A Kasetsart University alumnus honored for scientific paper

Figure 1. CAPTION: Research associate Pravara Thanapura Kulvichit of SDSU's Engineering Resource Center won a national award for her research paper proposing an improved method for accurately estimating runoff index in urban areas. Photo credited to Ag Bio Communications, SDSU.

A Kasetsart University alumnus, Faculty of Social Science, Department of Geography, Bangkok, Thailand (KU49/SOC24/GEOG15) has won a prestigious award in her field of research — and urban taxpayers may benefit.

Pravara Thanapura Kulvichit is a research associate at the Engineering Resource Center, South Dakota State University (SDSU) Brookings, South Dakota, U.S.A. She is also a Ph.D. candidate in the Geospatial Science and Engineering (GS&E) Doctoral Program, and recently won the award for proposing an improved method for accurately estimating runoff index in urban areas. See Figure 1.

The peer-reviewed paper won third place in the competition for the ESRI Award for Best Scientific Paper in GIS. ESRI, founded as Environmental Systems Research Institute in 1969, is a world leader in geographic information system software.

Pravara's paper, "Mapping Urban Land Cover Using QuickBird NDVI and GIS Spatial Modeling for Runoff Coefficient Determination," was originally published in the January 2007 issue of Photogrammetric Engineering & Remote Sensing (PE&RS). Photogrammetric Engineering & Remote Sensing is the official journal of the American Society for Photogrammetry and Remote Sensing (ASPRS).

The paper was also the sole winner of the 2006 BAE Systems award for the best student paper contest in a national and international competition of the 2006 ASPRS annual conference in Reno, Nevada.

Pravara said that determining "runoff index" is a critical step in calculating runoff volumes and peak discharge for the two most widely used urban rainfall runoff models—the rational method and the NRCS-CN method. Accurately estimating runoff index is critical in drainage design and analysis.

Pravara said conventional ground-based methods for estimating runoff index are time-consuming and labor-intensive, since they require detailed information about land use/land cover, as well as soil data. She said one alternative is to use remote sensing and GIS technologies to provide spatial input information needed for estimating runoff index values.

Pravara's proposed solution is the composite runoff index geographic model (© 2005-2006 Pravara Thanapura. Use with permission), which she developed at SDSU in 2005-2006. The model allows for repeatability and consistency of results by removing human error factors, increases speed, and potentially reduces costs in estimating runoff index values. She believes the method provides an effective and efficient methodology in drainage design, analysis, and water management for small and mid-sized watersheds in urban ungaged areas.

"The end products could benefit engineers in big cities around the world like Bangkok in designing sufficient capacity of minor drainage structures such as sized culverts and sewer pipes to effectively remove storm water out of an area. That, in turn, could help prevent local and downstream flooding and thus could enhance public safety, economic development, and quality of life for urban taxpayers worldwide," Pravara said.

Currently, Pravara is a NASA principal investigator working in collaboration with others and her research team to test her model in Las Vegas, Nevada, the fastest growing city in the United States. The research work is supported and awarded by the NASA Experimental Program to Stimulate Competitive Research (EPSCoR) of South Dakota under Award No. NCC5-588 (Sub-Award No. SDSMT-SDSU 02-05). Her NASA advisor, Dr. Edwin Taylor (Ted) Engman, is also her Ph.D. dissertation advisor. Dr. Engman is a NASA scientist and consultant at NASA Goddard Space Flight Center for Water Management Applications in Greenbelt, Maryland. Additionally, her Ph.D. major advisor and M.S. research advisor is Dr. Janet Gritzner, a geography professor who teaches various courses in GIS at SDSU. Pravara's dissertation title is "Developing and Testing the Composite Runoff Index Geographic Model Using Medium-High Resolution Digital Imagery & GIS for Urban Rainfall-Runoff Estimation: The Rational and the NRCS-CN Methods."

Pravara attended the ESRI award presentation at the ASPRS 2008 Annual Conference on April 30, 2008, in Portland, Oregon. See Figure 2.

Figure 2. CAPTION: The 2008 ESRI Award for Best Scientific Paper in GIS awardees were (l-r) Pravara Thanapura Kulvichit, Jonathan Li, Fred Woods, from ESRI who presented the awards, Rifaat Abdalla, Xutong Niu, and Sinchit Agarwal. Photo credited to ASPRS.