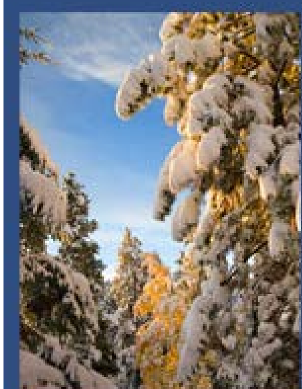

First snow of the season in Nederland, October 10.

(Photo by Carlye Calvin)

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Staff Notes Extra - The 2005 Outstanding Accomplishment Award winners

For the people of NCAR, UCAR, and UOP Vol. 40 #10 • November 2005

HIRDLS comes through

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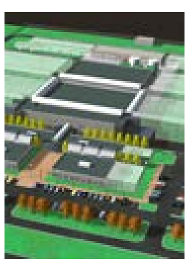

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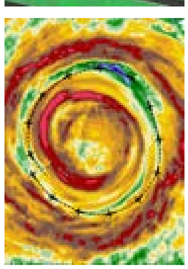

RAINEX: Bad weather is good news

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UCAR policy on classified research

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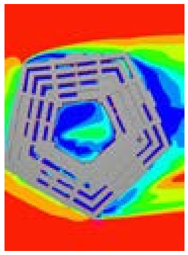

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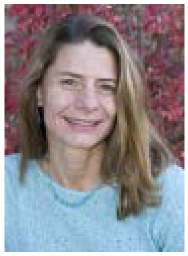

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Just One Look

Always appealing, the annual Super Science Saturday event at the Mesa Lab was especially attractive this year. It explored the scientific principles of cohesion, giving children an opportunity to engage in such exercises as lifting fish with magnets and adhering to a Velcro wall. NCAR scientists performed live demonstrations using magnets, electricity, and the forces of cohesion and gravity. The free public event, held on October 29, also featured robotics and electronics workshops, a slide show on space weather, a planetary orbit game, a 24/7 Weather Experience exhibit, and Halloween-themed fun. "We had a great time," says EO's Linda Carbone, who organized it with EO's Laura Einig. Sponsored this year by EO, Friends of UCAR, and KMGH-TV 7NEWS, Super Science Saturday is designed to promote public science literacy and enrich the science experiences of local students and teachers.

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HIRDLS comes through

Even though the orbiting instrument is damaged, ACD staffers and their colleagues have figured out how to achieve most of their science objectives.

For a brief time last July, ACD's John Gille and the rest of the HIRDLS team felt like they were on top of the world.

The much-anticipated HIRDLS instrument (HIRDLS stands for High Resolution Dynamics Limb Sounder) took off aboard NASA's Aura satellite in a perfect launch on July 15—exactly 16 years after the initial proposal for the breakthrough instrument. Everything seemed on track for the instrument to measure atmospheric chemicals and temperatures in unprecedented detail, advancing scientific insights on such critical issues as ozone loss and the impact of greenhouse gases on climate.

The instrument. Researchers are unsure why HIRDLS has experienced problems, but they believe a piece of plastic became lodged by the outer scan mirror just inside the viewing aperture. In this file photo, the aperture, shaped somewhat like a hot dog, is toward the top of the instrument. As it orbits, HIRDLS (just more than a cubic yard in size) hangs from the bottom of the Aura satellite, flipped from the orientation shown here. (Photo courtesy HIRDLS.)

But when team members began to activate the instrument in August, they discovered something had gone wrong. The signal, instead of revealing the expected range of atmospheric radiation detected by infrared technology, was almost entirely flat. Slowly a horrifying realization sunk in: the technology-laden orbiting instrument to which they had devoted years of their professional lives was not able to observe the atmosphere because its view was blocked.

"I felt like I had been kicked in the stomach," recalls John, the U.S. principal investigator on the project.

Rather than accede to recommendations that the project be scrapped, the team devoted the following year to a tenacious struggle to extract vital scientific data from their damaged machine. Their efforts have paid off dramatically. It now appears that HIRDLS, over the next few years, will be able to carry out 85–90% of its original science studies. NASA managers, at a September meeting with the HIRDLS principal investigators, accordingly signed off on continued funding.

Here's a look at how the HIRDLS project was saved.

Bright red from top to bottom

After getting their proposal accepted in 1989, John and colleagues in ACD, CU–Boulder, and Oxford University worked intensively to design and build an instrument that would provide a detailed picture of chemistry from the upper troposphere to well above the stratosphere.

Members of the HIRDLS team pose next to a model of the orbiting instrument in Center Green 2.
Seated (left to right): Vince Dean, Dan Packman, Cheryl Craig, and Hyunah Lee.
Standing in back row (left to right): Linda Henderson, Charlie Krinsky, Brent Petersen, Doug Kinnison, Tom Eden, Joe McInerney, Gene Francis, Brendan Torpey, Bruno Nardi, Chris Halvorson, Rashid Khosravi, Greg Young, and Charles Cavanaugh.
Standing to the right of the model: John Gille (left) and Joanne Loh.
Not pictured, include Mike Coffey, Jim Craft, Steve Massie, and Barb Tunison.
(Photo by Carlye Calvin, UCAR.)

The result, HIRDLS—little more than a cubic yard in size—was laden with technical wizardry. An outer scan mirror would reflect light from the atmosphere onto other mirrors and eventually to the instrument's core. There, infrared detectors, designed to sense wavelengths just longer than those that humans can see, would use 21 channels to measure signals indicating the amounts of numerous chemical compounds that influence ozone levels, climate, and air quality. The data would help scientists learn more about such issues as the role the stratosphere plays in climate change and whether the ozone layer is recovering as predicted.

John and other team members went to Vandenberg Air Force Base in California last year to watch NASA launch HIRDLS and three companion instruments aboard Aura. Once the satellite settled into orbit, they activated onboard coolers so the instrument's detectors would work. Then, on August 10, they opened the outer doors so light would be reflected onto the detectors.

That's when they got their first view from HIRDLS and realized there was a problem. "We weren't seeing what we were supposed to see," ACD's Tom Eden says of the digitized plots that were unexpectedly uniform.

Once visualized, the data should have revealed a two-dimensional image, indicating altitude and longitude, with colors ranging from yellow at the bottom (lower atmosphere) to black at the top (outer space). Instead, the team saw a bright red from top to bottom and left to right, except for a small area of orange at the lower left.

The researchers suspected something was blocking the instrument's view. They swung into action with a team of engineers from NASA and Lockheed Martin, which had built the instrument. While the researchers, working with NASA, gingerly repositioned the instrument's mirrors, Lockheed conducted a series of simulations. The company determined that a piece of plastic film, which had been designed to protect the instrument's optics, might have torn when the external pressure dropped during launch and become lodged over the outer scan mirror.

The next step was for NASA to try to shake off the plastic. For about two months, the team attempted a series of increasingly aggressive maneuvers, sharply moving the 8.5-inch (22-centimeter) diameter mirror in hopes that the plastic would fall away.

In January, a NASA review board concluded that the situation was hopeless. "They were on the verge of writing off the experiment," John says. But NASA agreed to John's request that funding be continued through the September 30 end of the fiscal year to see whether HIRDLS could still produce any usable data.

