

Researcher looks to use new algorithms to improve precipitation maps

November 4 2016

A UTA civil engineering professor and hydrologic researcher expects to improve the accuracy of rainfall maps produced by the National Weather Service by 10 to 20 percent for heavy-to-extreme rainfall events through a National Oceanic and Atmospheric Administration grant.

D.J. Seo, the Robert S. Gooch Professor of Water Resources Engineering in the Civil Engineering Department, is collaborating with Lin Tang, a research scientist at the University of Oklahoma; Jian Zhang of the NOAA's National Severe Weather Storms Laboratory; and David Kitzmiller and Greg Fall of the NOAA's National Water Center.

Seo said that more accurate rainfall maps such as those available from water.weather.gov/precip/, will positively impact decisions made by emergency managers, water managers, municipalities, the agricultural sector, the insurance industry and others. In addition, the more accurate precipitation information affects everyday people.

Under the grant, UTA will receive \$188,442 and OU will receive \$197,546. That \$385,988 is part of \$6 million in total funding from the NOAA's National Weather Service as part of its Joint Technology Transfer Initiative. The total funding was dispersed to more than 100 academic institutions. The initiative's aim is to get new tools and technologies more rapidly into the hands of [weather forecasters](#).

"NOAA has sharpened its focus on speeding up this important transition

of technology to National Weather Service day-to-day operations," said John Cortinas, director of NOAA Research's Office of Weather and Air Quality, which manages the Joint Technology Transfer Initiative in close coordination with NWS, in a news release. "This funding represents another important step to get new tools and technologies more rapidly into the hands of our weather forecasters who serve communities around the nation."

Seo said the project will take into account the weather radar networks, tens of thousands of rain gauges and satellite sensors that the National Weather Service employs.

"We'll be using that information, running it through a new suite of algorithms to determine heavy-to-extreme precipitation amounts more accurately," Seo said. "Our goal is to improve the accuracy by 10 to 20 percent. Being able to estimate precipitation better has a chain reaction of sorts on the entire water prediction and management enterprise. If we're more accurate in precipitation, then we can be more accurate in our streams, creeks and rivers. That leads to being more accurate in flood warnings and in the operation and management of our reservoirs."

Greg Waller, service coordination hydrologist for the National Weather Service's West Gulf River Forecast Center, said Seo's work will enhance the agency's ability to better serve the public.

"Dr. Seo is a great teammate," Waller said. "His work will help us forecast flooding more accurately. That helps meteorologists and invariably helps the public. We are looking forward to another collaborative effort with UTA."

College of Engineering Dean Peter Crouch said the research Seo and his team are carrying out in this project is another example of UTA-led research that cuts across data-driven discovery, sustainable urban

communities and global environmental impact, three tenants under UTA's Strategic Plan 2020: Bold Solutions | Global Impact.

"Creating a better tool in determining precipitation amounts is especially beneficial in severe weather episodes," Crouch said. "Improving forecasts could save lives and property."

Seo joined the University in 2010 following professional appointments to the National Weather Service's Hydrologic Research Laboratory in Maryland and as a senior researcher in the Environmental Remote Sensing Research Laboratory at the Korea Institute of Science and Technology in Taejon, Korea.

Seo earned his master's degree from the Massachusetts Institute of Technology and his doctoral degree from Utah State University.

In the spring of 2016, he launched a new Android cell phone app called iSeeFlood to encourage the public to file timely reports when they see flooding of varying severity on the streets, in and around their houses, and in streams and creeks.

At that same time, Seo's team also installed innovative wireless sensors to improve high-resolution modeling of urban water systems. Researchers about a dozen of the high-tech sensors in Fort Worth, Grand Prairie, Dallas, Arlington and Kennedale.

Seo was awarded in 2014 a four-year, \$1.2 million National Science Foundation grant to improve sustainability of large urban areas from extreme weather, urbanization and climate change.

That project built on Seo's previous work to help establish the Collaborative Adaptive Sensing of the Atmosphere, or CASA, radar system in North Texas. UT Arlington installed the first radar station in

North Texas atop of Carlyle Hall in 2012 as part of Seo's research. The CASA system provides weather data every minute compared to every five to six minutes with previous weather radar systems. CASA can adapt to focus on smaller areas, giving the users more detailed information to better monitor and track storms and precipitation.

Seo was also awarded a two-year \$283,000 grant in 2015 from the National Oceanic and Atmospheric Administration Climate Program Office to forecast inflows into water supply reservoirs and to generate optimal solutions for operation of water supply systems for major water providers in the region. He and his team collaborate on the project with the Tarrant Regional Water District, the National Weather Service, the Trinity River Authority and the North Central Texas Council of Governments.

Provided by University of Texas at Arlington

Citation: Researcher looks to use new algorithms to improve precipitation maps (2016, November 4) retrieved 24 April 2024 from <https://phys.org/news/2016-11-algorithms-precipitation.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--