

## SOARS alumnus researches hurricanes during record season

2005 was a record year for tropical storm activity in the Atlantic, with 27 named storms, including 13 that developed into hurricanes. As these storms were causing flooding and damage from the Caribbean to the Gulf coast, SOARS alumnus Jonathan Vigh was working to better understand hurricane structure and formation as part of his PhD research at Colorado State University.

Jonathan is exploring how the eye of the hurricane is formed, a process that continues to puzzle atmospheric scientists. He explains that the eye is often observed to form at about the same time a storm reaches hurricane intensity, but the exact mechanisms are still not fully understood. Working with Wayne Schubert, his PhD advisor, Jonathan uses output from the Weather Forecasting and Research (WRF) model to examine the stages of hurricane development. Particularly in the context of last year's active season, it's a research problem with real-world implications: "I feel that science should produce practical and direct benefits for society and that's why I really like my area of hurricane research. An

improved understanding of eye formation should lead to better predictions of storm intensity and structure, resulting in more accurate forecasts of rainfall and storm surge."

Jonathan's experience at UCAR began with his first SOARS summer in 1999, prior to his senior year as a meteorology major at Penn State. With science mentor Joel Norris, Jonathan assessed cloud parameterizations for the Community Climate Model (CCM3). He credits that first summer's project with giving him good programming experience as well as really wetting his feet in research.

Upon his return in 2000, Jonathan had the opportunity to work with hurricane researcher Kevin Petty. For this project, he explored a new technique incorporating a fuzzy logic and adaptive weighting approach to predict hurricane intensity. "It was a fun project," he says. "It



Jonathan Vigh (right) and science research mentor Kevin Petty discuss ways to improve predictions of hurricane intensity.

turned out that the new method wasn't any better than linear regression. Sometimes in science, you can spend a lot of time and energy and just end up verifying the 'null hypothesis.' But even when things don't work out as you had hoped, you can always learn something."

An alumnus of SOARS since completing his master's degree in 2004, Jonathan currently serves on the program's steering committee and remains dedicated to promoting the lessons and ideals of the program. He observes, "institutions do a good job of keeping their focus on education

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## COMING EVENTS...

2006 SOARS Summer Program  
 June 1-August 11, 2006

SOARS Summer Colloquium  
 August 7-9, 2006

## IT'S A FACT

By the conclusion of the 2006 summer program, the number of protégés who have participated in SOARS will exceed 100.

Visit the SOARS Web site at:  
[www.soars.ucar.edu](http://www.soars.ucar.edu)

## PROTÉGÉ AND ALUMNI UPDATES

**Shanna Pitter** received a master's degree in atmospheric science from Colorado State University in December. She now works for Itri Corporation in Springfield, Virginia, subcontracting to Lockheed Martin as a meteorological/oceanographic satellite data and information specialist.

**Erik Noble** completed a master's degree in environmental studies at the University of Colorado at Boulder in December.

**Olusegun Goyea** started graduate school in mechanical engineering at the City College of New York in spring 2006. He received a Louis Stokes Alliance for Minority Participation (LSAMP) graduate research assistantship

and is working in the Center for Mesoscale and Microscopic Simulation.

**Michelle S. Dunn** was promoted to a management position at Advance Direct, a printing and direct mail company in Boulder, Colorado. In her new position as Data Processing Manager, she leads the data processing department for direct mail.

*(continued on page 6)*

## SOARS welcomes new staff

*This fall, SOARS welcomed two new staff members who bring extensive experience to the program. Rebecca Haacker-Santos started as the new SOARS program administrator in September and Annaliese Calhoun began her program assistant position in November.*

### REBECCA HAACKER-SANTOS



Rebecca grew up in Germany and worked several years in Guatemala before coming to Boulder in 2001. Prior to joining SOARS, she worked at NCAR's Institute for the Study of Society and Environment (ISSE) and has also taught college courses in Spanish and geography. Rebecca has a master's degree in geography from the University of Hamburg in Germany and is passionate about languages: in addition to being fluent in German and Spanish, she speaks Maya-Q'eqchi', an indigenous

language she learned while working in Guatemala.

Rebecca's personal commitment to diversity and education aligns well with the goals of SOARS. "Working in SOARS allows me to have an impact supporting students from all backgrounds who will bring diverse and innovative ideas into the sciences. I think that's an excellent cause," she says. In SOARS she manages the program budget, coordinates internal and external communication for the program, and leads the organizational effort of the 10-week summer program.

