

NEWSLETTER

SOARS PROGRAM **SPRING 2010**



■ PROTÉGÉ EDITORIAL

Alex Gonzalez

Alex Gonzalez is a graduate student in atmospheric science at Colorado State University

Some of the greatest opportunities in my scientific career have come about when I tested myself while conducting research in SOARS. For the past two summers I have worked with Professor Wayne Schubert on deriving equations for two atmospheric models that can be used to simulate tropical weather. Two summers ago, after spending weeks upon weeks deriving equations for one of the models, Wayne and I came to a road block. The model equations couldn't easily be solved by hand; we needed the help of a computer. I suggested we make a simple approximation that was physically reasonable, and could possibly allow us to continue solving the equations

by hand. It actually worked out! In fact, I am still using this model for my master's thesis.

After this, Wayne asked me if I could help with the other model, which was a project among his research group of graduate students. This group project model would eventually be published in the first volume of a new online journal for the climate science community, the Journal for Advances in Modeling Earth Systems (JAMES).

I volunteered to orally present this published work, plus my other research, at the 21st Conference on Climate Variability and Change. I have to admit, presenting in front of a group of well-known climate scientists as



Alex Gonzalez (left) with his advisor Wayne Schubert.

an undergraduate was pretty nerve-racking, but it was one of the most beneficial experiences of my life. This presentation, and the journal article, really helped me appreciate the importance of communication skills in the scientific world. ■



Jonathan Vigh (right) and his mentor Greg Holland demonstrating hurricane warning flags.

Vigh one of few Native American Ph.D.s in atmospheric science

In January, Jonathan Vigh became the 11th protégé in SOARS' 15-year history to earn a Ph.D. and one of only a few Native Americans with a doctorate in the atmospheric sciences. At Colorado State University, Vigh used 5000 Vortex Data Messages and 60,000 satellite images to determine hurricane intensity and structure trends before and after eye formation. He found that storms often strengthen rapidly during this period. Now a postdoctoral fellow at NCAR, he will study why and how some tropical cyclones rapidly intensify—an area where our current lack of knowledge leads to unnecessary hurricane evacuations and loss of life. Vigh hopes to inspire other Native Americans whose love of the natural world might grow into a career in science. ■



SOARS 15TH ANNIVERSARY

The SOARS program is celebrating 15 years of dedication to broadening participation in the atmospheric and related sciences, built around a summer research internship, strong mentoring, and a supportive learning community. ■

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PRESENTATIONS 2009 CONFERENCE SEASON

During fall 2009 and winter 2010, 19 protégés gave a total of 26 presentations at conferences.

Society for the Advancement of Chicanos and Native Americans in Science (SACNAS), 2009 National Conference.

Dallas, TX, October 2009

POSTER PRESENTATIONS

Ian C. Colón-Pagán, "Passage of tropical cyclones over mountainous islands Part I: Control experiment"

Daniel A. Pollak, "Flash floods: A spatial and temporal analysis—A case study of the flash floods in southwestern Missouri in March 2008"

Matthew B. Paulus, "Comparison of the VORTRAC retrieved structure of Hurricane Danny (1997) to prior analyses". Matthew won the Recognition for Outstanding Student Poster award in the geoscience category.

AGU Fall Meeting

San Francisco, CA, December 2009

POSTER PRESENTATIONS

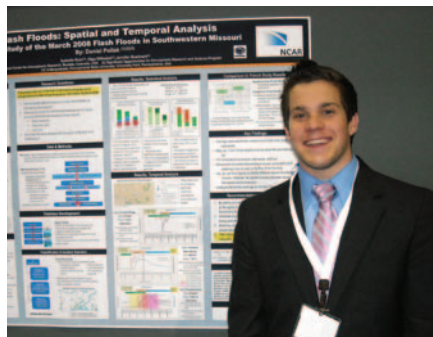
Karl C. Clarke, "A citizen science campaign encouraging urban forest professionals to engage the public in the collection of tree phenological data"

Ian C. Colón-Pagán, "Passage of tropical cyclones over mountainous islands Part I: Control experiment"

Sharome Goode, "Comparison of ABL heights derived from COSMIC RO and the RUC Model"

McArthur Jones Jr., "Eliassen-Palm Fluxes of the diurnal tides from the Whole Atmosphere Community Climate Model-Extended (WACCM-X)"

Daniel A. Pollak, "Flash floods: A spatial and temporal analysis—A case study of the flash floods in southwestern Missouri in March 2008"



Daniel Pollak presented his research at the 9th AMS student conference in Atlanta, GA.

