



# AOS & CICS Newsletter

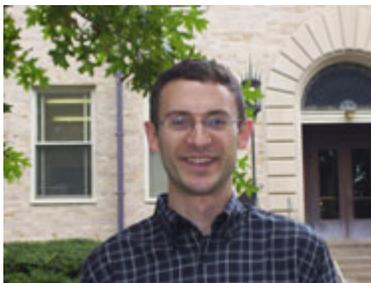
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## AOS Welcomes Assistant Professor David Medvigy

AOS welcomes our new Assistant Professor David Medvigy, who joined the Program in the fall.

Prior to coming to Princeton, Medvigy was a Postdoctoral Fellow at Duke University in the Department of Civil and Environmental Engineering with research interests in weather and climate modeling. Before that, he was a Postdoctoral Fellow at Harvard University in the Department of Applied Physics with research interests in the terrestrial carbon cycle.



Assistant Professor David Medvigy

Medvigy's current research efforts center around understanding local-regional scale variability in climate and terrestrial biosphere, with a special focus on the processes linking these two components of the Earth system. This includes study of the relationships between the atmospheric circulation, terrestrial ecology, and biogeochemical fluxes, and how all of these are responding (and are projected to respond) to anthropogenic forcings. "He has brought with him new projects, ideas, and energy. We are very pleased to have him on board," AOS Director Jorge Sarmiento said.

Medvigy earned his Bachelor of Science degree in physics from Rutgers University in 1998. He holds a Ph.D. in Applied Physics from Harvard University. ■

## Suki Manabe Inducted into the Kyoto Earth Hall of Fame

Suki Manabe, a Senior Scientist in the AOS Program, has been selected as one of the first three 2009 inductees to the Kyoto Earth Hall of Fame in recognition of his seminal contribution to the study of global warming. The commemoration ceremony will be held on February 14, 2010 in Kyoto.



Senior Scientist Suki Manabe

Founded in Kyoto "to honor environmental achievement in perpetuity and to send the world a message about the importance of solving our global environmental problems by living in harmony with nature," the Kyoto Earth Hall of Fame aims to commend those who have made significant contributions to the preservation of the global environment.

*Program in Atmospheric and Oceanic Sciences (AOS) & The Cooperative Institute for Climate Science (CICS)*

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During the last several decades, Suki Manabe has been a leader in the development of climate models and their application to the study of climate. In the early 1960's, he developed a single-column model of the atmosphere in radiative-convective equilibrium. His pioneering studies with colleagues at GFDL produced the first credible calculation of the role of greenhouse gases such as carbon dioxide, water vapor and ozone in maintaining and changing

the thermal structure of the atmosphere. These studies were of vital importance for the development of comprehensive general circulation models, initially for the atmosphere and subsequently for the coupled atmosphere-ocean-land system, and for the first application of these models to study and evaluate global warming. His decades-long quest to develop a quantitative understanding of the climate system led to the development of models that enable the Intergovernmental Panel on Climate Change to inform policymakers about the changes in climate that lie ahead and their attendant impacts on nature and people worldwide.

Manabe spent most of his career at GFDL, helping to build it into the world's premier laboratory for numerical simulation of the atmosphere and ocean. He served on the AOS faculty as lecturer with rank of professor from 1968 to 1997 and as Director of the Global Warming Research Program, Frontier Research System for Global Change in Japan from 1997 to 2001. In 2002, he returned to Princeton and has been a senior Scientist in AOS since 2005.

In a long line of firsts, it seems fitting that Manabe has been selected as one of the first group of inductees to the Kyoto Earth Hall of Fame. He joins fellow inductees Gro Harlem Brundtland, Special Envoy of the United Nations Secretary-General on Climate Change, former Prime Minister of Norway and Director General, Emeritus, World Health Organization (WHO), who is renowned for her legendary leadership in global sustainability and the stewardship of our environment as well as her significant contribution to Kyoto Protocol, and Wangari Maatai, the recipient of 2004 Nobel Peace Prize and the founder of the Greenbelt Movement, a non-profit grassroots organization whose mission is poverty reduction and environmental conservation through global tree planting initiatives.