### ANNALIESE CALHOUN



Annaliese moved from Boston to Colorado's Front Range in August 2005, and brings to SOARS a background in mentoring and leadership development. She ran a conflict

resolution program at a diverse Boston high school and has a degree in international relations from Brown University. During her college years, she studied abroad in Australia and Spain.

She was attracted to SOARS by the extensive opportunities the program offers its protégés. "I really like the holistic approach SOARS implements," she explains. "By providing such strong support through mentoring and taking care of things like funding and housing, I think the program really gives the protégés the best possible experience they could have." Annaliese looks forward to bringing new ideas about leadership training to the program and is excited about working with this summer's protégés. She coordinates travel, manages summer logistics, and takes care of other organizational aspects of the SOARS program. **S**

## AMS recognizes Tom Windham's efforts to promote diversity

Former SOARS director Thomas Windham recently received the 2006 Charles E. Anderson award from the American Meteorological Society (AMS). The award, honoring Dr. Anderson as the first African-American to earn a PhD in the atmospheric sciences, is given annually to an individual who has made outstanding contributions to promoting diversity in the atmospheric sciences and broader communities. Tom's selection for the award recognizes his vision and determination to promote diversity among students through mentoring, research, and outreach.

Tom says the award is first and foremost evidence of the success of the SOARS program, which he directed for eight years. He explains, "while SOARS has received national recognition in the past, particularly with the 2001 Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring, the Anderson award comes from the atmospheric

research community itself: it's a recognition from within the very community the program serves."

The UCAR community still marvels at Tom's contributions to SOARS. UCAR President Rick Anthes speaks very highly of Tom's dedication. "He contributed in so many intellectual and personal ways. His love of young people and his love of SOARS combined with his background and training made him an extremely successful leader, and at the same time taught all of us around him about how to be more successful teachers and mentors." SOARS director Raj Pandya concurs, "The more I learn about the program, and I am still learning after two years, the more I appreciate how well designed the program is—that speaks directly to Tom's role." In addition, the recently completed program evaluation found that 80 percent of the mentors, managers, SOARS staff, and steering committee offered unsolicited praise for Tom as a strong and capable leader.

One of things Tom brought to SOARS and continues to carry with him is the notion of eligibility as a factor for motivation. He explains, "For the SOARS protégés, it's important that they see themselves as eligible for successful careers in the atmospheric and related research communities. Without this recognition and acceptance of their eligibility to be successful in these areas, the level of motivation would be depressed."

Tom continues to work to broaden participation in the sciences through his current position in the Office of the Director at the National Science Foundation (NSF). Both his commitment to building a solid scientific workforce for the future and his connections to many of the SOARS protégés remain strong. In late January he traveled to the AMS Annual Meeting in Atlanta, Georgia, where he officially received the award and also gave a talk at the 5th Annual AMS Student Conference and Career Fair. **S**

## SOARS external evaluation reveals elements of program's success

A recently completed external evaluation of SOARS examines the factors contributing to the program's effectiveness and affirms the overall success of the program. The final 250-page report summarizes the perspectives of protégés, mentors, and the administration, and is available on the SOARS web site (<http://www.soars.ucar.edu>). Among the study's findings are details concerning the breadth of gains reported by the protégés. These gains include not only the program's explicit goals of enhanced experience in

research and improvements in writing skills, but also increases in social confidence, the ability to think like a scientist, and a "multiplier effect," in which the protégés become mentors or leaders in their home communities and pass along the benefits they receive from SOARS.

One major finding is the extent to which SOARS enables protégés to envision themselves in scientific careers, reports Liane Pedersen-Gallegos of the University

of Colorado's Ethnography and Evaluation Research group, who served as the study's principal investigator. "We were delighted to find that the protégés' ambitions were greatly expanded as they learned about options they hadn't known of before and developed the confidence to dream 'higher and more broadly' than they knew dreams could go before," she says. "The summer experience was very empowering for protégés on many levels, not all of which SOARS anticipated at the beginning." **S**

# Protégés complete 2005 conference season

During fall 2005 and winter 2006, 17 protégés delivered a total of 26 presentations at national conferences. Shanna-Shaye Forbes, a third-year protégé, received a first-place award in the computer science division for her poster at the Society for Advancement of Chicanos and Native Americans in Science (SACNAS) conference and reflects on her experience in "In her words" on page 4.



SOARS director Raj Pandya and protégé Erick Adame celebrate a successful poster presentation at the American Meteorological Society Student Conference.

