

# INTRODUCTION

## THE UCAR PRESIDENT'S COUNCIL

Welcome to the 2005 edition of *Highlights*, our biennial look at UCAR and its two major components, the National Center for Atmospheric Research (NCAR) and the UCAR Office of Programs (UOP). This report provides examples of UCAR's wide-ranging activities in the areas of science; facility support to the community; education, outreach, and training; advocacy, public policy, and communication; technology transfer; and research and operational partnerships. All this is carried out with hundreds of collaborators in the United States and throughout the world.

Our science ranges from basic research on the coronal magnetic fields of the Sun to development of new tools for observing snow and ice on roads to predicting the microscale flow of air around the Pentagon. Other recent work covered in this report addresses the predictability of summer rainfall in the United States and efforts to map and predict global air pollution, including the role of megacities in affecting regional air quality.

New remote sensing tools are assisting in these complex projects. Radars and lidars make visible the swirls of air carrying water, ice, particles, and gases in clouds and clear air, over complex terrain and around buildings. A national network of ground-based Global Positioning System receivers reveals with unprecedented accuracy and temporal resolution the total amount of water vapor in the atmosphere, assisting in the prediction of precipitation and hurricane flooding. These innovative radar and GPS data sets are brought to university departments and other users in real time via UOP's Unidata program.

Modeling is another critical area where UCAR activities help extend the community's work in understanding the Earth system and the evolution of weather and climate. The third generation of the NCAR-based Community Climate System Model (CCSM3), released in June 2004, is being used to support the Intergovernmental Panel on Climate Change, whose next assessment will be complete in 2007. The latest version of the Weather Research and Forecasting model has over 2,000 users worldwide; in October 2004, WRF successfully entered operational use at NOAA's National Centers for Environmental Prediction.

During the past year, NCAR carried out its first major reorganization in more than a decade. A key objective is to maintain and strengthen our efforts in service and facilities for the university

research community. Other goals are to improve NCAR's ability to define and execute large-scale interdisciplinary projects that are appropriate for a national center, and to create more flexible organizational units that provide new opportunities for community involvement in NCAR activities. Our overall aim is to strengthen NCAR's position as an open and collaborative center for the community.

Looking ahead to the near future, the communities' new NSF-sponsored research aircraft, HIAPER (the High-performance Instrumented Airborne Platform for Environmental Research), will make its first research flight in 2005. This Gulfstream jet, under development for more than a decade, is a major addition to NCAR's suite of observational facilities and promises to enable new discoveries in atmospheric physics, chemistry, and dynamics.

Another observational facility, COSMIC (Constellation Observing System for Meteorology, Ionosphere and Climate), will be launched in late 2005. COSMIC is an array of six microsatellites, each carrying a GPS receiver, a transmitter, and an ionospheric photometer. These instruments will provide valuable three-dimensional data on electron density in the ionosphere and on temperature and water vapor in the stratosphere and troposphere.

UCAR continues to provide a broad range of community education and outreach. This report highlights the recent GEO Forum 2004, designed to help community recruiting and diversity; resident and Web-based coursework for weather forecasters; training for K-12 teachers to bring modeling into the classroom; and our continued efforts to inspire children around the world to stay interested in the sciences by learning how to take and analyze environmental measurements.

We thank the entire UCAR staff for their dedication to excellence, leadership, and service to the community. We further acknowledge and thank our hundreds of collaborators in the community and those who participate in UCAR's governance, particularly the UCAR Member Representatives, the Board of Trustees, and the University Relations Committee. The university-based governance and the participation of university faculty and students in all of our programs are what make this institution great. Finally, we acknowledge with thanks the steadfast support and oversight of the National Science Foundation, NCAR's primary sponsor.



*Left to right:*

**Larry Winter**, NCAR deputy director

**Tim Killeen**, NCAR director

**Richard Anthes**, UCAR president

**Katy Schmoll**, UCAR vice president for  
finance and administration

**Jack Fellows**, UOP director and UCAR  
vice president for corporate affairs