In addition to this honor, Manabe has been recognized through his election to the National Academy of Sciences and other professional groups. He is an honorary member of American Meteorological Society and other learned societies. He is the recipient of the first Blue Planet Prize, the Volvo

Environmental Prize, as well as many other notable awards. ■

## GFDL Scientists Awarded Silver Medal

Hiram "Chip" Levy, Senior Research Scientist, Daniel Schwarzkopf, Meteorologist, Larry Horowitz, Physical Scientist, Kirsten Findell, Physical Scientist, V. Ramaswamy, Director, GFDL, and Alice Gilliland, (formerly ARL, now EPA), were recently awarded the 2009 Department of Commerce Silver Medal "for quantifying the impact of projected changes in the emission of air pollutants, ozone, sulfate particles, and soot particles on future climate. Specific projected changes in the future emission of pollution, primarily over Asia, are shown to significantly contribute to predicted increase in surface temperature (up to 40%) and reduced rainfall over the summertime continental United States throughout the second half of the 21st century."

The award, the second highest honorary award granted by the Secretary, is awarded for exceptional performance characterized by noteworthy or superlative contributions which have a direct and lasting impact within the Department. The medal was awarded at the Department of Commerce Awards Ceremony held on November, 19, 2009 in Washington, D.C. ■

## AOS Graduate Administrator Retires after 27 Years

Johann Callan, Graduate Administrator in AOS, retired on October 16, 2009, after 27 years in the AOS Program.

"Johann touched the lives of countless graduate students over her many years with us," AOS Director Jorge Sarmiento

said. "When it came to course and graduate study related matters, she was oftentimes the first point of contact for not only students, but faculty and staff as well."



*Graduate Administrator Johann Callan*

Callan began working in the AOS Program in 1982 when it went by the name of the "GFD Program." She acted as the Graduate Student Secretary assisting in the coordination of the day-to-day operations of the Program. As the Program evolved, one thing remained constant amid the changes: Johann's dedication and commitment to the students and staff. "For twenty five years plus, she was an essential and positive force within the Program, Sarmiento added. "She will most certainly be missed."

During her retirement Johann plans on spending time with family and friends and traveling. She hopes to get back to skiing, and perhaps foster a dog or two. We wish her all of the best in her retirement! ■

## GFDL Hosted Successful AeroCom Workshop

**Contributed by Maria Setzer, GFDL Communications Director**

The 8th annual AeroCom Workshop was held at Geophysical Fluid Dynamics Laboratory (GFDL) from October 5<sup>th</sup> to 7<sup>th</sup>, 2009. The event brought together about 90 scientists from ten countries around the world, featuring seminars and posters related to aerosol research.

AeroCom is an international initiative of scientists working to advance our

understanding of global aerosol and its impact on climate. It has enabled scientists to assemble a large number of observations and results from a global model intercomparison, in order to obtain reliable estimates of the present and future aerosol impact on climate and air quality.

This workshop featured new developments in aerosol modeling, reports on the progress of standing AeroCom working groups, and pressing topics in preparation of the fifth assessment report of the IPCC (AR5). Much of the discussion focused on the recently released emission inventories which will be used by climate models for the IPCC AR5; model and satellite-based evaluation of the direct and indirect aerosol effects; and the state of understanding of aerosol microphysics.



*GFDL hosted a group of international scientists whose work advances our understanding of global aerosol and its impact on climate, for the 8<sup>th</sup> Annual AeroCom Workshop, October 5-7, 2009.*

The very first talk, by AOS Postdoctoral Research Fellow Brian Magi, kicked off the workshop on a provocative note. Brian demonstrated that the emissions AeroCom had recommended in the past for the 'preindustrial' era are quite different than what is currently recommended for IPCC AR5. He also established that there are major discrepancies between modeled aerosol optical properties and measured aerosol optical properties, which he challenged AeroCom to address. Emissions may be a major reason for this variance, and the new IPCC AR5 emissions are unlikely to improve the discrepancies.