Subtracting the signal

Despite the setback, John and a few of his colleagues remained hopeful for a couple of reasons. First, the impact of the plastic appeared to be stable and predictable, which meant that perhaps it could be defined. Second, when the mirror was at an angle far from the Sun, the team could measure the atmosphere through a small gap in the plastic.

Perhaps, the researchers hypothesized, they could calculate the signal coming from the plastic and subtract it from the total signal. Whatever remained would be coming from the unobstructed portion of the mirror. They could then scale up the accurate piece of the signal to recreate the entire picture as it would exist without any obstruction.

"We had come back from the precipice."

—Steve Massie

As ACD's Gene Francis explains, "It became evident that the thermal signal from the obstruction is relatively stable and repeatable. That gave us confidence we should be able to mathematically model its behavior and subtract it from the measured signal to obtain the atmospheric signal of interest."

The team scored an important breakthrough when NASA pitched up the Aura spacecraft to point HIRDLS toward space, where the temperature, and thus the infrared signal through the gap, would be close to absolute zero. This meant the entire remaining signal from HIRDLS could be attributed to the plastic, and it enabled the team to produce a first estimate of the plastic's impact.

But the challenges remained enormously complex. Even though the plastic's signal was stable, it varied regularly as Aura orbited from the day to the night side of Earth, and as the seasons changed. Moreover, it blocked different amounts of the view as the mirror was moved up and down to gather data from various heights in the atmosphere.

As the researchers chipped away at the problem, they struggled to keep up their morale. Some left for other jobs, concerned that funding for the project would ultimately be cut. "We were on a roller coaster," Tom says. But he credited John's optimism for helping to keep the team going.

By summer, the team was beginning to see important results. The researchers used HIRDLS to estimate amounts of relatively abundant chemicals, such as ozone, and to determine temperatures in various regions of the atmosphere. By comparing their readings to data from other instruments, they verified that HIRDLS was, in fact, providing an accurate picture of the atmosphere.

"We had come back from the precipice," said ACD's Steve Massie. "To be able to work with the data and to do the reality checks—graph the data and see that it all made sense—was enormously gratifying. This was a triumph of the human spirit."

The progress also gave the team hope that it could home in on less abundant chemicals, including water vapor and various nitrogen compounds. To accurately measure such chemicals, the team will need to further refine its equations because even a small error in the process could greatly affect the estimate of a relatively rare chemical.

Armed with the findings, John went to NASA headquarters to ask that funding for the project be continued. On September 23, NASA managers agreed that the five-year project could go forward as originally conceived.

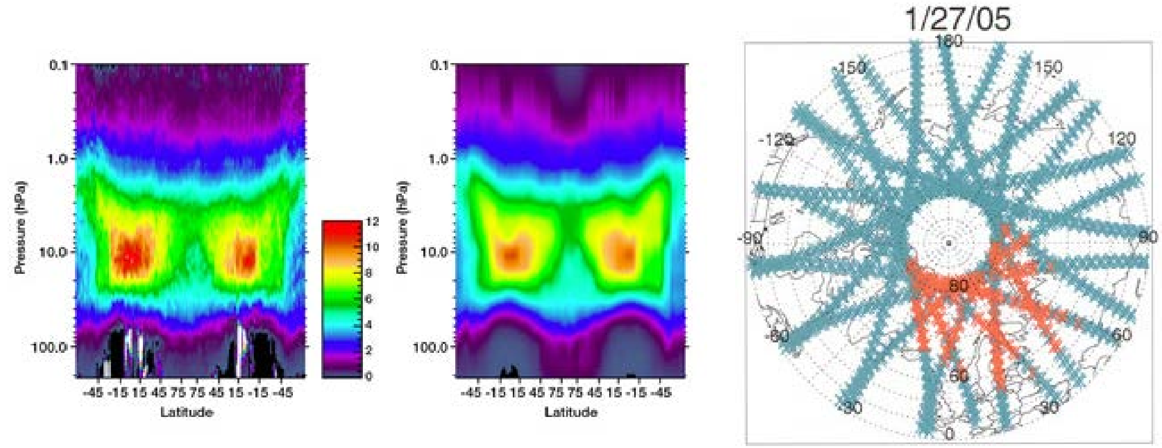
John and his colleagues were elated. As John puts it, "We were given up for dead and we've come back."

Unprecedented views

Thanks to the team's work, scientists are seeing aspects of the atmosphere in more detail than ever before.

For example, HIRDLS can detect the locations of polar stratospheric clouds over the Arctic, which play a central role in chemical processes involving chlorine that deplete stratospheric ozone. Steve believes the instrument will ultimately show the clouds on a daily basis, helping scientists better understand changes in the ozone layer that protects Earth's surface from dangerous levels of solar radiation.

"These are unique measurements," Steve says. "They will allow us to better estimate ozone loss." Along with ozone, the HIRDLS team expects to gather data on water vapor, another important greenhouse gas, and on pollutants such as nitrogen oxides. The instrument will also enable researchers to learn more about the behavior of high-forming cirrus clouds that influence climate by affecting the amount of solar radiation that reaches Earth's surface.



The view from HIRDLS. Researchers have verified that information from HIRDLS is providing an accurate picture of important chemicals in the atmosphere. The HIRDLS image (above left) corresponds to data from another orbiting instrument, the Microwave Limb Sounder (above right). At right, HIRDLS is generating data that enable researchers to map the locations of polar stratospheric clouds in the Arctic (shown in dark gray), which play an important role in ozone depletion. (Illustrations courtesy HIRDLS.)

But the plastic obstruction is forcing team members to scale back some of their scientific goals. They cannot turn the outer mirror as much as originally planned, which means the instrument cannot gather data from the extreme southern regions of the planet, including Antarctica. The limits on the mirror's movements will also curtail the instrument's horizontal resolution, which means researchers will not learn as much about longitudinal variations in chemical composition, clouds, and temperatures as they had hoped.

Still, John believes the team can compensate for some of these shortcomings. For example, HIRDLS is taking more vertical readings along its scan track than originally planned, and these narrow views of the atmosphere can be sewn together into a broader picture with the help of computer modeling. "We think we can reconstruct a lot of the longitudinal detail that we don't see directly," John explains.

As frustrating as the last year has been at times, team members say they've enjoyed the challenge of working with a compromised instrument. "It's problem solving in the real sense that you don't know what the answer is, you don't even know if there is an answer, but you try to move ahead in a systematic way," Gene says. "So far we haven't run out of ideas, and we are making progress. The collective expertise of the HIRDLS team is making this work."

