



# AOS & CICS Newsletter

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## Ocko Receives Emerging Alumni Scholars Award for 2012-2013

AOS Graduate Student Ilissa Ocko was chosen by the Alumni Council's Committee on Academic Programs (CAPA) as one of three recipients for the Emerging Alumni Scholars Award for 2012-2013. The award was presented at a forum for local alumni and members of the Princeton community on April 30, 2013 in Aaron Burr Hall.



AOS Graduate Student Ilissa Ocko

Ocko was selected based on the excellence of her dissertation project, her ability to communicate in an engaging manner to a broad public outside of her discipline, and on the merits of her distinguished career at Princeton. "Ilissa has concluded her meritorious career in the AOS Program with an excellent Ph. D. dissertation focusing on the contrasting climatic effects of the prominent particulate pollution (sulfates and soot) arising as a consequence

of human-influenced emissions. She has been honored with the award for her novel scientific research that identifies the physical mechanisms, and for her outstanding ability to communicate the findings and relate the climatic significance of the particulate pollution to diverse audiences ranging from the peer scientific community to the non-profit, governmental and private sectors," said her thesis adviser V. Ramaswamy, Director of GFDL.

"I was very thrilled when we received the news that Ilissa had been selected for this high competitively-earned honor, which went out to only three students," Ramaswamy added. "With her scholastic achievements and recognition, Ilissa has made us all in AOS/GFDL very proud of her."

The forum featured 15-minute presentations by each of the three recipients which were videotaped and made available online to the entire audience of 82,000 Princeton alumni and members of the public at large. (See: <http://alumni.princeton.edu/learntravel/events/gradscholars/>) Ilissa's presentation is entitled "How tiny particles in the atmosphere change temperature, rainfall, and the transport of heat."

This was the sixth year of the Emerging Alumni Scholars Program (formerly known as the Hoffman Scholars Program). The goal of this award program is to honor outstanding graduate students and introduce their work to the alumni community, both graduate and undergraduate, in an effort to engage them in the intellectual life of the University. ■

TigerTransit/Shuttle Services Operating on Summer Schedule  
<<http://www.princeton.edu/transportation/ttroutes/ForrestalSummer2013.pdf>>.

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

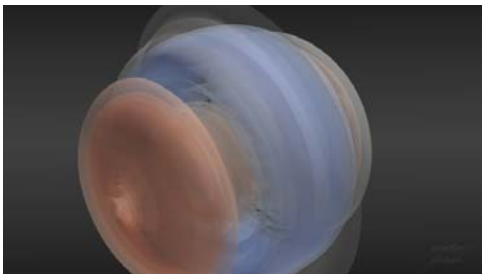
Inside this issue:

- Ocko Receives Emerging Scholars Award* ..... 1
- Jucker Wins First Prize Art of Science 2013*.....2
- Ming Appointed Lecturer*.....2
- Persad Awarded Fellowship*.....2
- Incoming Students Fall 2013*.....3
- Bollasina & Ginoux Honored by AGU* .....3
- AOS Represented at AOFD Conference* .....4
- GFDL Science Symposium* .....4
- AOS Student Workshop*.....5
- PECS Scholars at Environmental Humanities Conference*.....5
- Held Co-organizes Workshop*.....6
- AOS Alums Plan Summer School*.....6
- Nereus Annual Meeting Held*.....7
- Research in Action*.....7
- AOS & CICS News* .....8

# Jucker Wins First Prize Art of Science 2013

AOS Postdoctoral Research Fellow Martin Jucker was awarded first prize at the Princeton Art of Science 2013 Exhibit on May 10, 2013. The Art of Science exhibition explores the interplay between science and art. The exhibit consists of 43 images of artistic merit created during the course of scientific research.

The 2013 competition drew 170 submissions from 24 departments, with work by undergraduates, faculty, staff, graduate students, and alumni. Entries, including Martin's winning visualization of Earth's wind patterns in shades of red and blue "East-West, West-East," were chosen for their aesthetic excellence as well as scientific or technical interest by a distinguished panel of judges. The panel included Katherine Bussard, Peter C. Bunnell curator of the Princeton Art Museum; David Dobkin, Dean of the Faculty; Emmet Gowin, Professor of Visual Arts, Emeritus; Paul Muldoon, Howard G.B. Clark '21 University Professor in the Humanities; and Shirley M. Tilghman, President.



**East-West, West-East**

Martin Jucker

*Program in Atmospheric and Oceanic Sciences*

The theme for the 2013 exhibit was "Connections." Andrew Zwicker, an Art of Science organizer who is director of science education at the Princeton Plasma Physics Laboratory, said that some of the most exciting scientific discoveries have come from breaking down the traditional walls that separate scientific disciplines. "It is fascinating to see something as scientifically based as the Earth's wind patterns as a source of aesthetic pleasure. I am so pleased that Martin not only

participated in the competition but that he took home first prize," AOS Director Jorge Sarmiento commented.