The two AeroCom working groups related to the model intercomparison of aerosol absorption and indirect effects presented their results, which have been submitted for publication. Suggestions for the next phase of AeroCom model intercomparison were proposed, in particular to form an additional working group on black carbon, and to develop new metrics for the evaluation of

simulated aerosol indirect effects. New datasets were presented and will be incorporated into model evaluation, including ice-core data, ground and satellite lidar data, and aerosol chemical composition over the U.S. and Europe.

Princeton University was well represented among the 32 posters and 41 seminars at the workshop. AOS Postdoctoral Research Fellows Dilip Ganguly and Brian Magi presented posters, as well as graduate student Fuyu Li. Associate Professor Denise Mauzerall (Woodrow Wilson) and graduate students Ilissa Ocko (AOS), Whitworth Alexander (Woodrow Wilson), Yang Zhang (CEE), also attended.

GFDL scientist Paul Ginoux organized the workshop this year, with colleagues from Max Planck Institute, the Laboratoire des Sciences du Climat and de l'Environnement, and NASA. AeroCom is supported by Centre National d'Etudes Spatiales (France), Max-Planck Institute (Germany), and NASA (USA). Next year, their 9<sup>th</sup> annual workshop will be hosted by the University of Oxford, from September 28th to October 1<sup>st</sup>, 2010. ■

## CICS & AOS Researchers Among ARRA Award Winners

As part of the American Recovery and Reinvestment Act (ARRA), Princeton University has received more than \$17 million in research funding from the Air Force Office of Scientific Research (AFOSR), the National Institutes of Health (NIH), and the National Science Foundation (NSF). Funded among the some 40 projects in wide-ranging fields, including energy, mathematics, engineering, meteorology, computer science, politics and neuroscience, are those of Associate Research Scholar, Mike Hiscock, and Associate Research Scholar, Olga Sergienko.



*Mike Hiscock, Associate Research Scholar*

Hiscock has received \$345,000 from the National Science Foundation (NSF) to explore the polar ecosystem of the Ross Sea, one of the most productive regions of the Southern Ocean. The Sea features extreme gradients over space and time in phytoplankton blooms, which drive the oceanic food chain. These variations in productivity are believed to be dependent on the upwelling of deep, salty water that is rich in nutrients into relatively fresh surface water. Hoping to gain insights into the global carbon cycle, Hiscock, in collaboration with scientists at the University of Hawaii, Woods Hole Oceanographic Institute, and Rutgers University, will combine measurements made by remote-controlled deep water gliders with shipboard observations to understand the spatial and temporal variations in upwelling, the chemical composition of the water, and the biological consequences of the process.



*Olga Sergienko, Associate Research Scholar*

In response to the most recent report of the Intergovernmental Panel on Climate Change (IPCC) which called for a more stringent examination of ice stream behavior to improve the understanding of climate change, Sergienko was awarded \$376,000 from the NSF to create models that explore the behavior of ice streams (fast moving rivers of ice within glaciers) and the subglacial lakes that form beneath them under certain conditions. Ice

streams are responsible for the transportation of ice from inland West Antarctica to the floating Ross Ice Shelf. Their movements and characteristics have critical implications for sea level rise in the future. ■

## AOS Alumnus Making a "Green" Difference

Contributed by Maria Setzer, GFDL  
Communications Director



Whit Anderson, GFDL Oceanographer & Former AOS Postdoc

Former AOS Postdoc and Geophysical Fluid Dynamics Laboratory (GFDL) Oceanographer Whit Anderson is a recipient of the 2009 NOAA Green Steward Award. As a dedicated cycling enthusiast, Whit is among many employees at GFDL who commute to work by bicycle regularly. The award recognizes Whit for his efforts to have bicycle lockers installed at GFDL, to accommodate the growing number of bike commuters and encouraging others to do so.