• by David Hosansky

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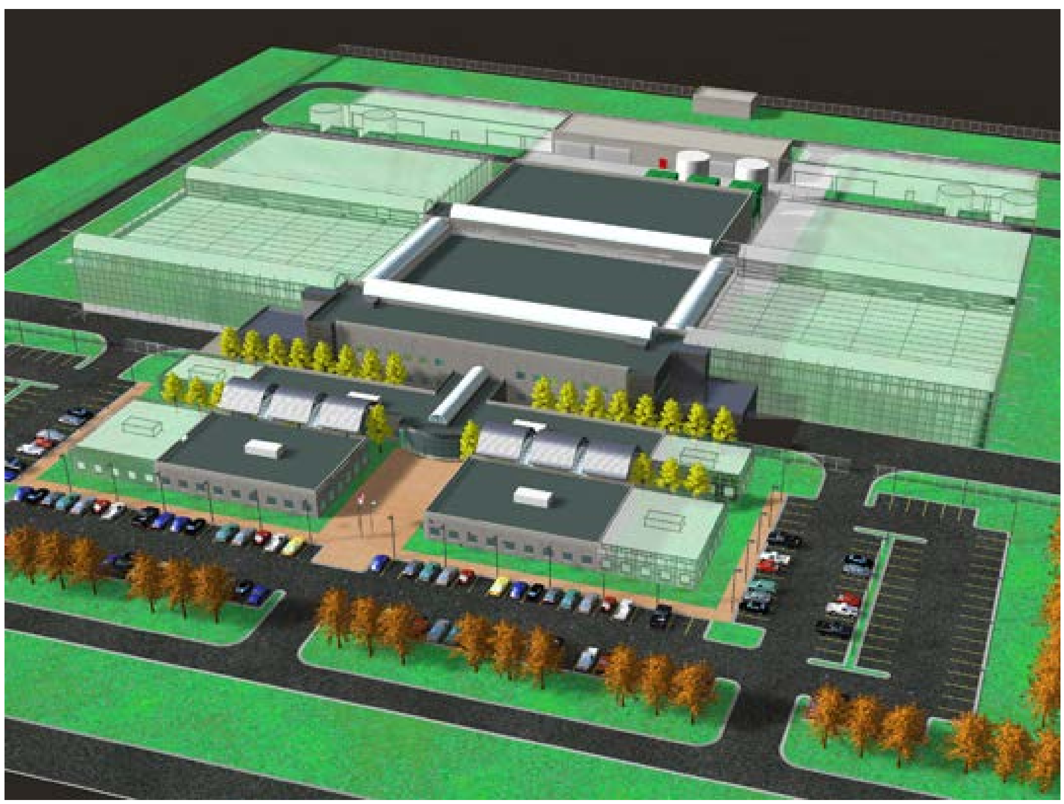
Planning a national supercomputing center for the geosciences

NCAR is laying the groundwork to create a computational equivalent of the Hubble telescope

With the Mesa Lab almost at its limit for providing electricity and floor space for increasingly powerful supercomputers, NCAR has been scouting alternative sites for new generations of machines. But instead of focusing on a supercomputing facility purely for atmospheric scientists, the organization has started to work with NSF and potential partners in industry and academia to develop a national supercomputing center that would serve the entire geosciences community.



An artist's rendition of the proposed new supercomputing center. (Courtesy The Crosby Group.)

Scientists envision an expandable facility that would eventually house supercomputers with peak speeds in excess of one petaflop (10^{15} operations per second). In contrast, today's supercomputers have peak speeds that are measured in teraflops, or trillions of operations per second. The new facility is being designed with sufficient flexibility to accommodate many generations of increasingly powerful machines to support cutting-edge geoscience research.

"This is extremely important, probably the number-one UCAR/NCAR priority," explained UCAR president Rick Anthes at the October meeting of the UCAR Management Committee (UMC). "It is a science-driven project and is exactly what a national center should be doing."

Supercomputing space is a major concern not just at NCAR, but also at a number of other scientific institutions. With NSF interested in establishing a single supercomputing center to serve a broad segment of the research community, NCAR has emerged as an ideal organization to manage the center because of its long and successful track record of serving the Earth sciences community. A consortium of partners, rather than just NCAR and UCAR, would likely govern the center.

The center is a critical component of NSF's strategic plan for strengthening cyberinfrastructure for the sciences. "NSF's intent is to gain leadership in high-performance computing for the geosciences," NCAR director Tim Killeen said at the October UMC meeting.

"It is a science-driven project and is exactly what a national center should be doing."

—Rick Anthes

Current plans call for the new facility to have 20,000 square feet of raised-floor computer space, which would eventually be increased to 60,000 square feet. It would be built on a 10- to 15-acre site and be powered by up to 13 megawatts of electricity.

Such a center would lead to greatly expanded scientific computing capability. For example, atmospheric researchers would be able to model regional climate on such a fine scale that they could capture individual mountain ranges and ocean currents. They could also fully integrate climate and weather models and simulate detailed cloud, ocean, land, and ice processes.

The center's supercomputers would enable geoscientists to better predict seismic activity and glean insights into Earth's inner core. In addition, researchers would use the center to assimilate data from increasingly sophisticated instruments into computer models to learn more about Earth's weather and climate, as well as biogeochemical and biogeophysical processes and space physics.

A presentation assembled by NCAR and UCAR staffers working on the project describes the facility as "a computational equivalent of the Hubble telescope for geoscience simulation."

The timeline

NCAR's goal is to have the new center operational by 2009. However, it must first tackle a number of issues:

• Where should the facility be located? NCAR is looking into several potential sites in Boulder County as well as elsewhere along the Front Range. The site could be developed on an industrial or university campus, or on vacant land near Boulder.

• How should the facility be governed? NCAR has been discussing the operation of the facility with potential partners in

Lawrence Buja. (Photo by Carlye Calvin, UCAR)

government, industry, and academia. No decisions have been made, but it's possible that a broad consortium of organizations may manage the center.

• How will it be financed? The facility is expected to cost $75 million to build, and $15 million a year to operate (about twice the budget to operate NCAR's current suite of supercomputers). Funding may come from a mix of government and private sector sources.

Additional issues also need to be addressed, such as who would own the center. One possibility is that NCAR could lease the facility from another organization.
An NCAR project committee, appointed by Tim and co-chaired by CGD's Lawrence Buja and HAO's Peter Fox, is studying the various issues. The committee is consulting with a blue-ribbon panel of NSF-funded scientists from across the geosciences. SCD's Aaron Andersen and F&A's Jeff Reaves are also working on the plan.

"It's been an exhilarating experience working with so many of the nation's top scientists and the talented experts here to develop this important facility," Lawrence says.

Helping to oversee the process is a UCAR executive committee, which consists of Al Kellie, director of the Computational and Information Systems Laboratory; Katy Schmoll, UCAR vice president for finance and administration; and Larry Winter, NCAR deputy director. UCAR will submit a proposal for the center to NSF this winter, and funding may be secured later next year.

• by David Hosansky

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RAINEX: Bad weather is good news

NCAR researchers capture new data during Gulf storms

One thing that can be said about RAINEX, the recent field project in Florida to study hurricanes, is that the weather certainly cooperated. The project ran from mid-August through the end of September, encompassing two Category 5 hurricanes and one Category 1 hurricane. Although the storms had terrible consequences on the ground, from a scientific perspective they presented a dazzling natural laboratory to the researchers who flew aircraft inside them.

Wen-Chau Lee. (Photo by Carlye Calvin, UCAR.)