Art of Science 2013 is sponsored by the David A. Gardner '69 Fund in the Council of the Humanities, the Princeton Plasma Physics Laboratory, and the School of Engineering and Applied Science. It is co-sponsored by the Office of the Dean for Research, Lewis Center for the Arts, PICSciE, Keller Center, Office of the Vice President for Facilities, Lewis-Sigler Institute for Integrative Genomics, Cooperative Institute for Climate Science, and departments of Astrophysical Sciences, Computer Science, Chemical and Biological Engineering, Civil and Environmental Engineering, Mechanical and Aerospace Engineering, Molecular Biology, Physics, and Psychology. This is the sixth Art of Science competition hosted by Princeton University.

The exhibit is displayed in an online gallery. Visit the Art of Science 2013 Gallery at:

<http://www.princeton.edu/artofscience/gallery2013/gallery.php%3Fp=1.html>. ■

## Ming Appointed Lecturer in Geosciences and AOS Program

Yi Ming '03 has been appointed a Lecturer in the Department of Geosciences and the AOS Program effective July 1<sup>st</sup>, 2013. He will be co-teaching AOS 527 Atmospheric Radiative Transfer in the fall with GFDL Director V. Ramaswamy.



*Geosciences and AOS Lecturer Yi Ming*

A physical scientist and head of the Atmospheric Physics and Climate Group at GFDL, Ming's research interests include aerosol physics and chemistry, aerosol-cloud-climate interactions, anthropogenic and natural climate forcings, and global and regional climate change. Ming was presented with The World Meteorological Organization's Norbert Gerbier-MUMM International Award for 2013 along with two other researchers from GFDL for their paper linking changes in monsoon rainfall to human activities. In January, as part of the CM3 development team, he was awarded a Group Gold Medal for Scientific/Engineering Achievement by the Secretary of Commerce and was named a recipient of the Presidential Early Career Award for Scientists and Engineers (PECASE) in 2008.

"We are so very pleased that Yi will be joining our faculty. His appointment furthers our ongoing commitment to delivering an exceptional student experience," AOS Director Jorge Sarmiento said.

Ming holds a Ph.D. in Civil and Environmental Engineering from Princeton along with a certificate in science and environmental policy from the Woodrow Wilson School. He has a B.E. in chemical engineering and a second in environmental engineering, both earned at Tsinghua University in Beijing, China, in 1998. ■

## PEI-STEP Fellowship Awarded to Persad

AOS Graduate Student Geeta Persad has been awarded a PEI-STEP fellowship by the Princeton Environmental Institute (PEI). Selected from a competitive pool of applicants, Persad will join fellow 2013 awardees Stephanie Debats and Xinwo Huang, both within the Department of Civil and Environmental Engineering, and Aahana Ganguly, from the Department of Chemistry, in addressing the environmental policy implications of their thesis research through supplementary course-work and policy-oriented research over the course of the next two years.

Persad's PEI-STEP project entitled, "International Policy Implications of Nonlocal Climate Impacts of Asian Aerosol Emissions" aims to investigate how the teleconnection of the local climate impacts of aerosols over Asia with climate impacts in remote regions may connect the political interests of those remote regions to the management of Asian aerosols and to analyze what benefits that might have for the geopolitics of climate negotiations.



*PEI-STEP Fellow Geeta Persad*

In describing her project, Persad noted that "My STEP project is closely related to my dissertation research." "Strong localized aerosol emissions over Asia have introduced an inhomogeneous forcing into the climate system. I plan to study how Asian aerosols impact both regional and remote climate, with a particular emphasis on how their dynamically important location over the Asian monsoonal heat pump can teleconnect their regional climate influence to remote climate impacts by modifying atmospheric general circulation," she said. "I then hope to expand this approach to a more general understanding of how particular localized forcings by regional aerosol emissions can impact the pattern of the global climate response to aerosols," she added.

Persad's STEP adviser is Michael Oppenheimer, Geosciences and International Affairs, Woodrow Wilson School and her thesis adviser is V. Ramaswamy, Geosciences and AOS.

"I'm really looking forward to this fellowship as a way to take advantage of the exceptional interdisciplinary resources on campus and help forward my goal of doing rigorous research that has simultaneous scientific and societal

benefits! I'm excited to work with Michael Oppenheimer, and hope that my project will help increase useful discourse between AOS/GFDL and the Woodrow Wilson School," Persad said.

"We are so pleased that Geeta was selected for this fellowship," AOS Director Jorge Sarmiento said. "This support will be invaluable to her as she explores the interdisciplinary dimension and policy side of her doctoral research."

