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LOUISIANA STATE UNIVERSITY

Supercomputing Tidal Models with the STORM Project at LSU

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The Louisiana State University Center for Computation and Technology recently received a large grant from the National Science Foundation to begin updating the coastal modeling system known as Advanced Circulation, or ADCIRC. The project, known as STORM, began in October of 2014 and work on the program will continue for four more years.

CCT and STE||AR will be working in tandem with a group of researchers from fields ranging from computer science to coastal science and engineering. They will be updating and expanding the ADCIRC system, which has been under development for more than two decades.

ADCIRC is a multi-scale, multi-physics coastal circulation model widely used in today's coastal modeling community to recreate the effects of winds, tides, waves and currents on large bodies of water. This information can be crucial to coastal communities in the events of large storms approaching the coast. However, ADCIRC is a more static of a model, with a narrow set of solution algorithms that needs to be adjusted to new technology and wider scales.

"The STORM project seeks to create a sustainable software framework and infrastructure that is the foundation for coastal circulation and storm surge modeling needs of a wide community for at least the next 20 years. The project will broaden ADCIRC from a successful, but somewhat static coastal modeling tool tied to a narrow set of solution algorithms and the message passing interface, or MPI, parallelization paradigm to a dynamic computational platform comprised of multiple solution algorithms that readily admits additional new solution algorithms and is built on a transformational new parallelization scheme that will allow scaling to at least 256k computer cores on modern, high-powered computing systems."

By using a next-generation parallel computing runtime system known as HPX, the STORM project will speed up ADCIRC. This will allow for better and more accurate information to be gathered more quickly and on a much larger scale.

STORM will be available for use by weather forecasters, academic researchers and the private sector. In addition, government agencies such as the U.S. Army Corps of Engineers, Department of Homeland Security, National Oceanic and Atmospheric Administration and the U.S. Navy will have access to the project.

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