With increasing numbers of staff biking to work at GFDL year-round, the lab had outgrown its indoor bike facilities. Whit identified the need to accommodate more commuter bikes, conceived of the solution, and advocated for its implementation. He did the initial research, drafted a preliminary plan, formed an informal committee of bike commuters, and gained the support of GFDL management. Whit remained involved in the final design, selection of materials, and installation. His efforts are likely to increase the number of GFDL staff who bicycle to work all year long. The project is under construction now, consisting of twenty individual bicycle

lockers and a three-walled bike shelter that will accommodate up to ten bicycles, for a total capacity of 30. A 950 square-foot concrete slab has been poured, and the shelter is in place. Once the lockers are delivered and installed, it will be complete.

2009 is the inaugural year for this award. NOAA strives to recognize and reward employees who initiate "best green practices", to encourage personal actions for a cleaner, healthier planet and lifestyle. Congratulations, Whit! ■

## AOS & CICS Research in Action

*[This column is intended to focus on AOS & CICS research accomplishments and milestones, past, present, and future. In this issue, we highlight the accomplishments of AOS Research Associate Stephanie Henson, who spent almost two years in Jorge Sarmiento's group.]*

After almost two years in Sarmiento's group, Stephanie Henson returned to her native England to take up a research Fellowship in the Ocean Biogeochemistry and Ecosystems team at the National Oceanography Centre, Southampton.



Research Scholar Stephanie Henson

Stephanie's research focuses on the interplay between ocean physical forcing and phytoplankton response, in particular the variability in bloom dynamics. Before joining AOS, she had worked only with satellite and field data and had every observational oceanographer's innate phobia of models. But with the help of colleagues at AOS and GFDL, she soon

learned that the TOPAZ biogeochemical model developed by John Dunne and others, could successfully reproduce many interesting aspects of phytoplankton blooms, and since then she has been merrily using the model to examine current and future ocean primary production. "Working at AOS has really broadened my scientific horizons," Stephanie said. Since my first day here I've been constantly impressed by the exchange of ideas and knowledge, and by how much we all enjoy working at Sayre Hall. We talk about science (and life!) in the corridors, by the coffee machine, at lunch and at tea time, and I am grateful to Jorge and the rest of the group for creating an environment that's not just scientifically stimulating, but also a lot of fun."

"Stephanie is a highly independent scientist, clearly relishing the exchange of ideas and sharing her exciting new findings with others, AOS Director Jorge Sarmiento remarked. "She stands out for her clear vision of where she wants to go in her research, her remarkable ability to see where there are interesting research opportunities and to tackle them imaginatively and creatively, and her talent for getting her research completed and out into the literature."

Her absence will be deeply felt by all of her colleagues in the AOS Program. ■

## AOS & CICS News

### Sarmiento Appointed to Endowed Professorship



Congratulations to AOS Director **Jorge Sarmiento** who has been named the George J. Magee Professor of Geosciences and Geological Engineering!

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Congratulations to AOS Postdoctoral Research Associate **Stephanie Downes** who was chosen to speak at JPL as part of the NASA (Mentoring Physical

Oceanography Women to Increase Retention) MPOWIR Speaker Series. The goal of the series is to familiarize junior women in the field of physical oceanography with the research conducted at the NASA labs and to inform NASA scientists of the research conducted by junior scientists in the community.

Stephanie's research focuses on the formation and circulation of Southern Ocean water masses. Specifically, she looks at the subduction and transformation of water masses, and the associated air-sea and Ekman fluxes, to understand why models differ.

