calibrated based on numerous historical rainfall events and produced flows consistent with those measured by stream gauges.

"By using radar rainfall data combined with the existing rainfall gauge network, we had a more complete and accurate depiction of storm events," she said.

To determine peak flows and the approximate time of the peak for Onion Creek, rainfall data was entered into a flood hydrograph package, HEC-1, which converts the rainfall data to runoff. HEC-1 was developed by the Hydrologic Engineering Center and it allows for fast computation results of peak flows available every five to six minutes.

Geographic information systems (GIS) technology will be used to separate sub-areas in the creek and develop watershed characteristic data. GIS technology is an environmental modeling system that uses satellites to map many types of geologic features.

Since peak flows are predicted using these technologies, the Onion Creek flood alert system will provide increased lead time and accurate flow levels to the city. City officials and emergency personal can be alerted in advance and put precautionary flood measures into effect, she said.

"Flood prediction is unique in that it can impact people's lives and properties. It is good to know that there are tools available to predict flooding," said Williford.

Williford, originally from Sugar Land, Texas, received her bachelor's degree in meteorology at Texas A&M University and her masters from Rice. She is currently working for Turner Collie & Braden, Inc., an engineering company, in Houston. She works on various water resource projects for municipalities and various private facilities.

Her research was funded by TWRI through the U.S. Geological Survey as part of the National Institutes for Water Research annual research program. TWRI is the designated institute for water resources research for Texas.

For more information on Williford's research, visit "USGS Research Grants" at http://twri.tamu.edu.

4. Graduate student assesses accuracy of Soil and Water Assessment Tool

Texas A&M University graduate student Xuesong Zhang is working with his advising professor Raghavan Srinivasan, director of Texas A&M's Spatial Sciences Laboratory, to evaluate and improve the accuracy and reliability of the SWAT model or Soil and Water Assessment Tool.

SWAT, developed by USDA-Agricultural Research Service and Blackland Research and Extension Center in Temple, is a water model used to determine what impacts land management practices have on a watershed.

"The accurate simulation of SWAT can assist the government in making correct decisions about water management practices, which are important for human health, agricultural management, industry development, environmental quality, flood risk assessment and recreation," said Zhang, a recipient of a $5,000 2004-05 Texas Water Resources Institute research grant.

Zhang, and Srinivasan evaluated the heterogeneity of a watershed through the HRU (Hydrologic Response Unit) concept using the SWAT model. Precipitation, topography, soils, geology and land use, infiltration and evapotranspiration are all highly heterogeneous, or varied, characteristics of a watershed.

Zhang worked to not only improve the accuracy and reliability of SWAT, but also to develop new programs and algorithms to assist the model in describing the hydrologic processes at the HRU scale more realistically.

"In order to facilitate the application of the new algorithms, user friendly interfaces were developed using Visual Basic 6.0 and MatrixVB language," Zhang said.

The researchers accomplished three major goals. They improved the accuracy of rainfall fields (one of the most important inputs for SWAT) through developing complex geo-statistical

algorithm and GIS program and developed a more reliable algorithm using physically based snow routing algorithm to replace the original algorithm. They also developed an advanced automatic parameters calibration program that alleviates the model user from tedious parameters calibration work and provides more objective solutions.

Zhang said he would like to continue to work on the SWAT model, and he hopes to develop a national water quantity and quality system for U.S. EPA's water management program. Results are expected to be applied in the HUMUS (Hydrologic Unit Model of the United States), CEAP (Conservation Effects Assessment Project) and HAWQS (Hydrologic and Water Quality System), which are supported by EPA.

His research was funded by TWRI through the U.S. Geological Survey as part of the National Institutes for Water Research annual research program. TWRI is the designated institute for water resources research for Texas.

For more information on Zhang's research, visit "USGS Research Grants" at http://twri.tamu.edu.

5. Rangeland Repair Enters Phase 2

Texas Agricultural Experiment Station scientists are creating a cookbook of sorts to improve water quality and training land at Fort Hood.

Dr. Bill Fox of College Station, senior research scientist with the Texas Water Resources Institute at Texas A&M University, said, "Our purpose in this (project) ultimately is to develop a standard operating procedure, or a cookbook, on the best management practices" for land recovery and restoration within the 214,000-plus-acre military installation.

The recently begun Phase 2 will focus on how and where dairy manure compost is used to enhance land restoration. Researchers will also study combinations of compost and management practices. The Department of Rangeland Ecology and Management at Texas A&M will develop sequential approaches to the revegetation process and the Department of Soil and Crop Sciences will study the amount of soil compaction and the impact of vegetation in recovery. Management practices such as soil ripping - deep plowing of the ground - will be studied to determine which practice best helps recovery and to what extent.

To read the complete AgNews story, go to:
http://agnews.tamu.edu/dailynews/stories/RNEC/Jun1206a.htm

6. Research surveys Fort Hood sediment retention ponds

Jason McAlister, a Texas Agricultural Experiment Station research assistant, working with **Dr. Dennis Hoffman**, is conducting bathymetric surveys of the 27 sediment retention ponds on Fort Hood.

McAlister and other researchers at the Texas A&M University System's Blackland Research and Extension Center in Temple have been contracted by land managers at Fort Hood - through the Natural Resources Conservation Service - to determine the current holding capacity of the ponds at the military installation.

The land managers at Fort Hood, or Integrated Training Area Management, want to know if the sediment retention ponds are silted in; if so, to what degree, McAlister said.

