

### Inside This Issue

|                            |       |
|----------------------------|-------|
| Faculty News               | 2-3   |
| Field Studies and Projects | 4-5   |
| Student and Staff News     | 6-7   |
| Alumni News                | 8-9   |
| Outreach and Conferences   | 10-11 |

## AMS Alumni Reception

Please join us for the  
Atmospheric Science  
Alumni and Friends Reception

**6:30-8:30 p.m.**

**Tuesday, Jan. 6, 2015**

at the

**Sheraton Hotel,**

340 N. Third St.,

Valley of the Sun D,

Phoenix, Ariz.

*Hope to see you there.*



*Dr. Kevin Maschhoff of BAE Systems,  
Professor Emeritus Graeme Stephens,  
and University Distinguished Professor  
Tom Vonder Haar*

## Greetings, Alumni and Friends!



*Department Head  
Jeff Collett*

As we enter 2015, I invite you to dive into this newsletter and learn about some of the latest activities here in the Department of Atmospheric Science. Featured in these pages are stories about our students, faculty, research staff, and alumni. As we began 2014, the addition of A.R. Ravishankara (Ravi) to our faculty brought the total number of faculty members in the Department to 19. This is the largest faculty the Department has ever enjoyed, a demonstration of the value placed on our activities by the University, even in a period when budgets remain difficult. Ravi, a member of the National Academy of Sciences and former director of NOAA's Chemical Sciences Division, is jointly appointed with the Department of Chemistry. 2014 also saw several faculty receive major awards. Dave Randall received the AMS Jule Charney Award, and Elizabeth Barnes received AGU's Holton Award. Sonia Kreidenweis was named CSU University Distinguished Professor. Sonia joins Tom Vonder Haar and Dave Randall as three of the 13 current UDPs across all of CSU. Congratulations are also due to Eric Maloney, who was selected by ATS students as the 2014 Outstanding Professor of the Year for his excellent work in the classroom. Department students and staff also received many forms of recognition over the past year. A few examples: longtime employee Paul Ciesielski received one of two 2014 CSU Outstanding Administrative Professional Awards, Melissa Burt was named chair of the AMS Committee on Women and Minorities, and Erik Nielsen received an NSF graduate fellowship. The Department is now home to seven NSF graduate

fellowship awardees. Along with the many other fellowships earned, this attests to the outstanding qualifications of our students! Congratulations also go to ATS alumnus Steve Ackerman (Ph.D., 1987), who in August received the Department's outstanding alumni award.

I would also like to call your attention to a new fundraising initiative in the Department: ASCENT (Assisting Students, Cultivating Excellence, and Nurturing Talent). The Department is proud to be ranked among the nation's top atmospheric science doctoral programs, but we want to do even more to better recruit and train tomorrow's leaders. ASCENT is designed to provide resources to help recruit top applicants and to enhance the training and professional development of our students. Activities to be supported include new opportunities for ATS graduate students to gain increased international experience by spending a few weeks or months at leading universities abroad. We are currently developing a graduate student exchange program with the University of Reading in the U.K. and are planning additional student exchange opportunities with leading programs in China. You likely received a recent solicitation for ASCENT in a separate communication. I hope you will consider supporting ATS students through this effort. A form to contribute to ASCENT can also be found on the back page of this newsletter.

I wish you all a happy and prosperous 2015. When you are next in Fort Collins, please make plans to stop by the Department, meet current students, faculty, and staff, and take a look at all the exciting activities underway.

Sincerely,

Jeffrey L. Collett Jr.



## Department Welcomes New Professor



Professor A.R. Ravishankara

### Professor A.R. Ravishankara

The Department of Atmospheric Science, along with the Department of Chemistry, was honored to have A.R. Ravishankara (Ravi) become a member of both faculties at CSU this past year. Ravi, who retired from his previous position as director of the Chemical Sciences Division of the NOAA Earth System Research Laboratory in Boulder, holds a primary appointment at CSU in chemistry with a joint appointment in atmospheric science. With countless years of experience, Ravi brings invaluable knowledge to both departments, along with the University as a whole.

Originally trained as a physical chemist, receiving his B.S. in chemistry and physics in 1968, his M.S. in physical chemistry in 1970, and his Ph.D. in physical chemistry in 1975, Ravi's work has encompassed problems in atmospheric chemistry with a focus on climate issues as well. He's an internationally renowned, highly productive researcher with a particular interest in issues that interface science and policy as demonstrated by his work earlier in the year at his fifth U.N. ozone assessment and second as a co-chair.

Through Ravi's years of international research, he's also received many accolades, and was also elected to the National Academy of Sciences in 2000. Ravi is also a Fellow of several societies including AGU and AAAS, and has extensive experience on high-level, international scientific committees. At CSU, Ravi will be actively engaged in teaching and research, with courses to be offered in both chemistry and atmospheric science. Read more about Ravi's research at <http://www.atmos.colostate.edu/faculty/ravi.php>.

## Faculty Awards, Appointments, and Milestones

### James. R. Holton Award to Elizabeth Barnes

Assistant Professor Elizabeth Barnes, a new Department faculty member in 2013, was selected to receive the American Geophysical Union's 2014 James R. Holton Award. The Holton Award, bestowed each year by the Atmospheric Science Section of the AGU, is presented to an early-career scientist in recognition of outstanding scientific research and accomplishments in the field, and Elizabeth's credentials fit impeccably into the scope of the award. The formal award will be presented at the Atmospheric Science Section banquet at the AGU Fall Meeting in San Francisco, Calif., in December of this year. To learn more about Elizabeth's research, visit her group's website at <http://barnes.atmos.colostate.edu>.