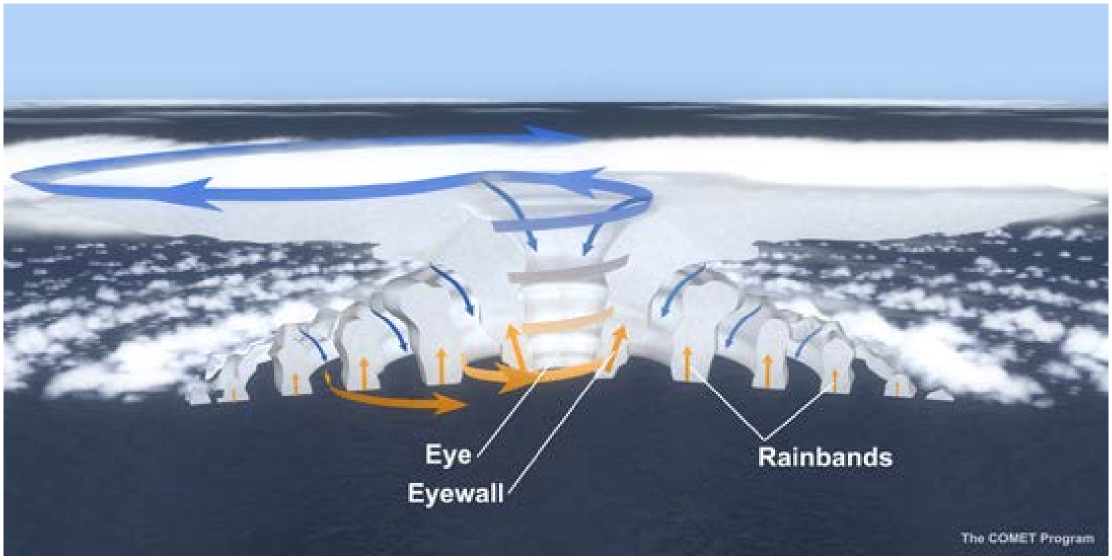
"It was just amazing," says EOL's Wen-Chau Lee, one of the project's co–principal investigators. "Observing two major hurricanes within a month and sampling different stages of these hurricanes from tropical depression through Category 5 was unexpected when we planned RAINEX."

The goal of RAINEX (the Hurricane Rainband and Intensity Change Experiment) was to better understand interactions between a hurricane's eyewall and its outer rainbands. These interactions can cause a storm to change dramatically in strength in mere hours. Hurricanes are composed of bands of thunderstorms that spiral around a calm center, or eye. As the bands get closer to the eye, they have progressively stronger winds. The innermost band that snakes tightly around the eye, called the eyewall, is home to the storm's heaviest rains, strongest winds, and tallest clouds. Bands of heavy showers that spiral outside the eyewall and closer to the edge of the storm, known as rainbands, are less intense but can still affect the overall strength of the storm.

Although researchers have studied the eyewall and rainbands separately, few experiments have ever looked at the two components together to determine how different interactions between them might change a storm's strength.

RAINEX broke ground by not only taking data on the eyewall and rainbands simultaneously, but also by witnessing a process called eyewall replacement that has puzzled scientists for years. Eyewall replacement occurs when a hurricane's eyewall contracts to a smaller size. The outer rainbands form a second eyewall that eventually squeezes out the original one. The storm weakens during this process, which lasts about a day, but it can be even stronger after the replacement is complete.

Wen-Chau and colleagues aboard a Navy P-3 aircraft observed Hurricane Rita's eyewall replacement as the plane crisscrossed the storm during RAINEX. "Everybody on board was so excited because we knew this data set had never been collected before," Wen-Chau says.



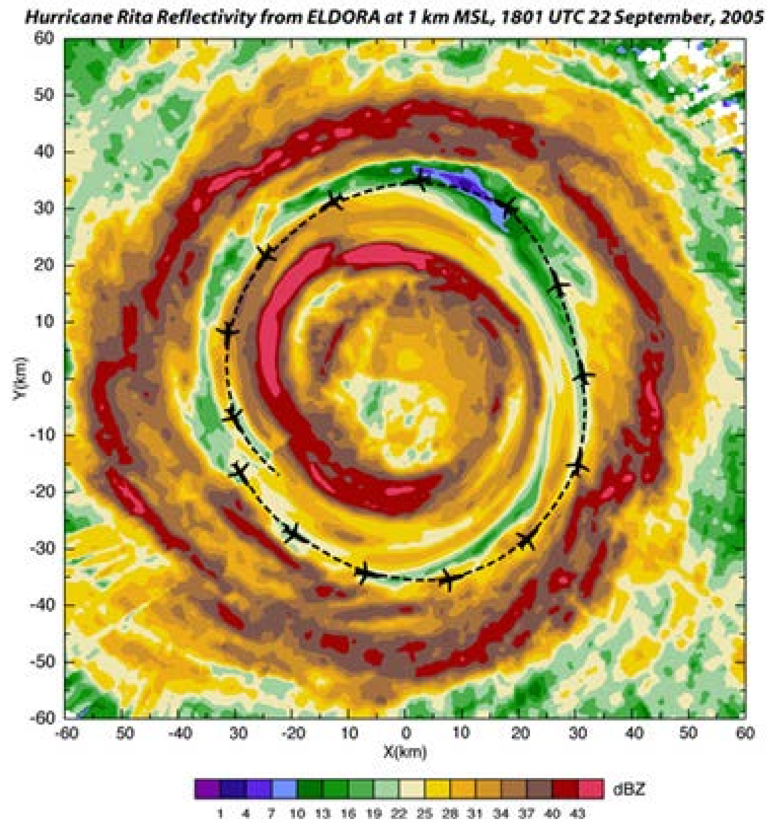
Understanding hurricanes. RAINEX, by collecting data on both the powerful eyewall and the rainbands of a hurricane, will help scientists learn more about these intense storms. This graphic, from COMET's Hurricane Strike! module, is an artist's depiction of how a hurricane would look if it were cut in half vertically and the interior exposed. The eye, eyewall, and rainbands are visible, and arrows show how warm, moist air flows into the eyewall from the ocean's surface and rises, spiraling counterclockwise upward to the top of the hurricane. Some of this air in the upper levels of the hurricane then sinks into the eye, drying and warming as it descends and creating the mild conditions in the eye at the surface. The rainbands, curved storm formations that form spiraling rings around a hurricane, can be between 3 and 30 miles (about 5 to 50 kilometers) wide and up to 300 miles (480 kilometers) long. Typically, the closer a rainband is to the center of the hurricane, the bigger and stronger it is. (Courtesy The COMET Program. View more COMET graphics of hurricanes.)

Flying into a tempest

About 20 staffers, mostly from EOL, participated in RAINEX as part of a larger team of researchers from NOAA, the U.S. Navy, the University of Miami, and the University of Washington. The team flew three P-3 aircraft simultaneously into hurricanes Katrina, Rita, and Ophelia before the storms made landfall. The aircraft—two from NOAA and a third from the Naval Research Laboratory that carried ELDORA, NCAR's airborne Doppler radar—flew into the outer rainbands and penetrated the eyewall on most flights.

The flights were surprisingly less turbulent than one might expect, according to the researchers. "On the Navy P-3, we actually didn't hit much turbulence because we flew between the rainbands. But in very intense storms, if you do make a wrong turn, you can get into trouble in the eyewall or where rainbands pinch together," says EOL's Michael Bell, a flight scientist who works with ELDORA.

