

# **National Center for Computational Sciences Snapshot**

## **August 14, 2006**

### **Science Highlights**

Are signs of climate change the result of human activity or are they natural variations? What impact could unlimited industrial emissions and increased deforestation have on the climate in your region of the world? Thousands of factors must be considered to even attempt to answer questions like these. Earth's climate is so complex that scientists must turn to computer models to weave their observational data into consistent pictures that give them insight into how the climate evolves.

A multiagency effort led by the head of the Climate Change Research section of the National Center for Atmospheric Research, Warren Washington, will develop the next generation of climate models using a climate-modeling end station that will merge the unparalleled computing resources of the National Center for Computational Sciences (NCCS) with the nation's top climatologists and computer scientists.

The primary objective of the end station will be to upgrade and maintain the Community Climate Systems Model (CCSM), which has already been used to generate almost a dozen millennia of climate simulations for the Intergovernmental Panel on Climate Change to aid in its mission to assess the risk of human-induced climate change. The upgraded version will incorporate the most recent atmospheric, oceanic, and ice data, as well as improved chemistry, biology, and physics. Another area of critical improvement will be the model's ability to assess how industrial emissions could impact climate change. The new model will incorporate satellite data on regionally produced industrial emissions so scientists can directly simulate their distributions in Earth's atmosphere. These changes will help position CCSM to become the next premier tool for assessing whether human activities are upsetting the delicate cycles that regulate atmospheric greenhouse gases.

### **NCCS Tours**

The NCCS recently provided tours of the facility to a number of distinguished guests from various walks of life and regions of the world. Most recently, on August 2, the Chief Executive Officers (CEOs) from Cray, Inc., Peter Ungaro, and AMD Inc., Hector Ruiz, got a close look at the facility. Cray currently supports the NCCS with the XT3, known as Jaguar, the facility's largest computer. As part of the Leadership Computing Facility project, Cray will provide the NCCS with the world's first petascale machine. AMD has also provided the NCCS with the processors for its cutting-edge computers.

Earlier, on July 12, a delegation from the Chinese Academy of Sciences (CAS), including President Lu Yongxiang, toured the computer room and the Everest visualization center. Other prominent CAS officials were present during the tour as well.

Other notable visitors of late included Kyo Kimura, Executive Director of Japan's Atomic Energy Agency; Representative Daniel Lipinski of Illinois, who is a member of the House Science Committee; Tennessee Valley Authority Chief Nuclear Officers and

Executive Vice President Karl Singer; and a delegation from the Russian city of Zheleznogorsk, one of the Soviet Union's former "secret cities" in eastern Siberia. The University of Tennessee's head football coach, Phillip Fulmer, also toured the NCCS facility while on campus to kick off the annual United Way campaign. He definitely left his mark when he signed the Cray XT3 with "Go Vols!"

The one thing all these distinguished visitors had in common was their eagerness to learn about the scientific breakthroughs being made possible by the unprecedented resources available at the NCCS. All eyes are certainly focused on the Center as it provides opportunities for researchers from around the globe to put its vast computational resources to work solving some of the world's most pressing problems.