Persad joins an impressive group of PEI-STEP Fellows, many of whom have gone on to pursue positions of environmental leadership in academic, government, nonprofit, and industry sectors following their time at Princeton, including former AOS Graduate Students Curtis Deutsch and Ian Lloyd who were awarded the Fellowship in 2000 and 2009 respectively, former Geosciences Graduate Student Bryan Mignone who was awarded the Fellowship in 2001, and current Graduate Student Joe Majkut who was awarded the fellowship in 2011.

Funding associated with Persad's Fellowship is provided by the William Clay Ford, Jr. '79 and Lisa Vanderzee Ford '82 Graduate Fellowship fund. ■

## Three Students Accept Offers of Admission

Three graduate students accepted offers of admission to the AOS Program for fall of 2013. In total, the Program received 57 applications, just shy of the 59 received last year. This number of applicants represents over a five percent increase over the number of applicants for the fall of 2010 and an almost forty percent increase over 2009's total. In total, the Graduate School received 11,179 applications for admission for the 2013-14 academic year, with the school's international reputation and generous financial aid program attracting students from around the world, according to William B. Russel, Dean of the Graduate School.

Among the total applicants to the Program, 42 percent were women and 58 percent were men. International applicants made up over 71 percent of the Program's applicant

pool, an upward trend that has been seen across the University over recent years. These applicants represent twelve countries, with the largest representation from China.

"We were thrilled to see so many impressive applications from around the globe," AOS Director Jorge Sarmiento said. "This is another exceptional group of admitted students who will enrich our already intellectually vibrant AOS community." The students hail from the University of Oxford, Ewha Womans University, Korea, and Peking University.

A new student orientation is being planned for the early fall. ■

## Bollasina and Ginoux Honored by AGU

Massimo Bollasina, an associate research scholar in the AOS Program, and Paul Ginoux, a visiting research collaborator in the AOS Program and physical scientist at GFDL, have been selected by the American Geophysical Union (AGU) to receive prestigious awards this year.

Bollasina has won the 2013 James R. Holton Award from the American Geophysical Union (AGU) for outstanding scientific research and accomplishments of early-career scientists in the fields of atmospheric and climate sciences.



*AOS Research Scholar Massimo Bollasina*

Bollasina's research focuses on the analysis and modeling of the hydrological cycle of the South Asian summer monsoon from intraseasonal to decadal time-scales, with focus on land-atmosphere and air-sea interactions, and understanding the

mechanisms and physical processes underlying aerosol-driven changes in regional hydroclimate and atmospheric circulation.

The award is named in honor of James R. Holton, an outstanding atmospheric scientist, educator, and mentor. During his 38 years on the faculty at the University of Washington, he taught, advised and mentored a large number of students and junior scientists, and was awarded every major honor available in the atmospheric sciences including AGU's Revelle Medal.

Bollasina will be honored at the Section Banquet of the Fall 2013 AGU Meeting in San Francisco. He will be awarded a certificate, a \$1000 prize, and dinner at the Section Banquet. He is the tenth recipient of the Holton award and follows in the footsteps of AOS Alumnus Tapio Schneider \*01 who won the award in 2004 and Arlene Fiore, a former AOS postdoc and GFDL physical scientist, who was awarded the honor in 2005.



*AOS Visiting Research Collaborator & GFDL Physical Scientist Paul Ginoux*

Paul Ginoux has been selected to receive the 2013 AGU Atmospheric Sciences Ascent Award. Established in 2012, the Award aims to reward exceptional mid-career (academic, government, and private sector) scientists in the fields of the atmospheric and climate sciences.

Ginoux is being recognized with the Ascent Award “for sustained pioneering work on aerosols.” His research involves the development and application of aerosols modeling to better understand their direct and indirect effects on climate.

Like Bollasina, Ginoux will be honored at the Section Banquet of the Fall 2013 AGU Meeting in San Francisco. ■

## AOS Well Represented at AOFD Conference

The 19th Conference on Atmospheric and Oceanic Fluid Dynamics (AOFD), sponsored by the American Meteorological Society and organized by the AMS Committee on Atmospheric and Oceanic Fluid Dynamics, was held jointly with the 17<sup>th</sup> AMS Conference on Middle Atmosphere from June 17-21, 2013 in Newport, Rhode Island. One of three special sessions was devoted to the accomplishments and contributions of AOS Faculty Member and GFDL Senior Research Scientist Isaac Held during the year of his 65<sup>th</sup> birthday.

“It was thoughtful for the conference organizers to label one of the sessions in this way,” said Held. “Someone told me the other day that 65 was the new 40(!) but I’ll settle for 55 at this point,” Held added jokingly.