## 2005 Society for Advancement of Chicanos and Native Americans in Science (SACNAS) National Conference

September 2005, Denver, Colorado

### ■ POSTER PRESENTATIONS

**Alisha Fernandez**

*Enhancing access to climate model metadata via a web-accessible database*

**Shanna-Shaye Forbes**

*Creating a software tool to re-use existing decoders (First-place award)*

**Stephen Hernandez**

*Characterizing multipath sources at seismic frequencies: A case study for the Parkfield GPS array*

**Marco Orozco**

*Examining the processes in a thunderstorm that affect soluble, reactive species (chemical reservoir species)*

**Luna Rodriguez**

*Lower tropospheric analysis of the daily cycle of the wind for the East Coast of the Gulf of California during NAME 2004*

### ■ GRADUATE ORAL PRESENTATION

**Casey Thornbrugh**

*Assessing sand dune mobility from 1980 through 2005 on the Moenkopi Plateau of the Navajo Nation*

## 2005 American Indian Science and Engineering Society (AISES) National Conference

November 2005, Charlotte, North Carolina

### ■ POSTER PRESENTATIONS

**Olusegun Goyea**

*Investigating airflow effects on the accuracy of cloud droplet measurements*

**Bret Harper**

*ENSO's effects on the wind energy production of South Dakota*

## American Geophysical Union Fall Meeting

December 2005, San Francisco, California

### ■ POSTER PRESENTATIONS

**Rebecca K. Y. Chan**

*Synoptic analysis of 2001-2005 significant snowfall events on Mt. Kilimanjaro*

**Anthony Didlake, Jr.**

*Using GPS radio occultation data in the study of tropical cyclogenesis*

**Bret Harper**

*ENSO's effects on the wind energy production of South Dakota*

**Nicole Ngo**

*Examining climate influences and economic impacts of harmful algal blooms in Massachusetts: 1993 and 2005*

**Nancy Rivera Rivera**

*Detection and preliminary assessment of source areas of the 15 December 2003 dust storm in the Chihuahuan Desert, southwestern North America*

## 5th Annual American Meteorological Society Student Conference

January 2006, Atlanta, Georgia

### ■ POSTER PRESENTATIONS

**Erick Adame**

*A global analysis of atmospheric refractivity anomalies using CHAMP data*

**Melissa Burt**

*Using CCSM3 to simulate climate changes caused by the 8.2ka meltwater pulse*

**Anthony Didlake, Jr.**

*Using GPS radio occultation data in the study of tropical cyclogenesis*

**Braxton Edwards**

*A flash flood risk assessment of the Colorado Front Range using GIS*

**Alisha Fernandez**

*Enhancing access to climate model metadata via a web-accessible database*

**Shanna-Shaye Forbes**

*Creating a software tool to re-use existing decoders*

**Nicole Ngo**

*Examining climate influences and economic impacts of harmful algal blooms in Massachusetts: 1993 and 2005*

**Julien Wang**

*Assessing the impact of climate factors on dengue outbreaks in Puerto Rico*

## 86th American Meteorological Society Annual Meeting

January 2006, Atlanta, Georgia

### ■ POSTER PRESENTATIONS

**Nancy Rivera Rivera**

*Characterization of dust storm sources in southwestern U. S. and northwestern Mexico using remote sensing imagery*

**Luna Rodriguez**

*Lower tropospheric analysis of the daily cycle of the wind for the East Coast of the Gulf of California during NAME 2004*

### ■ ORAL PRESENTATIONS

**Rebecca K. Y. Chan**

*Synoptic analysis of 2001-2005 significant snowfall events on Mt. Kilimanjaro*

**Erik Noble**

*U.S. flood damage: Future expectations based upon historical trends*

## American Association for the Advancement of Science Annual Meeting

February 2006, St. Louis, Missouri

### ■ POSTER PRESENTATION

**Anthony Didlake, Jr.**

*Using GPS radio occultation data in the study of tropical cyclogenesis*

## IN HER WORDS...

# You simply never know what benefits a conference will offer

Contributed by Shanna-Shaye Forbes

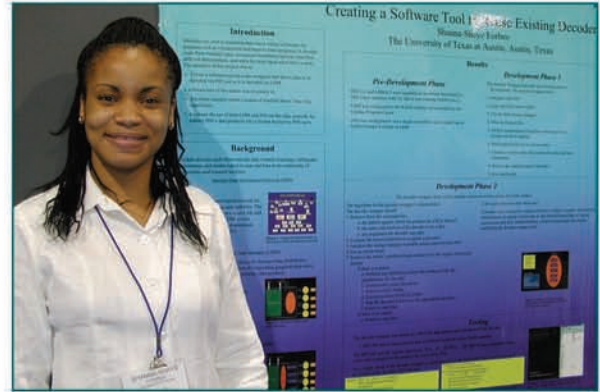
I have come to the conclusion—with input from my fellow protégés—that attending conferences and sharing your work with your colleagues is very important. Whether you are aware of it or not, you will present at conferences after you’ve obtained your graduate degree as presenting at conferences is one of the many ways experts share new developments in their fields.