American Meteorological Society, 90th Annual Meeting – 9th Annual Student Conference

Atlanta, GA, January 2010

POSTER PRESENTATIONS

Graylen L. Boone, "Poleward moisture transport by a recurring tropical cyclone and its effect on midlatitude precipitation"

Marques A. Cameron, "Modeling wildfire behavior and analyzing emissions"

Karl C. Clarke, "A citizen science campaign encouraging urban forest professionals to engage the public in the collection of tree phenological data"

Ian C. Colón-Pagán, "Passage of tropical cyclones over mountainous islands Part I: Control experiment"

Raymond J. Detweiler, "The effects of cloud cover on photosynthesis in a subalpine forest ecosystem focusing on Niwot Ridge, Colorado"

Alex O. Gonzalez, "Reconsidering the role of Rossby waves and inertia-gravity waves in the Madden-Julian Oscillation (MJO)"

Sharome Goode, "Comparison of ABL Heights derived from COSMIC RO and the RUC Model"

Maximo Q. Menchaca, "A higher order tracer transport scheme for icosahedral hexagonal grids"

Nicole Ngo, "The effects of convective clouds on vertical scalar transport using a numerically simulated flow field"

Lumari Pardo-Rodríguez, "Lightning activity in Atlantic tropical cyclones: Using the Long-range Lightning Detection Network (LLDN)"

Matthew B. Paulus, "Comparison of the VORTRAC retrieved structure of Hurricane Danny (1997) to prior analyses"

Daniel A. Pollak, "Flash floods: A spatial and temporal analysis—A case study of the flash floods in southwestern Missouri in March 2008"

Vanessa Marie Vincente, "The relationship between sea breezes and rainfall along western Mexico during the North American Monsoon"



Several SOARS protégés connected with the public and demonstrated hands-on science exhibits at the UCAR and CMMAP booths during the American Meteorological Society's Weather Fest event in Atlanta. Pictured: Protégé Maximo Menchaca.

Marcus D. Walter, "Re-examination of north-east United States drought trends and characteristics"

American Meteorological Society, 90th Annual Meeting

Atlanta, GA, January 2010

POSTER PRESENTATIONS

Roque Vinicio Céspedes, "Decrease in the summer rainfall of the southern United States coast and the Caribbean due to climate change"

Dana Pauzauskie, "Different ways of knowing: exploring traditional ecological knowledge and climate modeling for the Turtle Mountains, North Dakota"

ORAL PRESENTATIONS

McArthur Jones Jr., "Eliassen-Palm Fluxes of the diurnal tides from the Whole Atmosphere Community Climate Model-Extended (WACCM-X)"

Lumari Pardo-Rodríguez, "Science and education outreach: A case study of mutual learning between children and young scientists"

PROTÉGÉ AND ALUMNI ACCOMPLISHMENTS

Ian Colón-Pagán won second place for his oral presentation "Orographic Effects on Rainfall Induced by the Passage of Tropical Cyclones over Mountainous Islands Part I: The Control Experiment" in the field of Weather, Hydrology, and Watersheds at the 5th NOAA Educational Partnership Program (EPP) Forum, Nov. 2009, Washington, DC.

Maximo Menchaca continued as a TA for an introductory course in the physics department at the University of Illinois at Urbana-Champaign.

Matthew Paulus graduated *cum laude* with a bachelor of science in applied meteorology from Embry-Riddle Aeronautical University in December 2009 and named the ERAU Meteorology Department Outstanding Graduate.

Doing research, promoting diversity: Protégés follow passion for both

Like most SOARS protégés, Melissa Burt and Stephanie Rivale love research. But they have an equal love for increasing diversity in scientific fields, and they've found jobs that let them pursue both passions in a single career.

Getting away from a computer screen

"I used to think I just wanted to do research," says Burt. After earning a B.S. in meteorology, she entered Colorado State University in 2005 to work on a master's degree with support from the Center for Multiscale Modeling of Atmospheric Processes (CMMAP), an NSF Science and Technology Center housed at CSU. Modeling the climate of 21,000 years ago as her research project, she realized that her career track was going to mean writing computer code—lots and lots of code, day after day. Though the work was satisfying in itself, she says, "I'm very social and I need variety. If I had to sit in front of a computer all my life, I would go insane."

The day before she was to leave CSU, Burt took her dilemma to her advisor, David Randall. She explained that she wasn't ready to dive into Ph.D. work, but she also didn't want to leave the world of research completely. He suggested that she apply for a position at CMMAP that allowed time for research and offered the opportunity to work in education. Burt became the organization's Education and Diversity Manager.

The job itself is diverse. Burt recruits for CMMAP's summer internship program and the seven CMMAP member universities, gives talks, and travels around Colorado with a science teaching

initiative called the Little Shop of Physics. She jokes that she does diversity and education 100% of the time and research the other 25%. ■

From doing science to encouraging future scientists

Rivale started with a love of diversity and grew into a love of research. She majored in chemical engineering as an undergraduate because a high-school guidance counselor advised her to pick a major rather than from a conviction that it was her calling.