Eight AOS members, including 2 graduate students, 4 postdocs, and 2 members of the faculty gave a variety of oceanographic and atmospheric presentations. During the tropical tropopause layer (TTL) session, Thomas Flannaghan, a senior research assistant, gave a talk about his work on “The climatology of vertical mixing in the tropical tropopause layer” as did Visiting Postdoctoral Research Associate Tra Dinh who gave a talk entitled, “Cirrus, transport and mixing in the tropopause layer.” Flannaghan also presented a poster entitled, “The importance of background state for the climatology of equatorial Kelvin wave propagation into the stratosphere.” Faculty Member Stefan Fueglistaler presented a talk on “The impact of changes in the strength of the stratospheric Brewer-Dobson circulation on water entering the stratosphere” during the Brewer-Dobson circulation session and a poster on “Hemispheric (a-)symmetries in lower stratospheric dynamics and tracers.” In the session celebrating the accomplishments and contributions of Held, Postdoctoral Research Associate Malte Jansen spoke on the subject of “Supercriticality and the

Turbulent Energy Cascade in Primitive Equations” and Graduate Student Sam Potter gave a talk on “Spontaneous superrotation and the role of Kelvin waves in an idealized dry GCM.”

Postdoctoral Research Fellow Martin Jucker spoke on the subject of “Interplay between radiative base state and dynamics in a dry GCM” in the troposphere-stratosphere dynamical coupling session. During the special session on the ocean meridional overturning circulation, AOS Faculty Member Geoff Vallis presented a talk on “A theory for the meridional overturning circulation and deep stratification of the ocean.” Finally, Graduate Student Amanda O’Rourke presented a poster on “Minimum phase speed bound and jet interaction,” which won a ‘Best Student Paper’ award.

The Conference presented not only an opportunity for AOS members to showcase their research, network with peers who are conducting research in similar areas, and learn about the nature of research that is different than their own but also a unique occasion to celebrate a deserving colleague. ■

## GFDL Science Symposium

The GFDL Science Symposium “Frontiers in Climate and Earth System Modeling: Advancing the Science” was held on May 20, 2013 in the Smagorinsky Room, with approximately 100 people in attendance. About 80 others participated in the Symposium remotely from their home institutions.

The daylong event presented many of GFDL’s recent scientific findings in Climate and Earth System Sciences that have been achieved through frontier modeling efforts on the NOAA High-Performance Computing System, and through synergistic partnerships with CICS/ Princeton University and other national and international collaborators. It featured talks by GFDL scientists focused on important recent scientific findings from the Lab’s latest climate research and modeling activities, among the speakers, panelists and moderators AOS Faculty Tom Delworth, Bob Hallberg, Larry Horowitz, Isaac Held, and V. Ramaswamy; AOS Visiting Collaborators Paul Ginoux,

Vincent Saba, and Charlie Stock; and CICS Scientists Alistair Adcroft, Sarah Kapnick, Meiyun Lin, and Elena Shevliakova.

The symposium explored the following themes: NOAA/GFDL State-of-the-Science; NOAA/GFDL's IPCC AR5 Contribution; Climate Variability and Sensitivity: Ocean and Ice Perspectives; Climate Predictability on Seasonal Interannual and Decadal Scales; Aerosols, Chemistry, Clouds, and Radiation; Regional Climate, Extremes and Impacts; Climate, Carbon and Ecosystems Interactions; and New Modeling Capabilities Advancing NOAA Climate Science. According to GFDL Director V. Ramaswamy, the Symposium themes successfully conveyed a spectrum of the breadth and depth of the ongoing scientific research at GFDL/CICS, including addressing NOAA's key challenges of advancing the scientific understanding, and providing credible information and products about Climate and Earth System processes, variations, and change. "Visitors at the Symposium, including those attending remotely, expressed high acclaim for both the talks and the ensuing panel discussions," Ramaswamy commented.

In addition to the presentations, discussions surrounding the development of next-generation models for improved climate predictions and projections also played an integral role to the success of the Symposium. "The Symposium was a tremendous success and we are extremely pleased with the outcome of the Laboratory's efforts to inform the community about our research advancements," Ramaswamy said.

The event was built upon the October 2011 Climate Modeling and Research Symposium and the GFDL 5-10 year Strategic Science Plan developed in 2011.

## AOS Student Workshop Planned for Fall 2013

From September 9<sup>th</sup> through September 11<sup>th</sup>, 2013, the "Using Diverse Observations in Climate Modeling Research" workshop will be held at GFDL and Sayre Hall. According to AOS Graduate Students Jane Baldwin, Todd

Mooring, and Anna Trugman, members of the Workshop Planning Committee, the goal of the workshop is to give the AOS/GFDL community, particularly the AOS graduate students, the opportunity to learn from innovative scientists from institutions other than Princeton/GFDL and provide a framework for thought and discussion on how observations and modeling can best be used in conjunction to better our understanding of the earth sciences.

