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RANGER SUPERCOMPUTER AT THE UNIVERSITY OF TEXAS

Ranger's new challenge: help fight swine flu

Supercomputer sibling Lonestar also wrangling with software to aid public health officials assess outbreaks.

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The University of Texas is making its world-class supercomputers available to researchers working to find new ways to treat the H1N1 swine flu virus and other infectious diseases.

Researchers in Illinois and Utah have been given special access to Ranger, one of the world's most powerful supercomputers, to determine how to treat the new virus if it becomes more resistant to established anti-flu drugs.

Another research team at the University of Texas led by Lauren Ancel Meyers, an associate professor of integrative biology, is using Ranger's older sibling, called Lonestar, to develop software that helps public health officials make better decisions on how to intervene in disease epidemics.

Early fears about the swine flu virus have subsided since it appeared this spring. But the virus has spread worldwide with more than 19,000 cases reported and 117 fatalities.

Researchers are preparing for the possibility that the new flu virus will reappear, in a version that is deadlier and more drug-resistant. Other researchers, including Meyers, are using the virus as a real-world example of the public health challenges posed by a fast-spreading infection.

UT's supercomputers typically are used for longer-term research on everything from the birth of stars to the advancement of nanoelectronics, but sometimes they do work under a much tighter schedule. Last summer, the Texas Advanced Computing Center worked closely with the National Oceanic and Atmospheric Administration to evaluate new and more computer-intensive hurricane-simulation software on Ranger during hurricane season.

Ranger, which cost $59 million, can handle such complex simulations; it has the computing power of 30,000 desktops.

Late last month, the swine flu team from the universities of Illinois and Utah asked UT's Texas

Advanced Computing Center for special access to Ranger. They wanted to be able to use part of Ranger on an almost continuous basis over several weeks to make rapid progress, using computer models, simulating how the swine flu virus would interact with various anti-flu drugs.

Researchers were trying to find ways that drugs could still be used against the virus, even after it mutates and becomes more drug-resistant. That lays the groundwork for designing new drugs that will be harder for the virus to resist.

Klaus Schulten, a top researcher in molecular dynamics at the University of Illinois, is out of the country and could not be reached.

But in an article by Aaron Dubrow for the UT computing center, he explained Ranger's important role in his research: "We were able to learn something in a few weeks that usually would take many months. For the first time, these supercomputers are being used for emergency situations that require a close look with a computational tool in order to shape our strategy."

Because Ranger was paid for with a grant from the National Science Foundation, a foundation-related committee must approve which research projects get to use the computer. The computing center quickly got approval for the project and set up a special queue within the computer to give Schulten's team the access it needed.

"We like to be able to react to these kinds of projects because we do have one of the biggest computational resources around," said Chris Hempel, the center's associate director for user services.

Meyers said her team at UT is using Lonestar to create better software to help public health agencies find more effective methods for combating epidemics. Her team has adapted software first developed for operations engineering to give public health officials more disease treatment options covering questions such as when and where drug stockpiles should be used and how long affected schools should be closed.

Her team, which includes Ned Dimitrov, a postdoctoral fellow in operations research engineering, and graduate student Sebastien Goll, aims to deliver both software and disease response recommendations to public health officials in the U.S. and Canada by this fall.

The latest flu epidemic is giving Meyers' team a fast-changing real-world example that it can use to test and perfect the model.

"It has helped us hone the development," Meyers said.

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