Assistant Professor Elizabeth Barnes

### Sonia Kreidenweis Named CSU UDP

Professor Sonia Kreidenweis, a faculty member in the Department for 23 years, was named University Distinguished Professor at the *Celebrate!* Colorado State Awards reception in April 2014. This honor was bestowed on Sonia in recognition of her outstanding scholarship and achievement and is restricted to approximately 1 percent of the CSU faculty. Specifically, Sonia was recognized for her research involving atmospheric aerosols and their impacts on cloud formation, haze, and climate. Sonia is the fourth member of the ATS faculty to be designated as a UDP. The Department would like to congratulate Sonia on her outstanding achievements and acknowledge her for her superlative contributions over the years. "Sonia's arrival at CSU in 1991 reinvigorated atmospheric chemistry research within the Department. Thanks in large part to her dedication and hard work, atmospheric chemistry has grown into a major focus area for the Department in the past two decades. Sonia is an international leader in the study of atmospheric aerosols and their interactions with clouds. Groundbreaking studies by Sonia and her group have had tremendous impacts in the understanding of cloud drop and ice nucleation, the impact of aerosols on haze in U.S. National Parks, and many other areas. It is wonderful to see Sonia recognized by CSU for her many accomplishments," said Department Head Jeff Collett. To learn more about Sonia's work, visit <http://www.atmos.colostate.edu/faculty/kreidenweis.php>.



Professor Sonia Kreidenweis

## Outstanding Professor of the Year Eric Maloney

Every year in August, the Department eagerly gathers together at the New Student Picnic at Spring Canyon Park. They are there to socialize, listen to new student introductions, and hear the announcement of the Outstanding Professor of the Year Award. This year, 12 new students were introduced, along with the award winner. As was the case with last year's award recipient, a repeat winner was announced. For the second time in his career with the Department, Associate Professor Eric Maloney was named Outstanding Professor of the Year. Eric was on sabbatical in Australia during the award presentation, so graduate student representatives improvised, taping the announcement and e-mailing it to him. Eric graciously accepted his award and thanked everyone for this prestigious honor. Student comments received regarding Eric during student award polling included "very approachable outside of class" and "lectures were never boring ... Eric's enthusiasm for teaching made it really easy to learn and be interested." With comments like these, Eric was an excellent choice for the award. More information about Eric can be found at <http://www.atmos.colostate.edu/faculty/maloney.php>.



Associate Professor  
Eric Maloney

## Russ Schumacher Named Interim Graduate Student Counselor

Assistant Professor Russ Schumacher was named the Department's interim graduate student counselor for the 2014-2015 school year, succeeding Professor Sonia Kreidenweis. Sonia has filled this essential position for many years and has created a solid foundation for Russ to work with. As Russ stated, "The graduate students in our Department are always extremely well qualified and come from diverse scientific backgrounds. I look forward to working with the current students as well as the outstanding applicants who seek to join our program in the next year."



Assistant Professor  
Russ Schumacher

## Faculty Appointments

Professor Sonia Kreidenweis will take on a new role in January 2015, that of interim associate dean for research in the College of Engineering. Sonia will hold the interim position from January through August 2015 as COE searches for a candidate to fill this position.

## Happy 85th Birthday, Dr. Gray

On Oct. 13, the Department of Atmospheric Science was pleased to recognize Professor Emeritus Bill Gray with an 85th birthday celebration. This milestone, just one of many over the course of his life and his 50-plus year career in atmospheric science, demonstrates Bill's resiliency and determination to continue on with his research after countless years of commitment to the Department and to atmospheric science in general. Thank you, Bill, for all your contributions and, once again, happy birthday.



Professor Emeritus  
Bill Gray



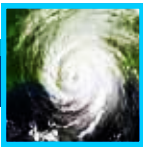
University Distinguished Professor Dave Randall receives the 2014 AMS Charney Award.

## AMS Award to Professor Dave Randall

As announced at the end of last year, University Distinguished Professor Dave Randall was chosen as the recipient of the Jule G. Charney Award. This award, one of the highest honors presented by the American Meteorological Society, was given at the annual AMS Meeting in February 2014. The photo featured here is of Dave at that award ceremony. Dave's selection was in recognition of his transformative research into atmospheric convection and cloud processes and their improved representation in global weather and climate models. Follow Dave and his research group at <http://kiwi.atmos.colostate.edu/rr>.

## 2014 Faculty and Staff CSU Milestones (Years of Service)

|                 |   |
|-----------------|---|
| <b>5 YEARS</b>  | Cliff Schulenberg   |
| <b>10 YEARS</b> | Jim Benedict, Jim George, Darby Nabors, Henry Reges, Russ Schumacher, Zach Schwalbe |
| <b>20 YEARS</b> | Bob Bowie, Amie Hedstrom, Jeff Collett  |
| <b>25 YEARS</b> | Dave Randel   |
| <b>30 YEARS</b> | Graeme Stephens   |
| <b>40 YEARS</b> | Bill Cotton   |



## Emily Fischer Leads NSF Grant to Bolster Women in Science

Assistant Professor Emily Fischer is quite literally trying to change the face of the earth sciences. Emily is the lead investigator on a \$1.7 million NSF project aimed at recruiting female undergraduates to the earth sciences through a combination of traditional in-person and online peer mentoring. Her NSF project specifically focuses on closing the gender gap between men and women in fields that encompass atmospheric science, natural resource management, and mining and geology, just to name a few.



Assistant Professor Emily Fischer

Emily's goal, along with that of her team members from various universities across the country, is to start a pilot program in 2015 that recruits first-year female students from CSU, University of Colorado Boulder, and the University of Wyoming. These students will attend an educational and scientific career workshop. After that, these women will have access to peer web support and will also have the opportunity to receive individual mentoring from members of the local Earth Science Women's Network, which is a nonprofit organization. There are currently more than 70 women involved in ESWN in the Front Range, and many of them are here at CSU. The team will run a parallel program in the Carolinas to learn what works in different regions.

Emily is thrilled to begin this project. "There are so many reasons to address diversity issues across the earth sciences. Our community's diversity issue has negative implications for innovation and could limit the social relevance of our science. Increasing women's participation in the geosciences is also an issue of social justice – STEM occupations have higher median earnings than the national average. I am so excited that CSU will lead both in the science and in this critical aspect of workforce development." Read more on Emily's research at <http://www.atmos.colostate.edu/faculty/fischer.php>.

## GPM and OCO-2 Successfully Launch with Help from CSU

This year, multiple professors in the Department of Atmospheric Science were involved with successful satellite launches.