Pavel Romashkin, a project manager in the EOL's Research Aviation Facility, credits Carl Newman, a NOAA pilot, for his skill in navigating the Navy P-3 through the storms. As he points out,



A view of Rita. This high-resolution radar image, taken by ELDORA inside Hurricane Rita on September 22, shows the process of eyewall replacement. The Navy P-3 aircraft (dashed line indicates track) flew through the "moat" between the deep convection of the primary and secondary eyewalls. Darker colors in this reflectivity image indicate heavier rainfall. (Courtesy Michael Bell and Wen-Chau Lee.)

pilots are trained to fly away from, not into, severe weather. "Carl's experience allowed him to work closely with us, understand radar data from ELDORA and the belly radar, and guide the airplane safely to maximize scientific output without risking too much," Pavel says. "He deserves a lot of credit for the success of RAINEX."

The aircraft were equipped as airborne weather labs in which crews used radar, dropsondes, and other instruments to record wind speed and direction, temperature, humidity, atmospheric pressure, and other conditions. With a 1,150-foot (350-meter) resolution, ELDORA produced the crispest picture of rainbands to date, including images of Hurricane Rita's double eyewall structure during the storm's replacement process on September 22.

"The high resolution of ELDORA is going to reveal new secrets of the hurricane," Michael says. "This is the first time we've flown three airborne Doppler radars into a hurricane, especially one with ELDORA's resolution. That is itself one of the major parts of RAINEX that is going to shine because we got so many different looks at the storm."

Eric Loew, EOL's project engineer for ELDORA, says that for him the biggest challenge during RAINEX was to keep the radar running reliably. Built in the early 1990s, ELDORA has reached the point where its signal processor and receiver need an upgrade. "The radar met all the objectives and the scientists collected a data set they're very happy with," he says. "But I would like to see 100% reliability so we don't miss any data, regardless of whether it happens at critical collection moments or not."

The radar is especially important because it offers investigators a tool for examining atmospheric conditions in a way that isn't possible with ground-based radar systems. "You don't have to wait for the storms to come to you because you're going out to them," Eric says.

Keeping everyone on the same page

Another area where RAINEX broke ground was in field project logistics with its sophisticated communications system. Radar data from the two NOAA P-3 aircraft were transmitted via satellite in real time to the RAINEX ground operations center at the National Hurricane Center in Miami. In a matter of minutes, the same data were then transmitted up to the Navy P-3. The Navy aircraft, unlike the NOAA planes, lacked a belly-mounted Doppler radar for navigation to help steer its crew to the most important parts of the storm.

"The whole package worked especially well," says Chris Burghart, a software engineer in EOL who generated the images that were sent to the Navy P-3. "It was recognized beforehand that getting this sort of information up to the Navy P-3 was an important piece."

Now that the field campaign is over, the next step for the RAINEX team is to run quality control tests on the data, a process that takes about three months. After that, scientists at NCAR and in the greater atmospheric sciences community can start analyzing results. Most of what they currently know about the interactions between the eyewall and outer rainbands comes from computer models that may not be completely accurate.

When data from RAINEX become available, scientists will incorporate them into models to determine whether a storm's circulation speeds up or slows down as rainbands wrap around it. In doing so, they'll get a better understanding of hurricane intensity that will eventually improve storm models and forecasts.

• by Nicole Gordon

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For more about RAINEX

Winds from Hurricane Rita damaged structures along much of the Texas and Louisiana coasts, including this gas station in Port Arthur, Texas. (Photo by Bob McMillan, FEMA.)

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UCAR policy on classified research

As NCAR conducts an increasing amount of research that touches on national security issues, the UCAR Board of Trustees is drafting a formal policy to affirm that the organization does not engage directly in classified research. However, the policy would allow staffers to do classified work with outside organizations on a voluntary basis.

NCAR for many years has worked on national security and public safety issues, such as generating weather forecasts for the Department of Defense. Since the September 11 terrorist attacks, this type of research has become more prominent. RAL scientists, for example, are creating models of the potential dispersal of airborne toxins, which could help safeguard a high-profile site such as the Pentagon in case of a terrorist attack. (For more about this type of RAL research, see the May 2004 issue of *Staff Notes Monthly*.)

Although this research is unclassified, RAL may be asked by the Department of Homeland Security or the Department of Defense to extend it by producing actual scenarios of potential terrorist attacks on U.S. targets. This would involve inputting classified data to its computer models. Although such research would be of value to society and to the scientific community, the organization would face such risks as potential breaches of security, the inability of some NCAR scientists to publish their research results, and possible changes to the organization's open culture.

Accordingly, the draft policy states that classified work cannot be conducted at UCAR or NSF-owned or leased facilities, nor can it be carried out under UCAR auspices. UCAR could participate in a project that required classification of a part of the research, but the classified portion would have to be conducted in partnership with a third party, such as a university, nonprofit organization, private company, or federal laboratory.

Under the draft policy, a staffer engaging in classified research would need formal written approval by the appropriate lab director, entity director (NCAR, UOP, or EO), and the UCAR president. Appropriate training by the sponsoring agency or a third party would be required for all UCAR employees undertaking classified research. Restrictions on publication and scholarly communication would be minimized.

The Board of Trustees will consider the draft policy at its February 8 meeting.

"NCAR has for many years done excellent research for the benefit of the community and the nation that borders on classified research," explains UCAR President Rick Anthes. "There are both opportunities and risks associated with doing classified research, and it is important to clarify the issues and develop a policy that will guide us in the future."

• *by David Hosansky*

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Random Profile: Meg McClellan

Every other month, Staff Notes Monthly *spotlights a stochastically chosen staff member. This month we profile Meg McClellan, UCAR's general counsel.*

Meg McClellan. (Photo by Carlye Calvin, UCAR.)

Immersed in intellectual property: On the road to scientific knowledge, it helps to have a good lawyer navigating the legal potholes. Meg handles an array of legal issues for the organization. Intellectual property and licensing are a major part of her job, but she also deals with risk management, compliance with regulations, confidentiality agreements, classified research, policies and procedures, contracts, insurance, ethics, and more.

Meg has been at UCAR for about five years. "I've never been bored here since there are always interesting projects and opportunities," she says.

In the general counsel's office, she works closely with Sarah Pritchard, associate general counsel; Kelly Coleman, paralegal; and Belinda Goody, administrative assistant.

Moving technology along: Meg worked in the high-tech industry before law school and then handled intellectual property litigation at a private practice in Denver for 10 years. "I love intellectual property and working with scientists and engineers. It's fun to help get technology out," she says.

An example of one of her assignments is the Hotplate Snow and Precipitation Gauge, known simply as Hotplate. Invented by RAL's Roy Rasmussen and a colleague at the

Desert Research Institute, Hotplate is a sensor that consists of two isolated plates warmed by electrical heaters. Small enough to be placed along runways and highways, it calculates real-time rates of snow and rain.

Meg helped shepherd the sensor through its patenting and manufacturing stages. "The Hotplate is being installed at the first airport this year and it should be exciting to see it in an operational system," she says.

Raising the next generation of soccer players: Meg and her husband, Jim, have two children—Kelsey, 11, and Andrew, 8—who are avid soccer players. The family lives in Louisville. In addition to soccer, they ski and love to travel. Last summer they spent 10 days in Alaska.