With that said, when I sat down to prepare my poster for the Society for Advancement of Chicanos and Native Americans in Science (SACNAS) conference I had no idea what the poster would look like, and I honestly didn’t know exactly what to put on it. To get myself started I reread my final paper, looked over my final presentation, and asked my peer mentor for an old poster as an example. Later, I decided which images from my final presentation to use on my poster, and then figured out which parts of my project needed extra attention so that anyone with an interest could understand what I worked on over the summer.

I later sent the draft of my poster to my science and former writing mentors. I paid

very close attention to the suggestions and comments from each mentor on how to make the poster more comprehensive for the casual viewer. Many of the comments I received from my mentors served as guidelines for questions I was asked at the conference, and as a result I was able to answer questions without being excessively nervous.

Presenting at SACNAS was a really good experience. Not only did I get the chance to talk with my neighboring presenters about their work, but I also got a lot of very useful information from all the sessions I attended. I found out the subtle differences at the graduate level in three areas of interest to me. Thanks to Luna Rodriguez’s vigilance I got to attend a session on cyber infrastructure, and I got the chance to talk with graduate students and professors about what is expected at the graduate level at their institutions.



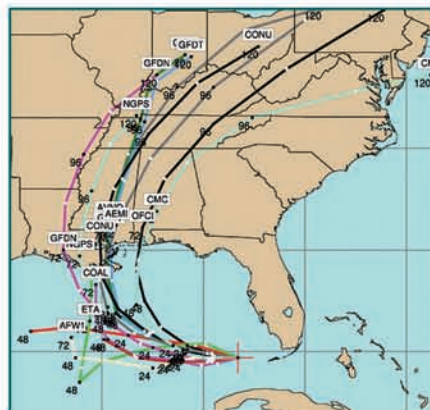
Shanna-Shaye Forbes presents a poster version of her summer research results. Her poster received a first-place award at the Society for Advancement of Chicanos and Native Americans in Science conference.

Overall, I met a lot of people, gathered a lot of pertinent information about graduate programs, about funding sources, about research opportunities, and most of all I had fun. Conferences provide opportunities to help you stay up-to-date with research in your areas of interest and keep up with new developments in as many fields as possible. You simply never know whom you will meet or what you will learn that may influence your career decisions. ☺

## Hurricanes... (continued from page 1)

and making sure that it is of high quality, but there’s a lot of rigor and sometimes not many opportunities for mentoring or social interaction.” He speaks highly of the emphasis on mentoring that is at the core of SOARS. “If institutions would foster more opportunities for mentorship, that is something everyone could benefit from, not just students from under-represented backgrounds.”

Jonathan plans to complete his PhD in about another year and a half and hopes to find a job that will allow him to continue his research investigating hurricanes. He takes with him many memories of his summers with SOARS. He describes the wonderful research opportunities, getting to work at NCAR, living with other protégés, and building friendships as just a few of the benefits of participating in the program. Most importantly, he says the experience gave him a greater appreciation of the value of diversity as well as of his own Native



Forecast tracks from 11 different weather models illustrate the likely paths for Hurricane Katrina as of 7 p.m. CDT on 26 August 2005.

American and Caucasian heritage. “Being in SOARS helped me have a greater appreciation of my own background—what it means to be a Native American and a Native American in science.” He summarizes one of the key lessons he carries with him from SOARS, reflecting that “there’s a

## TRACKING HURRICANES

A wealth of hurricane information, including links to forecast data as well as to surface, satellite, and aircraft observations, is available on Jonathan Vigh’s web site. His tropical cyclone model guidance page, located at <http://euler.atmos.colostate.edu/~vigh/guidance/index.htm>, offers access to real-time numerical weather model forecasts for tropical cyclone tracks and intensity in the Atlantic and Eastern Pacific Basins. With the events of the past year, it has become a popular site, receiving over 190,000 hits during the 2005 hurricane season.