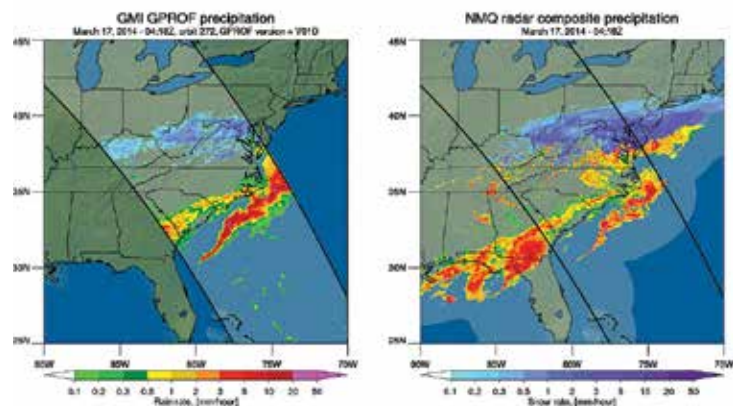
Specifically, the Global Precipitation Mission and the Orbiting Carbon Observatory-2 were satellites that included important contributions from various faculty members and their groups. Although each mission's objectives and goals are different, the planned observations and goals of both promise to revolutionize our understanding of atmospheric processes.

### First Up ... the GPM

The Global Precipitation Mission was successfully launched, according to schedule, from the Tanegashima Space Port in Japan in the early morning hours of Feb. 28. The mission itself consists of the core satellite with dual-frequency radar and the GMI Microwave Imager that joins a constellation of passive microwave radiometers on other satellites. The

latter are satellites of opportunity that were already in orbit, but will use information from the newly launched core satellite to produce a consistent and homogeneous three-hourly rainfall estimate worldwide. On Sept. 2, the first versions of precipitation products from both radars, as well as GMI and the constellation radiometers, were made available to the public via the Precipitation Processing System at NASA's Goddard Space Flight Center. So far, everything with these products looks extremely good. GPM mission scientists were very pleased with these results, especially ATS faculty members who have had sustained and significant input into the mission. Professor Chris Kummerow was on the team that originally proposed the GPM concept to NASA, served as its first study scientist, and has been on the science steering team for GPM ever since. Professor Steve Rutledge has been on the science team for GPM from the very beginning as well, focusing on surface-based measurements of precipitation and field campaigns designed to optimize the science algorithms and validate their products. He was also on the former TRMM science team and led the TRMM-LBA campaign in the Amazon. In addition, Professor Richard Johnson has been involved with the science team, as well as field experiments for both TRMM and GPM.

Collaboratively, CSU and the current Kummerow group play a key role in developing the rainfall products for the GPM GMI sensor as well as the constellation of radiometers. For this, they developed a fully parametric algorithm that uses only the sensor characteristics together with a global database of observed rainfall structure (to come from the GPM radars) in order to provide consistent rain and snow products for all constellation radiometers. These products are being distributed globally and constitute the core of GPM's three-hourly rainfall product needed by many applications. A sample of the products is shown below.



The GPM algorithm work has entrained three of Chris' students from the Department. Ph.D. student Sarah Ringerud is finishing her graduate studies working on characterizing land-surface emissivities in order to better couple land-surface models with space-borne precipitation estimates. Ph.D. student David Henderson is examining causes for temporal discrepancies between radar and radiometer rainfall amounts over tropical oceans that appear correlated with ENSO signals, and Ph.D. student Veljko Petkovic is trying to understand differences in the storm structures between the Congo and Amazon. In addition to this, Wes Berg, a senior research scientist in the Kummerow group, has been involved with the GPM Intersensor Calibration Working Group, which is establishing a common reference calibration for all the constellation radiometers.

The Rutledge group played a lead role in designing and conducting the NASA-DOE Midlatitude Continental Convective Cloud Experiment in Spring 2011 that focused on microphysical properties of convective clouds needed to refine GPM's radar algorithms. Following MC3E, the Rutledge group participated in the IFLOODS GPM ground validation program in Iowa (Summer 2013), working with the NASA N-pol S-band polarimetric radar to collect detailed rain measurements to once again help validate GPM algorithms. Brenda Dolan, research scientist from the Rutledge group, recently served as a project scientist for the NASA IPHEX ground validation field campaign, carried out in the North Carolina region. Now, the Rutledge group is preparing to participate in OLYMPEX, a major GPM ground validation program for orographic precipitation. OLYMPEX will be conducted over the Olympic mountain range in Washington state starting in late 2015.

## Second ... OCO-2

On Wednesday, July 2, NASA successfully launched the Orbiting Carbon Observatory-2. OCO-2 is a mission dedicated to measuring carbon dioxide from space with unprecedented accuracy, in order to help answer fundamental questions about sources and sinks of carbon dioxide, a



*Delta-2 LV carrying the OCO-2 satellite*

critically important greenhouse gas. The OCO mission itself has been in development for more than a decade, as OCO-1 failed to make orbit in 2009. The much-anticipated second satellite launch was on a Delta-2 rocket, the same launch vehicle used by the CloudSat/CALIPSO satellites. In orbit, OCO-2 is at the head of the afternoon constellation of earth-observing satellites called the A-Train that includes CloudSat/CALIPSO. The A-Train, including OCO-2, consists of six satellites that fly in close proximity to each other, all acquiring data at nearly the same time and place. This proximity aids scientists

in their quest to better understand the physical processes governing the earth system and how these processes will evolve in a changing climate.

CSU has been heavily involved in the OCO mission. In the beginning, part of the original measurement concept of the mission was conceived by Professor Emeritus Graeme Stephens and retired senior research scientist Denis O'Brien. These two scientists wanted to obtain new measurements of clouds and aerosols by measuring fine details in the spectrum of reflected sunlight in the near-infrared. After such an instrument was built to do so, but then cut from the CloudSat mission, it was re-envisioned as a way to measure CO<sub>2</sub> concentrations from space with possible spinoffs including cloud measurements. Currently, CO<sub>2</sub> fluxes can be inferred only crudely, via highly accurate, but spatially sparse measurements of ground-based CO<sub>2</sub> concentrations. OCO-2 should provide a major step forward in our ability to measure sources and sinks of carbon dioxide and to solve some long-standing riddles of the Earth's carbon cycle.