Meg is on the board of directors for Impact on Education (formerly the Foundation for Boulder Valley Schools), a private organization that raises support for public education in three focus areas: excellent teachers, at-risk students, and science and technology.

A rare species called "Boulder native": Meg was born here in Boulder, although her family then moved to Illinois, where she spent most of her childhood. She grew up surrounded by talented musicians. "I'm the only non-musician in a family of musicians. They all thought I was crazy when I went to law school," she says.

Although she doesn't play music, she does love to listen to it. "I have very eclectic musical tastes," she says. Indeed, her iPod contains everything from jazz to opera. With a passion for music and arts, she heads to Denver to drop in on small clubs, catch Broadway shows, and see the opera.

Meg prefers to shut her tunes off and listen to the world around her when she's exercising outdoors, which is frequently. She recently ran the Imogene Pass Run, a 17.1-mile trail race in the San Juan mountains that connects Ouray and Telluride by way of 13,120-foot Imogene Pass. "Training for the run really opened my eyes to trail running," she says.

An occasional triathlete, she also bikes, swims, and does yoga. "Something a lot of people here probably wouldn't know is that I trained to be a ballerina as a teenager," she adds.

• by Nicole Gordon

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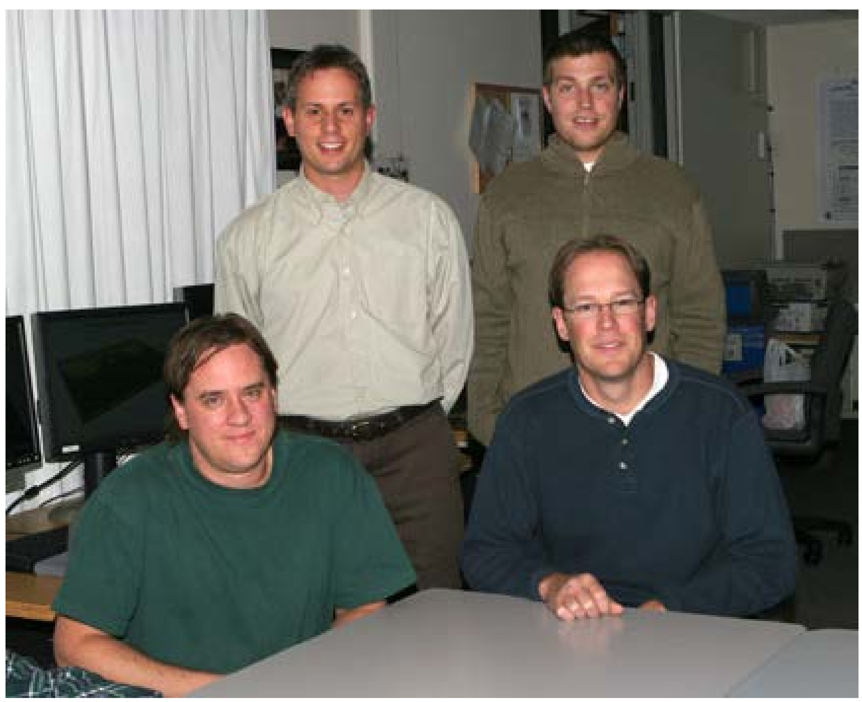
COMET project wins recognition

A Web development team from COMET has won an honorable mention in a contest sponsored by *Science* magazine and the National Science Foundation. The team's entry, *Rip Currents: Nearshore Fundamentals*, is an online, animated guide to the science of rip currents. (For more about the module, see the March 2005 issue of *Staff Notes Monthly*.)

COMET competed in the noninteractive multimedia category of the Science and Engineering Visualization Challenge. The contest celebrates the tradition of illustrating science with images, drawings, and animated presentations.



The winning COMET team (clockwise from bottom left): Steve Deyo (graphic animator), Kevin Fuell (meteorologist and project lead), Seth Lamos (audio technician), and Dan Riter (Web developer).
Not pictured: Katherine Olson, the instructional designer. (Photo by Carlye Calvin, UCAR.)

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Questions and suggestions from the staff to management may be submitted in confidence to the Delphi Coordinators (Teresa Rivas, left, and Nancy Wade). They should be submitted in written form, preferably via interoffice mail in a sealed envelope marked confidential. They must be signed. Detailed procedures for submitting questions are given in the UCAR Policies and Procedures Manual, section 4-1-2, and on the Delphi Web site. Staff Notes Monthly *publishes questions and answers of general interest to staff, and the Delphi Web site has a log of all questions submitted since 1995.*

Delphi Coordinators Teresa Rivas (left) and Nancy Wade.

Delphi Questions: HR policies, office temperatures, driving through a stop sign.

Delphi Question #543 (received October 18): I tried to find a few items among the Human Resources policies and procedures and was unable to find them, so I have a few questions.

I think it would be good to add "Delphi Questions" to the Human Resources Alphabetical Index. Could we please do that?

Response (all responses October 26): The Delphi Service has a nice Web site and we will add a link from the HR page. The Delphi Service is provided under a UCAR Communications policy, so it has not been listed on the HR home page. I noticed that every other issue of *Staff Notes Monthly* this past year had a section on Delphi questions, so I think the Delphi Service gets a lot of publicity and is well known by most employees.
(Editor's note: The HR index can be found here.)

Question continued: There are some employees who dress as if our organization is more like a bar, club, or gym than a professional office. As representatives of our organization I feel appropriate dress should be expected. How does a new employee know what UCAR/NCAR's policies are for a dress code? Or is any kind of dress okay with Human Resources?

Response: UCAR does not have a formal dress code. As an academic institution with many folks from diverse backgrounds, it's hard to set a common standard that fits with everyone's individual taste. There are some departments that have a dress code of sorts; for safety, health, security, or customer service reasons some departments have requirements that employees must follow. In those areas, the department managers inform their employees of the requirements.

There may be rare instances when an employee's attire violates a UCAR policy and HR would become engaged, but otherwise HR does not get involved.

Question continued: Working at our desks for eight hours a day does not lend much time for making the kinds of appointments that are required in life, such as doctors appointments. It seems in our division that a personal call here and there to make arrangements has been considered acceptable. How does a new employee find out about the organization's policy on personal phone calls?

Response: Limited personal use is allowed under UCAR's Access to and Use of Computer and Information Systems Policy (1-1-15). Phones are considered part of UCAR's information systems along with computers. This policy says: "Employees may use some UCAR computer and information systems, such as telephones, computers, Internet access, and facsimile and copy machines, for limited and reasonable amounts of personal use. Employees shall reimburse UCAR for any personal use of UCAR telephones and facsimile machines for long-distance communications. In no event does personal use include personal business activities or any activity that would violate any UCAR policy."

You can ask your supervisor, division or program administrator, or Human Resources if you have questions about work issues.

Thank you for your time and advice on these issues.

—Bob Roesch, director
Human Resources

Delphi Question #544 (received September 25): From conversations with my colleagues at the Mesa Lab (mostly in the A-Tower), I understand that many feel cold in their offices during the summer months. A few may feel comfortable but no one whom I have talked to feels warm. Of those who feel cold, none are able to adjust the temperatures in their offices sufficiently with their thermostats. Some open windows to avoid shivering (an early symptom of hypothermia). Most find that they need to wear more clothes at work in summer than in winter.