richness in the viewpoints and the directions from which people come: it helps you appreciate the value of diversity and in maintaining your culture.” ☺

# Protégés get hands-on experience in NCAR's Earth Observing Laboratory

NCAR's Earth Observing Laboratory (EOL) and SOARS are collaborating to offer unique opportunities to future members of the atmospheric science workforce. Together, they are providing protégés the chance to contribute to designing and using cutting-edge atmospheric observation tools. "Given the importance of observations and instrumentation to UCAR's research efforts as well as to the overall scientific community, this partnership is a win-win situation," says Roger Wakimoto, director of EOL. Roger knows from his own experience as well as from recent reports that exposing students to atmospheric instrumentation and observation can be a difficult task for universities. By funding and mentoring up to three SOARS protégés each summer, EOL is able to offer interested students the opportunity to work on projects in observational meteorology (see below).

The three protégés working in EOL last summer were encouraged both by the applicability of the work as well as by the


independence the projects provided. "I felt like I had total freedom with my research," says Clarence Mann. "It's hard to find someone at my stage in an academic career with the amount of freedom and control that I had." Keith Goodman concurs, "I am convinced that another opportunity outside of SOARS or EOL would not have been nearly as rewarding. SOARS and EOL placed me in a great situation where I could grow, learn, and develop."

Roger views the opportunities in EOL as an extension of the research projects more typical to SOARS. "It shows that research doesn't just have to be about atmospheric science and getting those types of results. It's a chance for protégés with an engineering background to really build something, which is a successful outcome all its own."

The outcomes of the new partnership have potentially large benefits to the UCAR community, and Roger plans to perhaps



Clarence Mann (right) and science research mentor Teresa Campos modify a vacuum ultra-violet (VUV) instrument to obtain better measurements of carbon monoxide.

eventually increase the number of protégés the lab can support. "UCAR has a unique breadth of observational capabilities," he and SOARS director Raj Pandya explain. "Together, EOL and SOARS are able to use our resources to support the goals of our university partners as well as to contribute to a diverse future workforce." 

R E S E A R C H


SUMMER  
2005

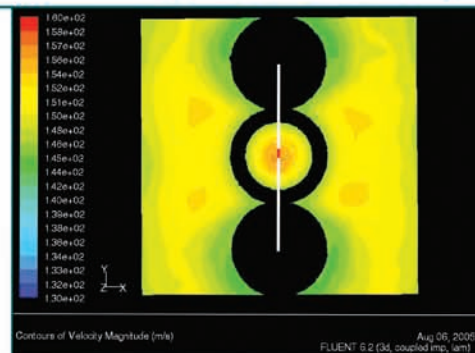
## SOARS research in NCAR's Earth Observing Laboratory

First-year protégé **Keith Goodman** spent the 2005 summer working with Scott Ellis and Cathy Kessinger to retrieve water vapor estimates from dual-frequency S-band and Ka-band radar instruments. These ground-based systems were deployed during the January 2005 Rain In Cumulus over the Ocean (RICO) experiment and provided measurements that could be used in conjunction with a radiative transfer model to estimate the water vapor content of the atmosphere. Keith evaluated the quality of the estimates by comparing the retrievals with simultaneous dropsonde measurements. He viewed the experience as a chance to extend his background in physics, and remarks, "I learned a lot, including how radars are operated, the different scanning capabilities, and minor limitations of the instruments."

**Clarence Mann**, a second-year protégé and civil/environmental engineering major, worked on a project to improve the sensitivity of a vacuum ultra-violet (VUV) instrument used for measuring carbon monoxide fluxes and explains that the summer presented a great

opportunity to learn the science and theory behind the project. "I am glad that my science mentor, Teresa Campos, adopted that strategy. I wouldn't have known what to do if she had just thrown me in the lab without knowing what to do or what to look for." The redesigned instrument Clarence worked on will be used this year to measure carbon monoxide and carbon dioxide in both developed and forested areas in Minnesota.

Third-year protégé **Olusegun Goyea** was able to apply his undergraduate experience in mechanical engineering to research in computational fluid dynamics. Working with Tom Horst and David Rogers, he investigated how airflow and other parameters affect cloud droplet measurements. "Coming to EOL taught me more about applied aerodynamics and its applications in atmospheric science," he explains. "It has been encouraging to see the results of my summer research put into use, the support of my mentors has been remarkable, and the experience has increased my interest in pursuing an atmospheric science career." 