Assistant Professor Christopher O'Dell, M.S. student Robert Nelson, researcher Tommy Taylor, and postdoctoral Fellow Hannakaisa Lindqvist, have helped lead the development of the algorithms that will convert the sunlight measurements into CO<sub>2</sub> concentrations and are pioneering ways to better exploit these measurements. Since the failure of OCO-1, the team has been primarily working with measurements from the

Greenhouse Gases Observing SATellite, a Japanese mission, though these measurements are much sparser and noisier than those expected by OCO-2. In addition to the O'Dell team, CIRA researchers David Baker, Tomohiro Oda, and Andrew Schuh, and atmospheric science Professor Scott Denning, plan to use the CO<sub>2</sub> measurements in global inversion models to actually infer sources and sinks of carbon, and to look for emission signatures from large anthropogenic sources such as megacities and power plants.

Finally, in addition to teaching us about the carbon cycle, and potentially about clouds and aerosols, OCO-2 has another trick up its sleeve. Scientists now expect OCO-2 to be able to measure the faint glow emitted by plants as they perform photosynthesis, known as solar-induced fluorescence. This direct measurement of the surface (rather than atmosphere), can potentially provide important information about the land biosphere, which could aid in endeavors such as drought monitoring and prediction of crop yields. Scott's research group also plans to use this product to better characterize the Earth's biosphere.

Though there have been some surprises, initial results from OCO-2 indicate that the instrument is healthy and functioning normally. These early data will be presented at the fall meeting of the American Geophysical Union in San Francisco this December.



*M.S. graduate Matt Paulus and graduate students Brad Wells and Aaron Piña participate in a now-casting session.*

## FRAPPÉ: Understanding the Sources of Air Pollutants We Breathe

It is not often that major atmospheric chemistry field campaigns are organized in your backyard, but Summer 2014 was special, as the Department was able to see two in action. The Front Range Air Pollution and Photochemistry Experiment was designed to characterize and understand summertime air quality in the Northern Front Range Metropolitan Area. This region exceeds the National Ambient Air Quality Standard for ozone during summer months. The campaign was a collaborative effort among the Colorado Department of Public Health and the Environment, CSU, the University of Colorado, the University of California, Berkeley, other University collaborators, NASA, NOAA, and the National Center for Atmospheric Research. The FRAPPÉ mission

*Continued on Page 9*



New 2014 CSU atmospheric science graduate students (not pictured: Travis Ashby)

## Welcome, New Graduate Students

| Name (M.S./Ph.D.)   | Adviser               | Undergraduate/Graduate University                        |
|---------------------|-----------------------|--|
| Travis Ashby        | Cotton                | Colorado State University                                |
| Steven Brey         | Fischer/Pierce        | University of Washington                                 |
| Edward Charlesworth | Birner                | Seattle University                                       |
| Brian Crow*         | Thompson              | University of Missouri-Columbia                          |
| Anna Hodshire       | Pierce                | Weber State University                                   |
| William Lassman     | Pierce                | Northwestern University                                  |
| Yoonjin Lee         | Kummerow/ M. Zupanski | Ewha Women's University                                  |
| Jingyuan Li         | Thompson              | California Institute of Technology                       |
| Bryan Mundhenk      | Maloney/Barnes        | University of Missouri-Columbia                          |
| Casey Patrizio      | Randall               | The University of British Columbia                       |
| Yixing Shao         | Collett               | Nanjing University of Information and Science Technology |
| Dakota Smith        | Denning               | Pennsylvania State University                            |

\*Spring 2014

## Alumni and Herbert Riehl Award Winners



L. to R.: Department Head Jeff Collett, Herbert Riehl Jr., Herbert Riehl Award recipient Leah Grant, Associate Professor Susan van den Heever, Alumni Award recipient Sarah Ringerud, and Professor Chris Kummerow

The Riehl Award recognizes an outstanding paper based on M.S. research and the Alumni Award recognizes an outstanding paper based on Ph.D. research.

## Retirement Announcements

Congratulations Gail Cordova and Bob Bowie on your retirement from the Department of Atmospheric Science this year. Your contributions and years of commitment to the Department are greatly appreciated, and the Department wishes you all the best in future endeavors.

## Student Appointments, Awards, and Recognitions

|  |                                |
|--|--------------------------------|
| 2013 AGU Fall Meeting Outstanding Student Paper Award  | Steve D'Andrea                 |
| 2014 American Association for Aerosol Research Annual Conference Outstanding Poster Award                      | Steve D'Andrea and Jack Kodros |
| 2014-2015 CSU International Presidential Fellow  | Zitely Tzompa                  |
| 2014 International Lightning and Meteorology Conference Outstanding Student Presentation (Kreider Scholarship) | Brody Fuchs                    |