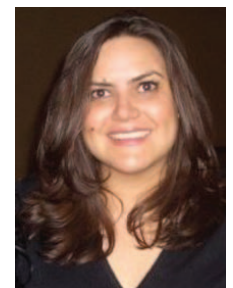
"In SOARS, I got to do some amazing research and use modeling to answer real science questions," Rivale says. But in grad school, she had the same response to programming all day that Burt did: "It was really boring. I began to question what made me happy." She had been involved in peer mentoring and other similar experiences since high school, and she realized that she had enjoyed those opportunities as much or more than the research itself.

Like Burt, Rivale finished her master's degree and then wasn't sure what to do next. Eventually she took a college teaching job, where she was frustrated by her own performance. "I knew there was a better way to teach than the way I had been taught. That's how I ended up in science education." She finished a Ph.D. in that field in December 2009 and is now Director of K-12 Engineering Education at the BOLD Center (Broadening Opportunity through Learning and Diversity) in the University of Colorado (CU) School of Engineering.



Melissa Burt during a visit to Columbia Middle School in Colorado.

Rivale's position is newly created. She places graduate students in middle and high school schools with large minority populations, where they teach modules on engineering and assist teachers. Rivale is also involved in efforts to increase retention for minority and women engineering students. She explains that these students are more likely than most to leave science and engineering if they don't see the work as relevant. To combat this, CU and other schools have created a freshman design project so that incoming students get a taste of real-world engineering.



Stephanie Rivale

Starting this fall, Burt will start working on her Ph.D. in atmospheric science. She's also keeping her current job, though she's well aware that will slow down the Ph.D. progress considerably. Rivale could be speaking for both women as she explains why she too wants to keep doing research: "Combining diversity education with that, I have the best of both worlds." ■

Dana Pauzauskie is working as an assistant teacher for Raintree Montessori School located in Lawrence, Kansas. She is currently applying to start a master's in public health.

Daniel Pollak was awarded the National Weather Association's Cassens/Phillips Family Undergraduate Scholarship for Meteorology.

Sarah Tessendorf, together with **Roelof Brintjes**, published an article in *International Water Power and Dam Construction* magazine, Dec 2009, entitled "Investigating cloud-seeding."

Jonathan Vigh successfully defended his Ph.D. dissertation on hurricane formation and will be graduating from Colorado State University in May. He has started a postdoctoral appointment with the Advanced Study Program at NCAR and will continue studying hurricane eye formation and rapid intensification.

Vanessa Vincente works as a SCEP (Student Career Experience Program) intern for the National Weather Service in Romeoville, IL. She was selected as a student representative

for the AMS Board on Outreach and Precollege Education for 2011. Vanessa was inducted into Chi Epsilon Pi (XEP), Valparaiso University's Meteorological Honor Society.

Marcus Walter accepted an internship at ABC News' Good Morning America.

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SIGNIFICANT OPPORTUNITIES IN ATMOSPHERIC RESEARCH AND SCIENCE

Theresa Aguilar chases thunderstorms into graduate school



Theresa Aguilar (right) with her SOARS science mentor Tammy Weckwerth during COPS, a 2007 field experiment designed to improve precipitation forecasts.

“Just applying to grad schools should be a semester in itself,” says Theresa Aguilar. “You have to put a lot of time into it.” She has been scouring faculty CVs, browsing university websites, and talking to friends to decide which schools to apply to. Her applications went out last month to some of the top meteorology departments in the country; she’ll hear back within weeks.

The Texas Tech graduate has a lot going for her as an applicant: good grades, appointments to SOARS and the McNair Scholars Program, and a multidisciplinary interest. She is interested in combining atmospheric research and wind engineering in her study of severe weather.

Aguilar is particularly intrigued by thunderstorms; growing up in West Texas, she saw many such storms and the destruction they wrought. She’d like to investigate fundamental questions about everything from the processes that give birth to

thunderstorms to the winds they produce near the ground.

Participation in SOARS and the McNair program gave her the chance to research high winds associated with thunderstorms, which have had devastating effects such as the collapse of the Dallas Cowboys training facility in 2009. She notes, “It’s important to improve forecasting and warning times for the public. Also, research can lead to improved building codes, which ultimately will save property and lives.”

Aguilar is the only member of her family to earn a college degree. “It is an amazing, but surreal, milestone to be at this point with the opportunity to go even further,” she says. “However, it would not have been possible without the guidance and support of my family, friends, mentors, and programs. I am very grateful to them for providing me the opportunity and resources to pursue what I love most – weather and research.” ■