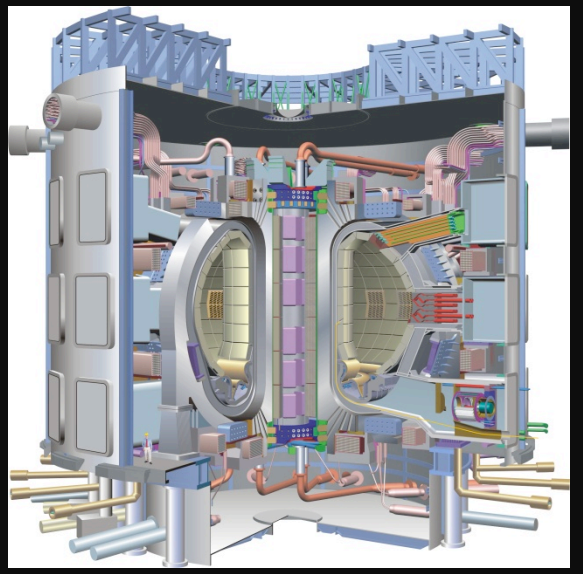
The Week of May 11, 2009

The Dynamic Duo

Team simulates core/edge interaction in fusion plasma

- **Recent simulations on ORNL's Jaguar supercomputer have verified that the temperature and turbulence at the edge of a fusion plasma affect the temperature and turbulence of the plasma core.**
- **Researchers used the XGC1 code on Jaguar to verify that turbulence in the well-confined edge can penetrate the core and boost its temperature, a phenomenon long postulated.**
- **The team, led by New York University's C.S. Chang, consumed more than 1 million CPU hours and gathered more than 1 terabyte of data.**



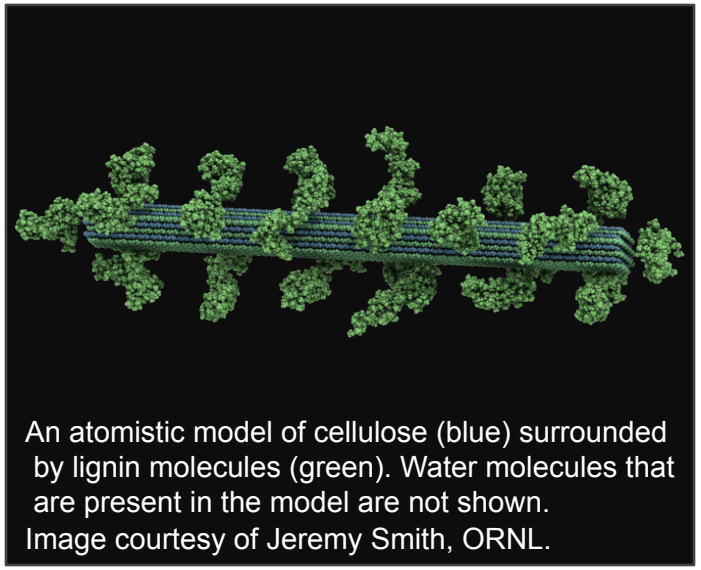
Chang's simulations are providing researchers with better data to be used in the design and construction of the ITER reactor.

"The purpose of the code and the purpose of the machine fit perfectly together . . . Jaguar is number one." – Principal Investigator C.S. Chang

From Photosynthesis to Fuel: The Next Generation of Ethanol

Cellulose holds great potential as source of biofuel energy

- **Researchers at Oak Ridge National Laboratory will use the fastest computer for open scientific research to run simulations that will help reveal the detailed workings of cellulose, a potential biofuel material.**
- **Figuring out how to unlock cellulose's sugar subunits, which can be fermented to produce ethanol, is a grand challenge of engineering. Tackling that challenge could enable full use of plants for cellulosic ethanol.**



An atomistic model of cellulose (blue) surrounded by lignin molecules (green). Water molecules that are present in the model are not shown.
Image courtesy of Jeremy Smith, ORNL.

"The simulations we are performing are designed to provide a picture of biomass that will help experimentalists design plants with new, less resistant cell walls and enzymes that break the cellulose down more efficiently. This is basic research designed to help underpin the current major, worldwide effort in renewable energy research," – Principle Investigator Jeremy Smith

Workshop and User Meeting Offer New Insights

Users introduced to Cray XT5 system

- **The NCCS and the NSF–funded National Institute for Computational Sciences held the 2009 Cray XT5 workshop, "Climbing to Petaflop on Cray XT" at ORNL April 13–16.**
- **ORNL staff introduced the Cray XT5 system to PIs and their research teams and users participated in hands-on sessions to become familiar with the supercomputer's new features.**

Attendees of the XT5 workshop held at ORNL collaborate during one of the breakout sessions.

"We were pleased here at the ORNL Leadership Computing Facility at the NCCS to have such a good turnout of key users on the Jaguar leadership computing platform." - Doug Kothe, NCCS director of science.

ORNL Hosts Global Audience at HUF '09

Researchers gather to discuss data storage needs

- An international audience shared problems and solutions to data storage challenges at HUF 2009, the annual High Performance Storage System (HPSS) users' forum.
- This year the event was held March 11–13 in the Joint Institute for Computational Sciences auditorium at ORNL.
- Organizers expected 35 attendees, but more than 70 participants came to the meeting, which was hosted by the NCCS and the National Institute for Computational Sciences.

Attendees of the 2009 HPSS User's Forum, hosted by the NCCS and NICS.

"We're starting out at the baseline with people who have the top needs in the world for storage." - Stanley White, site administrator of HPSS operations at ORNL.