## Student Fellowships

|  |   |
|--|---|
| AFIT (Air Force Institute of Technology)                                       | Bryan Mundhenk and Robert Tournay   |
| AGEP (Alliance for Graduate Education and Professoriate)                       | Jordan Allen and Jake Zaragoza  |
| AMS (American Meteorological Society)  | Aryeh Drager, Caitlin Fine, Erik Nielsen, and Peter Marinescu                                     |
| AWMA Scholarship (Air and Waste Management Association)                        | Yi Li and Brad Wells  |
| CIRA (Cooperative Institute for Research in the Atmosphere)                    | Leah Grant and Todd Jones   |
| CMMAP Diversity (Center for Multiscale Modeling of Atmospheric Processes)      | Noel Hilliard   |
| CONACYT (Mexican National Council for Science and Technology)                  | Zitely Tzompa   |
| Dietrich Scholarship   | Sam Atwood  |
| DOE Krell (Department of Energy)   | Chris Eldred  |
| EPA STAR Fellowship (Environmental Protection Agency)                          | Ashley Evanoski-Cole  |
| GATES Millennium Scholars  | Isaac Medina  |
| I-Water (Integrated Water, Atmosphere, Ecosystems Education, and Research)     | Aaron Piña, Isaac Medina, and Gavin Roy   |
| NASA NESSF (NASA Earth and Space Science Award)                                | Matt Igel, Veljko Petkovic, and Sarah Ringerud  |
| NASA DEVELOP   | Renee Curry   |
| NSF (National Science Foundation)  | Nick Davis, Aryeh Drager, Leah Grant, Adele Igel, Erik Nielsen, Gavin Roy, and Elizabeth Thompson |
| NSF EAPSI (East Asia and Pacific Summer Institutes for U.S. Graduate Students) | Ali Boris and Adam Rydbeck  |
| NSF GROW (Graduate Research Opportunities Worldwide)                           | Adele Igel  |
| NSF Honorable Mention  | Greg Herman   |
| NSERC (Natural Sciences and Engineering Research Council of Canada)            | Kim Sakamoto and Landan MacDonald   |
| PRSE (Programs for Research and Scholarly Excellence)                          | Greg Herman and Steven Brey   |
| Shrake Culler Scholarship  | Isaac Medina, Stephanie Henderson, James Ruppert, and Doug Stolz                                  |
| Sjostrom Family Scholarship  | Zitely Tzompa   |
| SOARS (Significant Opportunities in Atmospheric Research and Science)          | Jake Zaragoza and Annareli Morales  |

## AP Employee Award to Paul Ciesielski

We don't often mention much in our newsletter about our quiet (behind-the-scenes), dedicated, and hardworking research staff, but it is very important to recognize their achievements, accolades, and commitment as well. In 2014, one of our senior research associates took center stage, as Paul Ciesielski was recognized as a Distinguished CSU Administrative Professional Employee at CSU's *Celebrate!* Colorado State awards reception in April. Paul was one of only four AP employees recognized for their outstanding work in teaching, administration, service, and/or outreach. Paul was honored for his strong record of scholarship and his many contributions to improving the collection and analysis of atmospheric sounding data. With his research focus, Paul has collaborated with multiple professors over the years and currently works with Professor Wayne Schubert and Professor Richard Johnson. In addition to being a Department researcher, Paul is also an alumnus, receiving his M.S. from the Department in 1980. With so many ties to the Department and years of dedication, it is easy to see how Paul was chosen for the CSU award. As Professor Richard Johnson stated, "It is hard to find anyone more deserving of this award than Paul. His contributions to our research projects, scientific productivity, and service to the Department and University have been truly extraordinary." The Department would like to congratulate Paul on all of his achievements and his consummate contributions to this Department. Visit Paul's research page at <http://johnson.atmos.colostate.edu/personnel/ciesielski.html>.



Research Associate  
Paul Ciesielski



Graduate and M.S./Ph.D. candidates at Graduate Luncheon: (L. to R., back row): Ahmad Samman, Vanessa Vincente, Chris Slocum, and Brody Fuchs (L. to R., front row): Zitely Tzompa, Misha Schurman, and Leah Grant

## Postdoctoral Awards

|  |  |
|--|--|
| NSF AGS-PRF (Atmospheric and Geospace Sciences Postdoctoral Research Fellowship) | John Albers, Walter Hannah, Matt Igel, Shunsuke Nakao, and Greg Schill |
| NOAA Climate and Global Change Postdoctoral Fellowship                           | Nathan Arnold  |
| SoGES (Colorado State University Global Sustainability Leadership Fellow)        | Andrea Clements and Hannakaisa Lindqvist                               |

## Congratulations, Atmospheric Science Graduates

| Student          | Adviser                 | Degree Conferred |
|------------------|-------------------------|------------------|
| Gus Alaka        | Maloney                 | Ph.D.            |
| Becky Bolinger   | Kummerow                | Ph.D.            |
| Steve Brown      | Collett                 | Ph.D.            |
| Brant Dodson     | Randall                 | Ph.D.            |
| Kim Erickson     | Vonder Haar/Kummerow    | M.S.             |
| Elliott Foust    | Thompson                | M.S.             |
| Brody Fuchs      | Rutledge                | M.S.             |
| Leah Grant       | van den Heever          | M.S.             |
| Walter Hannah    | Maloney                 | Ph.D.            |
| Matt Igel        | van den Heever          | Ph.D.            |
| Josh King        | van den Heever/Kummerow | M.S.             |
| Alyssa Matthews  | Rutledge                | M.S.             |
| Annareli Morales | Kreidenweis/Schumacher  | M.S.             |
| Ahmad Samman     | Cotton                  | M.S.             |
| Misha Schurman   | Collett                 | Ph.D.            |
| Jeremiah Sjoberg | Birner                  | Ph.D.            |
| Zitely Tzompa    | Kreidenweis             | M.S.             |
| Vanessa Vincente | Schumacher              | M.S.             |
| Brandon Wolding  | Maloney                 | M.S.             |

## Welcome, New Postdoctoral Fellows and Researchers

| Postdoctoral Fellows | Research Adviser           | Graduate University  |
|----------------------|----------------------------|--|
| Hannakaisa Lindqvist | O'Dell                     | University of Helsinki   |
| Emily Riley          | Maloney/<br>van den Heever | University of Miami Rosenstiel School of Marine and Atmos. Sc. |
| Greg Schill          | DeMott                     | University of Colorado   |
| Kaitlyn Suski        | DeMott                     | University of California, San Diego                            |
| Juliet Zhu           | Fischer                    | University of Colorado, Boulder                                |
| Researchers          | Research Adviser           | Graduate University  |
| Katie Benedict       | Collett                    | Colorado State University                                      |
| Ilana Pollack        | Fischer                    | University of Pennsylvania                                     |
| Yong Zhou            | Collett                    | University of New Hampshire, Durham                            |

## Researcher Faculty Appointments

Congratulations Shunsuke Nakao and Andrew May on your recent and upcoming faculty appointments. Shunsuke is now an assistant professor in the Department of Chemical and Biomolecular Engineering at Clarkson University in Potsdam, N.Y., and Andrew May has moved on to The Ohio State University where he will transition to an assistant professor position in the Department of Civil, Environmental, and Geodetic Engineering in September 2015.