Three invited speakers are confirmed for the event. They are: David Noone (University of Colorado Boulder), Scott Saleska (University of Arizona), and Tianle Yuan (University of Maryland Baltimore County/NASA-Goddard Space Flight Center). Each speaker will give one 1.5-hour tutorial for AOS students, lead a small group discussion for AOS students, and present a plenary talk for the entire AOS/GFDL community. In the tutorials, speakers will discuss the observational datasets they use in their research and how these might be productively integrated with or used to assess models. The small group discussions will provide students with a chance to discuss research questions or papers chosen by the speakers in a small group. In the plenary talks, speakers will have the opportunity to present their latest research. The last day will close with a moderated panel discussion with the speakers on the larger themes of the workshop. Beyond these formal events, the workshop will include numerous opportunities for casual interaction between the speakers and AOS students and faculty over meals and breaks.

Over the remainder of the summer, the Planning Committee will be planning the logistical details of the workshop and finalizing the agenda. This fall workshop will likely continue biannually funded by AOS Faculty Member and GFDL Senior Research Scientist Isaac Held's BBVA Foundation Frontiers of Knowledge Award in Climate Change. The topic will change, but the workshop will continue to bring in scientists from outside Princeton to teach and discuss with AOS/GFDL community.

Any questions regarding the Workshop may be directed to the Committee. ■

**Save the Date!**  
**"Using Diverse  
Observations in Climate  
Modeling Research"**  
**September 9th through  
September 11th, 2013.**

## Persad joins fellow PECS Scholars at Environmental Humanities Conference

On March 9<sup>th</sup>, 2013, AOS Graduate Student and PECS (Princeton Energy & Climate Scholars) Scholar Geeta Persad had the unique experience of participating in an interdisciplinary conference, organized by the Princeton Environmental Institute (PEI) and co-sponsored by ten other entities across the University, to consider how the respective disciplines can work together to tackle the enormous environmental challenges that confront our planet. The "Environmental Humanities in a Changing World" Conference was intended to provide an overview of the environmental humanities, an emerging but lesser known field, for scholars, students, and the general public.



(from left to right: Geeta Persad, Tristen Hohman and D.J. Bozym)  
Photo: Courtesy of PEI

In an effort to increase the interdisciplinary make-up of PECS, Persad joined fellow PECS Scholars D.J. Bozym (Chemical and Biological Engineering) and Tristen Hohman (Mechanical and Aerospace Engineering) in a presentation describing the PECS Program and the group's interest in recruiting more graduate students from the humanities and social sciences.

"We had a lively discussion after our presentation with the humanities faculty in attendance on the value of having humanists and scientists in conversation and ways in which humanities viewpoints might be useful to the goals of PECS," Persad said. "It was a thought-provoking experience, and gave me some intriguing insight into the unique ways in which

humanists rather than scientists view environmental issues.”

PECS was created in the spring of 2008 with the aim of providing a platform for Ph.D. students focusing on any aspect of energy and climate research to collaborate, interact, and broaden their understanding of research areas outside of their own discipline as well as their horizons both as scholars and citizens.

Since its inception, PECS students along with members of the Faculty Board are presented with a unique opportunity to thoughtfully approach the multifaceted energy challenges of the 21<sup>st</sup> century. The Conference posed a similar opportunity with the environmental humanities entered into the discussion. For Persad and fellow scholars, that is most certainly a step in the right direction. ■

## Geostrophic Turbulence and Active Tracer Transport in 2 Dimensions Workshop

In collaboration with Princeton University's Program in Applied and Computational Mathematics, CICS co-hosted a workshop from March 13-15, 2013 through the Princeton Center for Theoretical Science on “Geostrophic Turbulence and Active Tracer Transport in 2 Dimensions.” The workshop brought together mathematicians and atmosphere/ocean scientists from around the globe to familiarize them with ongoing research outside of their fields, and possibly fertilize new work within both groups.

According to AOS Faculty Member and NOAA/GFDL Senior Research Scientist Isaac Held, one of the Program's organizers, atmosphere/ocean research on geostrophic turbulence and mathematical research on singularity formation and related questions involves looking at many of the same equations. With that in mind, Held joined forces with Peter Constantin, William R. Kenan, Jr. Professor of

Mathematics and Applied and Computational Mathematics and Director, Program in Applied and Computational Mathematics, Princeton; and Bill Young, a professor of physical oceanography at Scripps Institution of Oceanography, UC San Diego, to organize a workshop around this notion.