Since 2004, McAlister has been doing these surveys by using remote sensing techniques and calculating the decrease in capacity in the ponds.

To read the complete AgNews story, go to:
http://agnews.tamu.edu/dailynews/stories/AGEN/Jun1206a.htm .

7. A&M's water program wins education, public service award

Texas A&M University's Water Management and Hydrologic Sciences graduate degree program recently won the 2006 Education and Public Service award from the Universities Council on Water Resources. The award will be presented at the council's conference on July 18 20
in Santa Fe, N.M.

The award recognizes entities that have made significant contributions to increase public awareness of water resources development, use or management, according to the council's Web site.

Dr. Ronald Kaiser, professor in the Department of Recreation, Park and Tourism Sciences, and **Dr. John R. Giardino**, dean, Office of Graduate Studies, are the program co-chairs.

The Universities Council is a consortium of more than 90 universities that facilitates water education, promotes research, and provides technical information on water problems and solutions.

8. Project seeks proposals for new technologies for waste pollution control

Texas Cooperative Extension and the Texas Water Resources Institute have issued a Request for Proposals (RFPs) for the project, ***"Demonstration and Evaluation of the Use of Technologies to Reduce Animal Waste Pollution."*** Proposals are requested from technology providers for technologies to be tested and demonstrated in the Bosque and Leon River Watersheds. The proposals are due July 31, 2006.

The project, funded by the U.S. EPA Region 6 and administered by the Texas State Soil and Water Conservation Board, provides for testing of new technologies designed for reducing water pollution associated with animal production systems, principally dairies. This project is strictly to evaluate the ability of new technologies to **reduce soluble phosphorus by at least 50 percent** in the Bosque River basin in an environmentally sound manner that does not adversely impact the existing waste management system.

Additional proposal information may be obtained at:
http://twri.tamu.edu/projects/NewTechnologies/RFP_2006.pdf .

For more information, contact **Dr. S. Mukhtar**, Biological & Agricultural Engineering Department,

Texas A&M University, 979.845.3932 (fax) mukhtar@tamu.edu .

9. Communities, Not Just Crops, Depend on Irrigation

The impact of irrigation on rural communities in the Ogallala Aquifer region is being studied by economists with Texas Cooperative Extension, West Texas A&M University, Texas Tech University and Kansas State University. The study is a part of the Ogallala Aquifer Initiative, funded by the U.S. Department of Agriculture-Agricultural Research Service.

Dr. Steve Amosson, Extension economist in Amarillo, said the information gathered will provide scientific facts to decision-makers and producers so they understand the possible outcomes before implementing policies.

"Hopefully, they can use it to design strategies that are not only cost-effective, but also minimize the economic impacts," Amosson said.

To read the complete AgNews story, go to:
http://agnews.tamu.edu/dailynews/stories/AGEC/Jun1306a.htm .

10. Spatial Sciences Lab to host Remote Sensing Workshop

The Spatial Sciences Laboratory will host a remote sensing technology introductory workshop on Aug. 22-24, 2006.

The three-day workshop will introduce the fundamentals of remote sensing; discuss data storage and assessment, and will provide hands-on activities for attendees. The cost is $500 per person and $300 for students.

For more information, contact Lesli Gomez at l-gomez@tamu.edu , or 862-7956.

11. Desalination Workshop will present latest technologies

A hands-on workshop exploring the technologies of desalination is set for August 6-8, 2006 in College Station. "The Future of Desalination" is sponsored by Texas A&M University, the Global Petroleum Research Institute, the Separation Sciences Program and Texas Water Resources Institute.

The workshop presenters will cover water and wastewater topics including pretreatment equipment, filtration technologies, economics, case studies, cleaning and sanitizing systems and post-treatment technologies. Desalination equipment will be demonstrated to familiarize attendees with the practical aspects of membrane desalination. Lectures will be complimented by several daily pilot plant demonstrations at the Separation Sciences Laboratory on the Texas A&M campus.

Texas Water Development Board's director of special projects, **Jorge Arroyo**, will speak about the TWDB's Desalination Program.

The registration fee is $475 before July 28, 2006 and $495 after July 28. To register, visit

http://engrevent.tamu.edu/event/100180 .

For more information, please visit www.tamu.edu/separations or call Carl Vavra @ 979/845-2758 or email @ cjvavra@tamu.edu or Connie Conaway @ 979/845-2272 or email @ connie@pe.tamu.edu

New Publications/ Papers

"*Economic and Conservation Evaluation of Capital Renovation Projects: United Irrigation District of Hidalgo County (United) - Rehabilitation of Main Canal, Laterals, and Diversion Pump Station*," TWRI Technical Report 288, **M. Edward Rister**, **Ronald D. Lacewell**, and **Allen W. Sturdivant**.

Texas Agricultural Experiment Station (TAES) and Texas Cooperative Extension (TCE) economists and engineers are collaborating with Rio Grande Basin irrigation district managers, their consulting engineers, and using RGIDECON© to develop supportive materials documenting the sustainability of the projects being proposed by Texas irrigation districts to the U.S. Bureau of Reclamation (USBR).

This report documents the economic analysis conducted for the project proposed by the United Irrigation District (i.e., the District) to the USBR. TAES/TCE agricultural economists have developed this analysis report as facilitated by the Rio Grande Basin Initiative and administered by the Texas Water Resources Institute of the Texas A&M University System.
Download the report at http://twri.tamu.edu/report-abstract/TR-288/ or contact twri@tamu.edu .

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