## Professor Steve Ackerman: Distinguished Alumni Award Recipient

On Monday, Aug. 11, Professor Steve Ackerman was awarded the CSU Department of Atmospheric Science Distinguished Alumni Award by Department Head Jeff Collett. This award is presented to



Department Head Jeff Collett and Professor Steve Ackerman

an outstanding alumnus and/or alumna who exemplifies core values revered by the Department including dedication to research, commitment to education, and leadership prowess in the atmospheric sciences. These values, exemplified throughout the course of Steve's distinguished career, are the very reason he was chosen for this award. Since graduating with both an M.S. and a Ph.D. from the Department, Steve has contributed to research in satellite meteorology, mentored a multitude of students, and mastered teaching techniques that have greatly enhanced the public's knowledge of meteorology. Steve holds the current positions of professor in the Department of Atmospheric and Oceanic Services and associate vice chancellor for the Physical Sciences, Research, and Graduate Education at the University of Wisconsin-Madison. He has also been the director of NOAA's Cooperative Institute for Meteorological Satellite Studies (<http://cimss.ssec.wisc.edu>) at UW-Madison for the last 15 years. This institute performs impactful research in remote sensing, satellite meteorology, tropical cyclones, and arctic weather and climate, with results that have global implications. With all of Steve's national and international contact, he is widely respected by both communities for his contributions to research and teaching. Given his high level of achievements, Steve was eminently deserving of the Alumni Award. The Department would like to congratulate him on his body of work and thank him for proudly representing CSU over the years. Learn more about Steve at <http://cimss.ssec.wisc.edu/wxwise/ack.html>.

### The Five A's of Data

Professor Steve Ackerman, recipient of the CSU Department of Atmospheric Science Distinguished Alumni Award, shares his thoughts and his experiences with the use of data sets over the years.

My career in atmospheric science began at Colorado State University with a focus on working with large data sets in the Department of Atmospheric Science in 1976. Even though much time has passed since then, one thing has remained constant with research over the years: When it comes to data, particularly large data sets, one needs

to consider the five A's: Archive, Access, Assemblage, Analysis, and Artistry. Understanding the 5 A's and how they've evolved over the years, yet remain our central focus, is one key to success, therefore, I'll discuss these five A's in reference to activities I was involved with in the late 1970s that still carry through to today.

Early in my career, I worked on determining regional energy budgets. An important aspect of those projects was the assignment of regional cloud properties including presence, vertical assignment, and microphysical properties. The regional nature of the problem required the use of satellite observations to detect the location of cloud systems. To study the energy budget of the Southwest Summer Monsoon region, I used observations from GOES-1 and TIROS-N. It is with these observations, that one can see the progression in the 5 A's.

**Archive:** In 1979, satellite observations were archived on 9-track magnetic tapes. At the time, there were 1,600 bits in a track, which equates to approximately 40 megabytes of data storage. These 9-track tapes had reflective stickers to mark the beginning of the end of the tape. Damage to the tape resulted in lost data. Today, the entire GOES data set is archived on disks at the University of Wisconsin's Space Science and Engineering Center. The center contains more than 169 terabytes of reconstructed, unprocessed data going back to 1978.

**Access:** Data is useless if it cannot be accessed. In the late 1970s and early 1980s, access required reading the 9-track tapes. The tape had to be loaded by an operator onto a reel-to-reel machine. Given the relatively low storage capability by today's standard, the operator would have to load multiple tapes to process a month's worth of satellite imagery. Today, about 96 gigabytes of satellite data per day comes into the SSEC building, and much of that data is used in near-real time. SSEC's online GOES archive is an ADDE server, which can be accessed using the Man computer Interactive Data Analysis System, or McIDAS. This software package has been in use and maintained for more than 40 years and continues to be a resource to access and analyze satellite data.

**Assemblage:** Even back in the late 1970s, it was important to assemble the satellite data with other observations. To compute energy budgets, satellite observations of clouds had to be combined with other constituents of the atmosphere, along with the type and condition of the atmosphere. Today, satellite observations are combined with data from other satellite platforms, ground-based systems, radiosonde and model output in a routine and computationally efficient manner.

**Analysis:** An atmospheric scientist's ultimate goal is to analyze the data to address a question about the Earth system and how it works. Computer systems and software have enabled scientists to create more complex algorithms for larger data sets. Observations from the TIROS-N satellite that took several months to process in the early 1980s can now be accessed and processed in less than two days.

**Artistry:** We need and want to visualize our data and the results of analysis. In the early 1980s, McIDAS was one of a few tools available to visualize satellite data. Forty years ago, images were also produced by "overprinting" on a computer output. This overprinting enabled one to produce a gray-scale image of the observations. Today, images from satellite data are routine and awe inspiring.

While much has changed in our field over the years, data remains the centerpiece of everything we do. As we continue to work with ever-larger data sets, it is important to remember the five A's when we use data to convey an interesting story.

## Alumni Updates

**Brant Dodson** (M.S., '08; Ph.D., '14) was accepted into the NASA postdoctoral program this year and is now working at NASA Langley Research Center.

**Eric Guillot** (M.S., '10) is currently working as a scientist for Integrity Applications Inc. as a contractor to the National Weather Service Office of Science & Technology at NWS Headquarters in Silver Spring, Md.

**Jim Fleming** (M.S., '73) is a professor of Science, Technology, and Society at Colby College and a research associate at Columbia University. The MIT Press is publishing his new book, and he's had three articles published this year as well.

**James C. Jones** (M.S., '03) continues to work at Northrop-Grumman out of Bellevue, Neb. He was recently promoted to a brand-new role and is now the chief scientist for the Space Weather Analysis and Forecast System program.

**Josh King** (M.S., '14) began working as a research associate in the ARM Data Quality Office (<http://dq.arm.gov>) within the Cooperative Institute for Mesoscale Meteorological Studies at the University of Oklahoma in October 2014.