Many idealized models of atmospheric and oceanic flows reduce to the two-dimensional (2D) advection of a tracer that in turn determines the flow field. The classic example is non-divergent 2D flow on a plane (or a sphere), where the tracer is the vertical (or radial) component of the vorticity. Of special interest is the "geostrophic turbulence" generated in systems with two interacting active tracers, representing flow at the tropopause and the earth's surface in the simplest atmospheric case. Another example of special interest is surface quasi-geostrophic (SQG) flow, in which the state of the system is completely determined by the temperature at the surface. SQG flows bear some formal resemblance to 3D incompressible flows – for example, dimensional arguments suggest a  $-5/3$  kinetic energy spectrum for the direct turbulent cascade to small scales, just as in 3D. SQG has developed into a model problem for those interested in singularity formation in 3D Euler or Navier-Stokes. The possible formation of singularities in SQG remains unsolved. There is also interest in possible blow-up of active scalar equations with more singular constitutive laws and in questions relating to long time behavior in the limit of small dissipative mechanisms.

According to Held, the workshop provided the opportunity for mathematicians and AOS scientists to discover some common ground, and exposed participants to new methods and models that will possibly galvanize new work within both groups in the future. Approximately one dozen graduate students and post-docs attended from several U.S. universities, and 5 graduate students presented posters. ■



Princeton University  
Summer Faculty and Staff  
Blood Drive Wednesday July 10,  
2013 – 9am-2pm at the Frist  
Campus Center Multipurpose  
rooms B & C

## AOS Alums Plan Summer School on Fundamentals of Ocean Climate Modeling at Global and Regional Scales

In August, the Summer School on Ocean Modeling will train users in the “art” of ocean climate modeling in Hyderabad, India. AOS Senior Professional Technical Specialist V. Balaji has joined forces with former AOS Research Scholar Riccardo Farneti (Abdus Salam International Centre for Theoretical Physics [ICTP], Italy), former AOS Technical Staff Member P.S. Swathi (CMMACS, India), and M. Ravichandran (INCOIS, India) to organize a two-week school that will take students through all the steps involved in configuring, running, and analyzing results from ocean models running on parallel supercomputers and attached to large-scale data archives. The course will also provide an overview of the ocean model MOM's scientific formulation.

According to Balaji, a particular emphasis will be given to the case of the Indian Ocean as an example for regional ocean modeling. Leading experts in the field, among them Steve Griffies (GFDL) and Jasmin John (GFDL), will teach and train young students and scientists in what would be considered “hands-on” practical sessions preceded by daily morning lectures. Lectures will include: introduction to ocean modeling; theoretical knowledge (physics, parameterization, numerics); regional ocean modeling; data assimilation and forecasting; introduction to the TOPAZ biogeochemistry and ecosystem model; and introduction to the FMS software infrastructure.

"I am very excited to co-organize the Summer School on Ocean Modeling in India with some GFDL and AOS researchers," said Farneti. "As an alumnus, I try to keep working and collaborating with as many people in Princeton as possible. This is a great opportunity to build a bridge between some of the best ocean modelers in Princeton and

young talented scientists from the Indian Ocean rim countries. We expect around 40 to 50 participants; it should prove to be a great two-week experience."

"This summer course will be a terrific continuation of a similar course organized in Bangalore in 2004 which spurred several young Indian Ocean modelers to use MOM effectively," Swathi added. "Since then, MOM has developed considerably in terms of new physics, biogeochemistry and computational complexity. This new course will be a wonderful opportunity for your scientists to be introduced to these features," he said. The course is aimed principally at advanced graduate students, postdocs, and research staff who have sufficient computational resources at their home institutions to perform climate experiments.

The Summer School is being sponsored by ICTP, Trieste, Italy and the Indian National Centre for Ocean Information Science (INCOIS) in Hyderabad, India. ■

## Nereus Annual Meeting Held on Main Campus

In mid-February, concern surrounding over-exploitation of the world's fish resources brought together a group of international cross-disciplinary experts from the Nereus Program, a program launched in 2010 to provide scientific advice on this very issue. The annual meeting was held on Main Campus February 12 -14, 2013.

An international research and outreach network, the Nereus Program focuses on understanding the state of the global ocean and the present generations' responsibility to ensure that there will be seafood and a healthy ocean for coming generations. To evaluate implications for the global ocean, this nine-year cooperative program focuses on research, capacity building, and outreach.

Along with their institutional partners, representatives from Princeton University used the opportunity to address the serious decline in marine species around the globe. AOS Director Jorge Sarmiento, Nereus Fellows Thomas Frölicher and James Watson, former Nereus Fellows Kelly

Kearney (RSMAS, Miami) and Ryan Rykaczewski (University of South Carolina), and Charlie Stock, a research oceanographer from GFDL, were all on hand to lend their expertise to this discussion. According to Watson, their work focuses on models of high-trophic marine species. Watson's talk, "A global baseline for fish biomass," for example, couples the global circulation modeling done at GFDL with a new size-based approach to modeling marine ecosystems. The agenda included progress summaries from all Nereus partners, presentations by Nereus Fellows, a special lecture on "Law of the Sea" by Fred Soons and Alex Oude Elferink, University of Utrecht, and strategic and technical workshops.