*Olusegun investigated the effects of cloud droplet velocity and trajectory on measurements by a Forward Scattering Spectrometer Probe (FSSP). The FSSP is flown aboard an aircraft and uses a laser to determine cloud droplet concentration, based in part on the speed of a droplet as it encounters the laser beam.*

*The figure above represents a cross section through the laser beam location, indicated by the central vertical line. Cloud droplets are measured only if they pass through the optical depth-of-field shown by the red rectangle. The contours indicate different velocity magnitudes and suggest that the sample tube and its two supporting cylinders cause droplet velocities to decrease as the sample approaches the laser beam. Within the sample tube itself, an increase in velocity is observed.*

PROTÉGÉ AND ALUMNI UPDATES *(continued from page 1)*

**Sarah Tessendorf** is an author on two papers appearing in the December 2005 issue of the *Journal of Atmospheric Science*, The 29 June 2000 supercell observed during STEPS: Part I and Part II. Sarah is the lead author on Part 1. She presented related research at the 32nd Conference on Radar Meteorology in Albuquerque, New Mexico and at the 2nd Conference on Meteorological Applications of Lightning Data in Atlanta, Georgia.

**Rei Ueyama** is first author of a paper resulting from her master's degree research at Cornell University. The paper, "Wind-induced modulation of seasonal phytoplankton blooms in the North Atlantic derived from satellite observations," co-authored by Bruce Monger, was published in *Limnology and Oceanography*, 50(6): 1820-1829, 2005.

**Nancy I. Rivera Rivera** received an American Geophysical Union travel scholarship to present a poster at the 2005 Fall Meeting this past December in San Francisco, California. The title of her poster was "Detection and preliminary assessment of source areas of the 15 December 2003 dust storm in the Chihuahuan Desert, southwestern North America."

**Casey Thornbrugh** gave an oral presentation of his research, "The assessment of sand dune mobility from 1980 through 2004 on the Coalmine Mesa Chapter area of the Navajo Nation," at the 8th Biennial Conference of Research on the Colorado Plateau, in Flagstaff, Arizona. He also presented "Climate and drought monitoring web tools" at the 2006 Annual Southeastern Arizona Agricultural Day in Willcox, Arizona.

**Nicole Ngo** and **Julien Wang** presented their summer SOARS research at the National Oceanic and Atmospheric Administration's Oceans and Human Health Initiative All PI's 2006 Meeting in Charleston, South Carolina. Nicole presented a poster titled "Examining climate influences and economic impacts of harmful algal blooms in Massachusetts: 1993 and 2005." Julien's poster was titled, "Assessing the impact of climate factors on dengue outbreaks in Puerto Rico."

**Ernesto Muñoz** gave a presentation titled "Science higher education in Nuestra Comunidad" during Hispanic Heritage Month at the University of Maryland. In the presentation, he summarized Hispanic enrollment statistics from the National Science Foundation and the University of Maryland and discussed articles addressing the situation for under-represented groups in science and math. 5

SOARS PARTICIPATING UNIVERSITIES: Colorado State University, Cornell University, Dartmouth College, Drexel University, Florida State University, Georgia Institute of Technology, Iowa State University, Michigan Technological University, New Mexico Tech, North Carolina State University, Old Dominion University, Oregon State University, Pennsylvania State University, Purdue University, Rutgers, the State University of New Jersey, Stanford University, University of Alabama at Huntsville, University of Alaska at Fairbanks, University of Arizona, University of California/Irvine, University of California/Los Angeles, University of California/San Diego (Scripps Institution of Oceanography), University of Colorado/Boulder, University of Hawaii, University of Illinois/Urbana-Champaign, University of Iowa, University of Miami, University of Michigan, University of Missouri/Columbia, University of Nebraska/Lincoln, University of Nevada/Reno, University of Oklahoma, University of Rhode Island, University of Texas, University of Utah, University of Washington, University of Wisconsin/Madison, University of Wyoming, Washington State University, Woods Hole Oceanographic Institution.



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Writing/Editing: Amy Stevermer

External Review: Tim Barnes

Photography: Carlye Calvin,

Annaliese Calhoun

Design: Nicole Brinn, Core Design Works

Distribution: Annaliese Calhoun

#### SOARS PROGRAM OFFICE

Rajul Pandya, Program Director

Center Green Campus, Bldg. 2

3085 Center Green Drive

Boulder, CO 80301

Phone: 303-497-8622

E-mail: soars@ucar.edu

Subscriptions:

Contact SOARS Program Office

Visit the SOARS Web site at

[www.soars.ucar.edu](http://www.soars.ucar.edu)

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