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Congratulations to AOS Graduate Student **Ian Lloyd** who was selected from a competitive pool of applicants to

receive a PEI-STEP Fellowship within the Princeton Environmental Institute. The fellowship funds will support the development of the environmental policy implications of Ian's graduate research involving hurricanes, climate change, and global governance.

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## Arrivals:

**Antoine Venaille** arrived in June and will be working with Geoff Vallis as a Postdoctoral Research Associate. He comes to Princeton from Universite Joseph Fourier – Grenoble, France. His research focuses on connecting theoretical approaches of turbulent flows to the real ocean.

**Ayumi Fujisaki** arrived in July and will be working with Leo Oey as a Visiting Postdoctoral Associate. She comes to Princeton from the University of Tokyo.

Her research involves analytical and numerical modeling of ice-melting as a result of wind acting on inhomogeneous distributions of ice. She is one of those rare scientists with exceptional mental and physical toughness, having recently completed the New York marathon (her 5th) in 3 hours and 52 minutes.

**Jeffery Gall** arrived in July and will be working with Isaac Held as a Visiting Postdoctoral Research Associate. He comes to Princeton from the University of Rhode Island where he is a Marine Research Associate. His research focuses on tropical storm genesis in our global climate models, with an emphasis on the predictability of sub-seasonal variations in storm activity.

**Joe Kidston** arrived in July and will be working with Geoff Vallis as a Postdoctoral Research Associate. He comes to Princeton from the School of Geography, Environment and Earth Sciences at the Victoria University of Wellington, New Zealand. His research focuses on the poleward shift of the mid-latitude jet streams under global warming.

**Young-Gyu Park** arrived in August and will be working with Anand Gnanadesikan and Sonya Legg for one year as a Visiting Research Scholar. He comes to Princeton from the Korea Ocean Research and Development Institute (KORDI) where he is a Research Scientist. His research focuses on the effect of horizontal resolution on tracer uptake in conjunction with convection through idealized modeling.

**Mehmet Ilicak** arrived in August and will be working with Sonya Legg and Robert Hallberg as a Postdoctoral Research Scholar. He comes to Princeton from the Rosenstiel School of Marine and Atmospheric Science, University of Miami. His research focuses on the influence of small scale processes in the ocean on the large scale circulation.

**Thomas Spengler** arrived in September and will be working with Isaac Held as a Postdoctoral Research Associate. He comes to Princeton from the Institute for Atmospheric and Climate Science, ETH Zurich. His research focuses on Tropical - Extra-tropical Interactions: Mechanisms and impact on synoptic and seasonal scales.

## Graduate Student Defenses

**Aga Smith-Mrowiec**, under the guidance of Steve Garner, successfully defended her thesis (July 2009) entitled, "Hurricane Intensity in Dry and Moist Atmosphere." She has accepted a postdoctoral associate position at NYU.

## Departures

**Johann Callan** – Oct. 2009  
Retired after 27 years in the AOS Program

**Stephanie Henson** – Oct. 2009  
Ocean Biogeochemistry and Ecosystems team at the National Oceanography Centre, Southampton

**Arnico Panday** - Aug 2009  
University of Virginia

**Joke Lubbecke** – July 2009  
IFM-GEOMAR in Kiel Germany

**Torge Martin** – July 2009  
IFM-GEOMAR in Kiel Germany

## Birth Announcements

Congratulations to former Graduate Student **Patrick Schultz** and his wife Polina on the birth of their son, Micah Eli, who was born on September 25, 2009, weighing 7 lbs. 4 oz. and measuring 21 inches long.

*AOS Program  
Princeton University  
Sayre Hall  
300 Forrestal Road  
Princeton, NJ 08540*

*Phone:  
(609) 258-6047*

*Fax:  
(609) 258-2850*

*We're on the Web!  
[www.aos.princeton.edu](http://www.aos.princeton.edu)*

*Editor: Joanne Curcio  
Email:  
[jcurcio@princeton.edu](mailto:jcurcio@princeton.edu)*