**Gavin McMeeking** (M.S., '04; Ph.D., '08) is working at Droplet Measurement Technologies in Boulder, Colo.

**Laura Paulik** (M.S., '11) is an associate scientist II at CIRES working in the NOAA/ESRL/Global Systems Division in the Forecast Impact and Quality Assessment Section.

**Thomas C. Peterson** (M.S., '89; Ph.D., '91), president, World Meteorological Organization Commission for Climatology and principal scientist, NOAA's National Climate Data Center, was re-elected in July 2014 to a second four-year term as president of the WMO Commission for Climatology. The WMO is a specialized agency of the United Nations.

**Derek J. Posselt** (Ph.D., '06) was promoted to an associate professor with tenure as of September 2014 in the Department of Atmospheric, Oceanic and Space Sciences at the University of Michigan. In addition to this, he is the graduate admissions chair and the deputy principal investigator of the NASA Cyclone Global Navigation Satellite System mission (<http://cygnss-michigan.org>).

**Lauren Potter** (M.S., '13) currently works as an associate analyst in strategy and new product development at E Source LLC in Boulder, Colo.

**Ananthakrishna Sarma** (Ph.D., '86) worked for SAIC for 27 years before the company split into two this year, becoming SAIC and Leidos. With the split, Ananthakrishna continued on as a senior scientist, technical Fellow with Leidos, which retained the R&D component of the old SAIC.

**Misha Schurman** (M.S., '09; Ph.D., '14) accepted an offer for a postdoctoral position at the Hong Kong University of Science and Technology this year.

**Rob Seigel** (M.S., '10; Ph.D., '12) transitioned from scientist to science entrepreneur in 2014 by creating a website called Publiscize ([www.publiscize.com](http://www.publiscize.com)). The purpose of this website is to serve as an outlet for the public to learn about valuable research (including research never published), and research that is currently inaccessible to the public due to technical language and expensive fee barriers.



Read more about our alumni on the Department's website.

## FRAPPÉ

*Continued from Page 5*



*CSU graduate student Jake Zaragoza working on an instrument on the top of the NOAA trailer at the BAO tower.*

supported the deployment of airborne measurements of ozone and its precursor on the NCAR/NSF C-130 aircraft and extensive ground-based measurements. It was closely linked with a concurrent NASA DISCOVER-AQ project, which also had three aircraft deployed to the Colorado Front Range.

CSU played a major role in the experiment. In collaboration with Department of Chemistry Assistant Professor Delphine Farmer, Assistant Professor Emily Fischer conducted a suite of ground-based measurements at the NOAA BAO Tower, located in Erie, Colo. These measurements were designed to constrain ozone production rates in the Front Range and to understand the impact of hydrocarbon emission from oil and gas operations on the production of ozone. The BAO field site is well situated for this research because the hydrocarbon signature connected to oil and gas operations can be clearly distinguished from the urban signature at this location. FRAPPÉ marks the beginning of a much longer-term collaboration for these two research groups. Emily and Delphine began a three-year NOAA project in Fall 2014 to follow emissions from oil and gas development through their impacts on tropospheric ozone.

With support from the National Park Service, Professor Jeff Collett and Emily's research groups also conducted measurements of a large suite of pollutants at Rocky Mountain National Park. RMNP suffers from multiple air quality problems, including elevated ozone concentrations and harmful levels of nitrogen deposition. The measurements at RMNP were designed to better understand the sources of ozone at the site and the specific species contributing to nitrogen deposition.

The Department also provided essential forecasting support for the NCAR/NSF C-130 aircraft during FRAPPÉ. Supervised by Assistant Professor Russ Schumacher, several past and present CSU atmospheric science graduate students served as now-casters and were in contact with the mission scientists on the C-130 through chat during each flight. They provided advice on flight route adjustments that allowed the aircraft to collect the data needed to meet the scientific objectives of the campaign and keep everyone safe.

To learn more about the FRAPPÉ mission, visit <https://www2.acd.ucar.edu/frappe>.



## Front Range Teen Science Café

Teen Science Café Network  
scientists & teens exploring the world

### CMMAP Introduces the Front Range Teen Science Café

The Center for Multiscale Modeling of Atmospheric Processes, in Spring 2014, introduced a new and innovative event

for teens in Northern Colorado called the Front Range Teen Science Café. This event, held once a month during the school year, allows Northern Colorado teens with a passion for science the opportunity to gather in an informal setting, where they mingle with their fellow teens and members of the scientific community and listen to presentations on various topics. The FRTSC, which takes place on



the second Wednesday of the month at Everyday Joe's Coffee House in Old Town Fort Collins, lasts about an hour and includes a mix of hands-on activities, lecture, and discussion. The inaugural event featured Dr. Scott Denning with a presentation titled "Invisible Light Keeps Us Warm! The Science Behind Climate Change." Subsequent presentations have covered a wide range of scientific topics, and CMMAP looks forward to this event growing even larger in the near future. Interested in the FRTSC? Contact Melissa Burt at [mburt@atmos.colostate.edu](mailto:mburt@atmos.colostate.edu).



Young scientists participate in the hands-on activities during Dr. Lisa Angeloni's presentation.



Dr. Tod Clapp from CSU's Department of Biomedical Sciences addresses local Fort Collins teens at the third Teen Science Café.



USA Science and Engineering Festival participants left to right: Sheila Ferguson,\* Melissa Burt, Adam Pearlstein,\* Sean Beal,\* and Heather Michalak\* (\*Little Shop of Physics).

### CMMAP and Little Shop of Physics Team Up Again for Outreach

It was a very busy year for CMMAP and the Little Shop of Physics. Not only did they participate in the annual 9News Weather and Science Day and the Front Range Teen Science Café together, but they also teamed up for the Third Annual USA Science and Engineering Festival. This festival, a multiday, hands-on science expo in Washington D.C., was attended by several Little Shop of Physics members and Melissa Burt, CMMAP's education and diversity manager. This festival, the largest and only national science fair in the country, attracted children, teens, and their families, who had a curiosity about science, and featured 750 exhibits with information from professional scientific and engineering societies, to universities, and television science celebrities as well. "We had a fantastic time at USA Science and Engineering Festival!!" stated Melissa. "We saw more than 10,000 people in three days and helped demonstrate hands-on science to children and adults alike. Participating in this event was a great experience, and we'd like to thank the National Science Foundation for making this possible!"



