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Third generation supercomputer at LSU

(Source: [The Advocate](#))

LSU is about to put its third generation supercomputer into widespread use next month, opening up possibilities that LSU researchers and engineers will make the next big medical breakthrough or scientific discovery.

SuperMike II has the capacity of 440 desktop computers with the capability of running 7,000 different programs simultaneously.

The \$2.6 million machine built by Dell Inc. is housed in a specially customized, climate controlled room in the back of LSU's Frey Computing Center.

While standing just outside the room on Friday, LSU IT communications and planning officer Sheri Thompson points to a folded metal gate hanging from the ceiling designed to unfurl itself in case of an emergency.

She explains that SuperMike II's fire suppressant room is designed to seal itself off automatically in case of a fire while oxygen is sucked from the immediate vicinity.

Inside the room, Thompson has to raise her voice over the loud humming of the computer and the sound — similar to gusts of wind — of the room's extensive cooling system.

"The machine puts out massive amounts of heat but it has to be in a cold environment," Thompson said. "We have to push in cold air run through chilled water."

SuperMike II is made up of two rows of six-and-a-half-foot computer towers, with six separate units, or racks per row. Each rack is about half the width of a conventional home refrigerator.

SuperMike II has 10 times the processing capability of Tezpur, the second generation machine installed in 2007, and 100 times the power of LSU's original SuperMike supercomputer brought on-line in 2002.

Joel Tohline, director of LSU's Center for Computation and Technology, said SuperMike II will be shared by a number of different scientists and engineers, who need a machine capable of tackling multiple complex equations at once.

He says the computer has the capability of providing immeasurable value to the state and society at large.

For instance, smaller computers are capable of simulating within 10 to 50 miles where a storm surge will come on land. SuperMike II has the capability of possibly projecting within a few meters where the same surge will come ashore, Tohline said.

"It will be very accurate in terms of how high the water is and what time the water's going to come in," Tohline said.

LSU administrators believe SuperMike II could strengthen partnerships between LSU and a number of different industries.

Louisiana's oil and gas companies, for instance, could see a significant financial benefit from SuperMike II because of the computer's ability to simulate how oil and gas flows through particular underground rock formations, Tohline said.

"There are certain groundbreaking things companies haven't invested in yet, so they seek out universities for help ... We can now circumvent some of the exploration process," he said.

The supercomputer could also give LSU researchers the upper hand when it comes to securing grants from the U.S. Department of Energy and the National Science Foundation, Tohline said.

One particular field, Tohline said he is excited about is the health care innovations SuperMike II could spearhead in the area of medical imaging. Magnetic Resonance Imaging, or MRI and CAT scan technology — where large amounts of digital data is collected and then transformed into images doctors can analyze — could one day be done in the operating room while surgery is in progress, Tohline said.

"We could one day see a CAT scan that straddles the body where we get high-resolution, real time imaging," he said.

LSU assistant professor Parampreet Singh and assistant research professor Peter Diener, both in the LSU Department of Physics and Astronomy, have a very specific use for the computer.

The two recently received a \$250,000 grant from the philanthropic John Templeton Foundation to study the origin of the universe.

The two will use SuperMike II to figuratively hit the rewind button on time until they reach the true beginning of the universe.

Specifically, the two said in October that they are looking for the point when gravity loses its pulling force of attraction and does the opposite — becomes a repellent force.

SuperMike II is in use by a select few LSU staffers but is expected to be made available for regular use by Feb. 1.

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