Interestingly, I have heard such complaints from people in offices all over the U.S. But let's focus on NCAR. Why do we waste so much energy only to feel uncomfortable all summer long? By the way, I've never heard a complaint in winter.

Thank you in advance for your attention.

Response (October 27): The heating, venting, and air conditioning (HVAC) systems at the Mesa Lab are currently being controlled in two different ways until the Mesa Lab Utilities Refurbishment project is completed in 2006.

Modifications to the HVAC system have been completed in the A-Tower and the public portions of the low building. This includes the main lobby, cafeteria, library, and the conference rooms on the first and second floors. In occupied areas, cool and warm air can be provided. The temperature control system varies the amount of air supplied to an occupied space as needed to satisfy the thermostat setting. With the exception of a few areas where two to three offices share a common supply, most occupied areas have a dedicated thermostat.

The building automation system (BAS) has the capability of controlling temperatures in these dedicated areas to within a few degrees. Several factors can impact the ability of the BAS to accurately control temperature in a given space. These include furniture placement, proximity to outside walls and windows, and the occupant's use of the room. Minor modification to equipment and programming can correct the majority of problems. The design of the system and controls will allow Physical Plant Services to fine-tune areas of the A-Tower to meet an occupant's needs.

It is the mission of PPS to provide facilities that meet the expectations of the staff. In many cases we are not aware that a problem exists until it is brought to our attention by staffers. Most HVAC control systems are designed and set to industry standards as a baseline for their operation. Customer input, such as you have provided, will help us identify problem areas and enable us to fine-tune the BAS to a level that provides an acceptable comfort level while maximizing energy efficiency.

A call to the maintenance request line at ext. 1120 is all that is needed to start the correction process.

Thanks for your question and input.

—John Pereira, director
Physical Plant Services

Delphi Question #545 (October 21): Is there anything that can be done about the disregard for the 3-way stop at the entrance to the FL campus? As a witness to, and near victim of, some UCAR staffers blowing through the stop sign in their cars, I know there is an accident waiting to happen. The parking shortage also contributes to the safety aspect as the Wild Oats folks park so near the intersection. What can be done about the safety of this intersection that is used by bicyclists and pedestrians alike?

Response (October 31): Thank you very much for letting us know about this situation. In the future please report these drivers to me as soon as possible (you can call me at ext. 8625 or e-mail me). The Health, Environment, and Safety Services (HESS) office takes prompt action when receiving these notifications. Responses include a conversation with the "offender" when that person can be identified and "ticketing" the described vehicle with a notice that inappropriate driving behavior was observed and asking that the behavior be discontinued.

The Boulder Police Department manages street parking issues. Parking violations can be reported directly to its communications line at 303-441-3333. If preferred, HESS will also pass along complaints about illegal parking from staffers to the police.

Additionally, HESS and the Physical Plant Services maintenance office have reviewed the intersection and found that it needs to be re-striped. PPS expects to have the intersection re-striped within the next couple of weeks.

—Milenda Powers, manager
Health, Environment, and Safety Services

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The 2005 Outstanding Accomplishment Awards

The December 16 all-staff party at CG1, sponsored by the Employee Activities Committee and TIAA-CREF, continued the tradition of ringing in the holidays while recognizing the outstanding work of employees.

This year's awards featured 14 nominations, comprising a record 127 individuals, including many university collaborators. UCAR president Rick Anthes emphasized that all the nominees were to be congratulated on their achievements. He praised their work as representing "a tremendous dedication by our excellent staff to the goals and missions of our institution."

Rick also thanked the divisions and programs for nominating staffers engaged in outstanding work, as well as the jurors for their difficult task of choosing among stellar nominees.

Before Rick announced the winners, staffers entertained the crowd with a rousing open jam session. The UCARolers and special guest Yoda also touched off the day's entertainment with original interpretations of Christmas carols, such as "Coming to Town Santa Claus Is." After the winners were announced, staffers enjoyed an excellent buffet provided by Event Services and danced to the music of Hot Swing and Gypsy Jazz of Rue.

Following are the nominees and winners in the five categories in which awards were given. There were no awards this year in the Distinguished Achievement category.

Education and Outreach

The winners were SCD's Dianne Bernier, John Clyne, Susan Cross, Joey Mendoza, Don Middleton, Darin Oman, and Tim Scheitlin of the Visualization Lab Outreach Program.

For the past 10 years, members of the SCD Visualization and Enabling Technologies Section (VETS) have provided hundreds of unique educational presentations and outreach materials in a creative, three-dimensional display that engages and educates audiences of all ages and levels of scientific understanding. The presentations visually demonstrate wide-ranging geoscience concepts and highlight some of the most pressing environmental issues facing society.

Education and Outreach Award winners (left to right): Darin Oman, Don Middleton, Joey Mendoza, Susan Cross, Tim Scheitlin, Dianne Bernier and John Clyne. (Photo by Bob Henson, UCAR.)

Also nominated:

Dwight Owens, Dolores Kiessling, and Steve Deyo (all in COMET), and Tom Holzer (HAO) for developing *Physics of the Aurora: Earth Systems*, a multimedia, Web-based module that explains how Earth's magnetic field and upper atmosphere capture the solar wind to light up the polar sky with the aurora. The module engages learners with sections on the history, lore, and science of the aurora, the magnetosphere, the thermosphere-ionosphere, basic electromagnetism, and upper-atmosphere physics.

Administrative Achievement

The winners, and sole nominees, were Geoff Cheeseman (EOL) and Pat Munson (F&A) for professional excellence and innovativeness demonstrated during the acquisition of the HIAPER aircraft.

As the single largest acquisition in NCAR's history, HIAPER (High-performance Instrumented Airborne Platform for Environmental Research) presented NCAR and UCAR with major challenges. Geoff and Pat provided a solid core of fiscal and contractual support from 2002 to 2005, tackling such issues as the administration of a highly complex subcontract with Gulfstream Aerospace Corp. and the development of a reporting package to assess the cost and schedule performance of the program.

Administrative Achievement Award winners Geoff Cheeseman,left, and Pat Munson. (Photo by Bob Henson, UCAR.)

Scientific and Technical Advancement

The winners were David Brown, Fred Clare, Richard Grubin, Mary Haley, and David Kennison (all in SCD), Sylvia Murphy (ACD), and Dennis Shea (CGD) for the development of the NCAR Command Language.

The NCL is a data analysis and visualization tool that enables scientists to easily and effectively access, analyze, and visualize geoscientific data on platforms ranging from personal systems to supercomputers. Although NCL was designed primarily for climate research, it has been embraced by the international Earth system sciences community, spanning research and education

Scientific and Technical Advancement Award winners (left to right): Dave Brown, Dave Kennison, Mary Haley, Fred Clare, and Dennis Shea. (Photo by Bob Henson, UCAR.) (Not pictured: Richard Grubin and Sylvia Murphy.)