"The Nereus fellowship has been extraordinary. I have had the opportunity to devise my own interdisciplinary research, sourcing the data, theories and expertise at GFDL, AOS and the department of Ecology and Evolutionary Biology," Watson added. "This has been a very enjoyable and productive postdoc experience."

Nereus' institutional partners include the Nippon Foundation, the University of British Columbia, Duke University, Princeton University, Cambridge University, and Stockholm University. For more information on the Nereus Program, see:

<http://www.nereusprogram.org/content/about-nf-ubc-nereus-%E2%80%93-predicting-future-ocean>. ■

## 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 Associate Research Scholar Claudie Beaulieu who spent four years in Jorge Sarmiento's group.]*

Associate Research Scholar Claudie Beaulieu left the AOS program in May to join the School of Ocean and Earth sciences at the University of Southampton, as a lecturer. Claudie's research focuses on the detection and attribution of temporal changes in the climate system and carbon cycle, with special emphasis on abrupt

changes. She utilizes statistical methods such as change point detection to analyze observations and model outputs.



Former Associate Research Scholar  
Claudie Beaulieu

During her time in Princeton, Claudie investigated abrupt changes in the carbon cycle in collaboration with Jorge Sarmiento. An abrupt increase in the land uptake of carbon has been detected since the late 1980's, suggesting that the land carbon uptake can undergo large changes very rapidly with possible impacts on the rate of climate change. As part of a multidisciplinary effort with NASA and UCLA, Claudie has investigated the mechanisms driving abrupt changes in the terrestrial carbon cycle. Using biogeochemical models, they have identified regions where this uptake increase seems to have occurred and found the climate constraints driving the increase.

Claudie has also researched the detection of climate change trends in ocean productivity. Global climate change is predicted to alter the ocean's biological productivity with implications for fisheries and climate. The most comprehensive information available on the global distribution of ocean productivity comes from satellite ocean color data. However, the limited record length and large natural variability challenge the detection of long-term trends. Our ability to detect long-term trends in ocean productivity is also threatened by potential interruptions in the record due to an aging satellite fleet. Claudie has assessed the impact of interruptions in the satellite record and of natural variability in our ability to detect long-term trends in ocean productivity.

Claudie has also investigated early warning signals for critical transitions in the Earth's climate and ecosystems by supervising an

undergraduate student, Brian Huang, during summer internships and a semester of independent work. Such methods are very important to develop, since current models often fail to represent processes likely to undergo abrupt changes.

“It was great fun having Claudie here,” said AOS Director Jorge Sarmiento. “The convergence of her talents with the particular scientific problems we were trying to make progress on when she arrived was perfect. We are really going to miss her!”

During her time in Princeton, Claudie has developed collaborations within the AOS/CICS community and will continue working with AOS and GFDL scientists. According to her, she “has had a wonderful time in Princeton.” ■

## AOS & CICS News

AOS Faculty Member **Gabriel Lau** has announced his retirement from GFDL effective July 31, 2013. He will be returning to his roots and joining the faculty at his alma mater, the Chinese University of Hong Kong. The AOS family thanks him for his commitment and dedication to our students and wishes him all the best! **More news to come ...**

\*\*\*\*\*  
Congratulations to **Hissa Ocko** who successfully defended her thesis titled, "Contrasting features of scattering and absorbing aerosol direct radiative forcings and climate response" on April 29, 2013. She has accepted a position with the Environmental Defense Fund as a High Meadows Postdoctoral Science Fellow.

\*\*\*\*\*  
Congratulations to Graduate Student **Amanda O'Rourke** on winning a 'Best Student Paper' award at the recent AMS' 19th Conference on Atmospheric and Oceanic Fluid Dynamics.

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**Larry Horowitz** has agreed to serve on the GWC, joining DGS **Isaac Held** and Fellow Committee Member **Stephan Fueglistaler**. We look forward to working with Larry in this capacity! He will be taking the place of **Sonya Legg** who served as DGS, prior to Isaac, as well as a member of the committee. The AOS Program

extends our heartfelt thanks to Sonya for her enormous dedication and commitment to our Program.

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Check out AOS Graduate Student **Kityan Choi's** Science Action Video “How do aerosols influence cloud formation and the Earth's climate?”  
<<http://www.youtube.com/watch?v=8IwG4X6nQ00>>.

\*\*\*\*\*  
AOS Graduate Student **Spencer Hill** has been awarded a Department of Defense NDSEG fellowship.