A young scientist is intrigued by one of many Little Shop of Physics displays.

## Weather Station Commemoration – 125 Years of Observations

**O**n Monday, July 28, 2014, the Colorado Climate Center hosted an event at the historic Fort Collins Weather Station located on CSU's main campus, just north of the Lory Student Center. This event commemorated 125 years of weather observations and featured a plaque dedication, multiple speakers, and a public open house. The event drew close to 200 people and showcased the importance of weather observations on an individual and larger-scale basis. Observations in Fort Collins and elsewhere are vital, as weather has a direct impact on everyone's daily life. Understanding the history of the station and past observations helps current observers and weather forecasters interpret and analyze data to the best of their ability, keeping in mind that trends, variations, and extremes in climate, past and present, all have meaning.

To learn more about the Colorado Climate Center, the weather station, and historical weather perspectives, visit <http://climate.atmos.colostate.edu>.



*Weather Station observers discuss rain gauges with budding young scientists.*

## Melissa Burt Named to AMS Board on Women and Minorities

**M**elissa Burt, CMMAP's education and diversity manager and atmospheric science Ph.D. student, was appointed to chair the American Meteorological Society Board on Women and Minorities in the last quarter of 2013. This board, a perfect fit for Melissa with her outreach background, examines workplace issues, including educational and professional opportunities that affect those employed in the atmospheric and related oceanic and hydrologic sciences for all segments of the AMS, with special emphasis on women, minorities, and underrepresented groups. The function of this board is to recommend and develop programs, advocate for educational and professional opportunities, and periodically survey the membership and report on the society's character, demographics, and professional needs. In addition to this, the board also reviews AMS minority scholarships and makes recommendations to the AMS Council. With all these board objectives in mind, Melissa has been busy and has tenaciously taken on each objective and will continue to do so through her 2016 appointment. As chair, she's been focusing on hosting a variety of events, including the annual Women in Atmospheric Sciences luncheon to be held on Jan. 7, 2015 at the annual AMS Meeting in Phoenix. Interested in the luncheon? Contact Melissa for details at [mburt@atmos.colostate.edu](mailto:mburt@atmos.colostate.edu).



*Melissa Burt*



*Professor Scott Denning interacts with students at the Student Communication Workshop.*

## CMMAP Hosts Successful 2014 STC Directors Meeting

**O**n Aug. 18 and 19, CMMAP successfully hosted the 2014 National Science Foundation Science and Technology Center Directors Meeting. This meeting, held at a different center location each year, brings together science and technology center staff and NSF members to discuss a variety of topics, ranging from center overviews and highlights, to current scientific and education topics, to best center practices and future collaborations, through a variety of breakout sessions. A plenary speaker was included at this event as well as students, who received training at a separate Student Communication Workshop. Bringing STC staff together for this meeting each year not only strengthens bonds between the centers and NSF, but also allows for networking opportunities and the chance to discuss new research possibilities and funding for years to come.





Department of Atmospheric Science  
 117 Atmospheric Science Building  
 1371 Campus Delivery  
 Fort Collins, Colorado 80523-1371

NONPROFIT ORGANIZATION  
 U.S. POSTAGE  
**PAID**  
 Fort Collins, Colorado 80523  
 Permit Number 19

## Contact Us

Department of Atmospheric Science  
 1371 Campus Delivery  
 Colorado State University  
 Fort Collins, CO 80523-1371  
 Phone (970) 491-8682  
 Fax (970) 491-8449  
 www.atmos.colostate.edu

Editor: Noel Bryan

**The Atmospheric Science Newsletter is published annually for alumni, friends, and members of the Department.**

**Please send alumni news, article suggestions, comments, questions, corrections, and address updates to: [info@atmos.colostate.edu](mailto:info@atmos.colostate.edu), or call (970) 491-8682.**

**[www.atmos.colostate.edu](http://www.atmos.colostate.edu)**

An equal-opportunity University.

## Colorado State University Department of Atmospheric Science

Please consider supporting the activities of the Department of Atmospheric Science. Your gift strengthens the core of Colorado State through the recruitment and retention of world-class students and faculty. It also ensures that our Department will continue to be a leader in weather, climate, and air quality research.

Enclosed is my/our check for a gift of:

\$1,870    \$1,000    \$500    \$100    \$50    \$ \_\_\_\_\_

*(Payable to Colorado State University Foundation)*

Name \_\_\_\_\_

This gift is from    me    my spouse and me    my partner and me

Spouse's/Partner's Full Name \_\_\_\_\_

Address \_\_\_\_\_

City, State, ZIP \_\_\_\_\_

Home Phone (\_\_\_\_\_) \_\_\_\_\_

E-mail \_\_\_\_\_    Home    Work

A matching gift form is enclosed.

**Make a gift online at [www.advancing.colostate.edu/atmos](http://www.advancing.colostate.edu/atmos)**

Charge this gift of \$ \_\_\_\_\_ to my/our

VISA    MasterCard    American Express

Card Number \_\_\_\_\_

Expires \_\_\_\_/\_\_\_\_ (mm/yy)   Card Security Code \_\_\_\_\_

Name on Card \_\_\_\_\_

Signature \_\_\_\_\_

**Please apply this gift to:**

\$ \_\_\_\_\_ Atmospheric Science (13683)

\$ \_\_\_\_\_ ASCENT (70403) – Assisting Students, Cultivating Excellence, Nurturing Talent, Helping Colorado State University's Department of Atmospheric Science recruit and train tomorrow's leaders.

\$ \_\_\_\_\_ Other \_\_\_\_\_

(College, department, or fund name)

Please return this form with your gift to: CSU Foundation, P.O. Box 1870, Fort Collins, CO 80522-1870

E1514/13683