Also nominated:

• ACD's John Gille, David Edwards, Merritt Deeter, Dan Ziskin, Barb Tunison, Dan Packman, Gene Francis, Juying Warner, Jean-François Lamarque, Valery Yudin, Boris Khattatov, Louisa Emmons, Shu-peng "Ben" Ho, Gabriele Pfister, Jean-Luc Attié, Debbie Mao, Jarmei Chen, Cheryl Craig, and Charles Cavanaugh for the deployment of the Measurement of Pollution in the Troposphere instrument (MOPITT) on NASA's Terra satellite in 1999, which heralded the dawning of a new age of tropospheric remote sensing. With the acquisition of over five years of validated retrieval data, the joint NCAR and University of Toronto teams have fulfilled both the scientific and technical goals promised by MOPITT.

• Krista Laursen, Dick Friesen, Pat Munson, Geoff Cheeseman, Jennifer Oxelson, and Carla Hassler (all in the former HIAPER Project Office) and Mike Spowart, Gordon Maclean, Grant Gray, John Wasinger, Chris Webster, Gary Granger, Charlie Martin, Chris Burghart, Susan Stringer, Kurt Zrubek, John Cowan, Bill Irwin, George Nicoll, Allen Schanot, David Rogers, Jorgen Jensen, Pavel Romashkin, Jack Fox, Steve Rauenbuehler, Mark Lord, Henry Boynton, Ed Ringleman, Bob Olson, Bob Maxson, Brent Kidd, Bob Beasley, Kip Eagan, and Gerry Albright (all in EOL) for the acquisition, modification, and initial instrumentation of HIAPER. The team designed and installed the basic infrastructure needed to support research projects, and its efforts have produced an aircraft that should serve the atmospheric sciences community for decades.

• MMM's Jordan Powers, Kevin Manning, Michael Duda, Dale Barker, Syed Rizvi, and Bill Kuo for the Antarctic Mesoscale Prediction System, an experimental numerical weather prediction system that supports the U.S. Antarctic Program and international science. AMPS has flexible, high-resolution, real-time capability, and it uses the Pennsylania State University/NCAR mesoscale model (MM5) and the Weather Research and Forecasting model (WRF).

Mentoring

The winner, and sole nominee, was Chris Snyder (MMM).

Chris has dedicated significant time and effort for years to mentoring post-doctoral researchers, early career scientists, and graduate students. He has patiently introduced junior scientists to new areas; provided a clear, positive example for how to frame and approach research questions; and built mentees' capacity to address their own research interests. Through his mentoring, Chris has had a direct, long-term, positive impact on a number of individuals' careers, and on the meteorology community in general.

Mentoring Award winner Chris Snyder. (Photo by Bob Henson, UCAR.)

Outstanding Publication

The winners were Chris Davis (MMM) and his co-author, Lance Bosart of the University of Albany, State University of New York, for the article "Baroclinically Induced Tropical Cyclogenesis" (published in 2003 in *Monthly Weather Review*, **131**, 2730–2747).

This paper, which examines the transition of extratropical disturbances into Atlantic tropical cyclones, combines real-data analysis with insightful and original scientific thinking to significantly improve our understanding of the development of tropical cyclones from baroclinic influences. The paper offers a plausible mechanism to explain some recent anomalous cases of tropical cyclone development (such as Catarina, which developed off Brazil in 2004). It provides dynamical mechanisms linking a variety of higher-latitude cyclones and tropical cyclones, painting the picture of a continuum of cyclogenesis as opposed to the traditional view of a tropical extratropical dichotomy.

Outstanding Publication Award winner Chris Davis. (Photo by Bob Henson, UCAR.)

Also nominated:

• Grant Branstator (CGD) for the article "Circumglobal Teleconnections, the Jet Stream Waveguide, and the North Atlantic Oscillation" (published in 2002 in the *Journal of Climate*, **15**, 1893–1910).

By documenting the nature of extratropical teleconnections in the Northern Hemisphere, this paper has made a landmark contribution to the theoretical understanding of the nature of climate variability in the hemisphere.

• Christopher Cantrell, Sherry Stephens, Roy Mauldin, Ed Kosciuch, Fred Eisele, Richard Shetter, Sam Hall, Frank Flocke, Andy Weinheimer, Alan Fried, and Eric Apel (all in ACD), and Gavin Edwards, Mark Zondlo, and Barry Lefer (all formerly in ACD) for the article "Peroxy Radical Behavior during the Transport and Chemical Evolution over the Pacific (TRACE-P) campaign as measured aboard the NASA P-3B aircraft" (published in 2003 in the *Journal of Geophysical Research*, **108** (D20), 8797, doi: 10.1029/2003JD003674). The nomination also includes co-authors Yutaka Kondo (University of Tokyo); Don Blake, Nicola Blake, and Isobel Simpson (all at the University of California, Irvine); Alan Bandy and Don Thornton (both at Drexel University); Brian Heikes (University of Rhode Island); Hanwant Singh (NASA Ames Research Center); William Brune (The Pennsylvania State University); Hartwig Harder and Monica Martinez (both at the Max Planck Institute for Chemistry); Daniel Jacob (Harvard University); Melody Avery, John Barrick, Glen Sachse, Jennifer Olson, and James Crawford (all at the NASA Langley Research Center); and Antony Clarke (University of Hawaii at Manoa).

This paper, which makes a valuable contribution to atmospheric chemistry research and the study of air pollution, presents an overall assessment of tropospheric photochemistry during the TRACE-P field campaign, suggesting valuable tools (such as the use of simple equations) that are applicable to other data sets.

• Janice Coen (RAL/MMM) for the article "Infrared Imagery of Crown-Fire Dynamics during FROSTFIRE" (published in 2004 in *Journal of Applied Meteorology*, **43**, 1241–1259). The nomination also includes co-authors Shankar Mahalingam at the University of California, Riverside; and John Daily, CU–Boulder.

This paper represents an important contribution to our knowledge of wildfire dynamics and the coupling of fires with the surrounding atmosphere, and it presents fundamentally new observations that will change the focus and direction of future theoretical and modeling studies.

• Arturo López-Ariste, Roberto Casini, Bruce Lites, and Steve Tomczyk for their work on three papers: "Magnetic Fields in Prominences: Inversion Techniques for Spectropolarimetric Data of the He I D_3 Line" (published in 2002 in *The Astrophysical Journal*, **575**, 529–541), "Improved Estimate of the Magnetic Field in a Prominence" (published in 2003 in *The Astrophysical Journal*, **582**, L51–L54), and "Magnetic Maps of Prominences From Full Stokes Analysis of the He I D_3 Line" (published in *The Astrophysical Journal*, **598**, L67–L70).

These papers constitute an important advance in efforts to understand the magnetic structure and environment of prominences in the solar corona, providing the most complete picture yet obtained of a prominence's magnetic fields.

• Junhong Wang, Harold Cole, and Kathryn Beierle (all in EOL), and David Carlson and Erik Miller (both formerly in EOL), for the article "Corrections of Humidity Measurement Errors from the Vaisala RS80 Radiosonde—Application to TOGA COARE Data" (published in 2002 in *Journal of Atmospheric and Oceanic Technology*, **19**, 981–1002). The nomination also includes co-authors Ari Paukkhunen and Tapani Laine of Vaisala.

This paper, focusing on the diagnosis and correction of humidity errors in operational radiosonde data sets, has had a profound impact on operational weather prediction and efforts to understand climate change, and it has improved the accuracy of both the global observing system and the climatic record.

• by David Hosansky

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For more about the award categories

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