\*\*\*\*\*  
AOS Postdoctoral Research Associate **Malte Jansen** has been awarded a postdoctoral fellowship with the NOAA Climate and Global Change Postdoctoral Fellowship Program. AOS Visiting Postdoctoral Research Associate **Tra Dinh** is in the 2<sup>nd</sup> year of this fellowship.

\*\*\*\*\*  
Congratulations to AOS Graduate Student **Andrew Ballinger** who was the recipient of an Outstanding Student Paper Award at the AGU Fall Meeting for his presentation “Influence of the zonal mean circulation on tropical cyclone frequency.”

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## Alumni News

AOS Alums **Daniele Bianchi** and **Eric Galbraith** collaborated with AOS Postdoc **Allison Smith**, GFDL Researcher **Charlie Stock**, and McGill Doctoral Student David Carozza on a recent paper that reveals how migrating animals add new depth to how the ocean ‘breathes.’ The paper was published online by Nature Geosciences on June 9<sup>th</sup>  
<<http://www.nature.com/ngeo/journal/v6/n7/full/ngeo1837.html>>.

AOS Alums **Neven Fučkar**, **Shang-Ping Xie**, **Riccardo Farneti**, and **Dargan Frierson** collaborated on a recent study “Influence of the extratropical ocean circulation on the intertropical convergence zone in an idealized coupled general circulation model” available online in the Journal of Climate  
<<http://journals.ametsoc.org/doi/abs/10.1175/JCLI-D-12-00294.1>>.

Former AOS Graduate Student **Yuanyuan Fang** is the lead author of two recent papers: “Using synthetic tracers as a proxy for summertime PM2.5 air quality over the Northeastern United States in physical climate models” published in Geophysical Research Letters  
<<http://onlinelibrary.wiley.com/doi/10.1002/grl.50162/abstract>>, and “Air pollution and associated human mortality: the role of air pollutant emissions, climate change and methane concentration increases from the preindustrial period to present” published in Atmospheric Chemistry and Physics  
<<http://www.atmos-chem-phys.net/13/1377/2013/acp-13-1377-2013.html>>.

## Save the Dates!

We will be honoring **Gabriel Lau** for his contributions to our Program with an informal farewell luncheon at Prospect House on **July 30th** at noon in the Presidential Dining Room. Please R.S.V.P. to Anna Valerio by July 15<sup>th</sup>.

A one-day symposium in honor of **Hiram (Chip) Levy** will be held at GFDL/Princeton on **Friday, August 16th**, in celebration of his retirement from GFDL.

"Using Diverse Observations in Climate Modeling Research" Workshop is planned for the fall. This AOS student-run workshop will be held at GFDL and Sayre Hall from **September 9th through September 11th, 2013**.



If you access computing resources from off campus, you'll be interested to know that OIT has recently introduced **Secure Remote Access (SRA)** as the new remote access service at Princeton. SRA allows the Princeton community to remotely and securely access campus resources. For full information and instructions:  
<<http://www.oit/news/archive/?id=7589>>.

The summer lineup of **University training opportunities** is now available for registration at the Princeton Employee Learning Center  
<[www.princeton.edu/training](http://www.princeton.edu/training)>.



**Princeton Summer Theater** announces its 45<sup>th</sup> season. For information on upcoming performances, please visit:

<<http://www.princetonsummertheater.org/>>

## Arrivals

**2013 Summer undergraduates:** **Ethan Campbell**, an undergraduate from Princeton who will be working with Joe Majkut; and **Bruna Favetta**, also a Princeton undergraduate, who will be working with James Watson in Stockholm this summer. In addition, two CICS-supported MPOWIR interns will be working over at GFDL. **Chen Chen**, from Columbia University, will be working with Andrew Wittenberg; and **Jinting Zhang** will be arriving next week from the University of Washington to work with Rong Zhang.

**Katsuya Toyama** (Tohoku University, Japan) arrived in mid-June and will be working with Keith Rodgers and Bob Key as a postdoc.

**Pu Lin** will arrive in July from the University of Washington to work with Yi Ming and V. Ramaswamy.

## Departures

In April, after two and a half years in the AOS Program and Jorge Sarmiento's group, AOS Postdoctoral Research Fellow **Thomas Frölicher** accepted a position as an AMBIZIONE Research Fellow of the Swiss National Science Foundation in the Environmental Physics Group, ETH Zurich. His research interests include carbon cycle modeling; variability in the carbon cycle from regional to global scales; ocean acidification; oxygen minimum zones; and past and future climate change.

**Claudie Beaulieu**, an AOS associate research scholar, accepted a lecturer position in May at the School of Ocean and Earth Science, University of Southampton. Claudie, who was a member of Jorge Sarmiento's group for four years, specializes in statistical hydrology and climatology.

After three and a half years as an AOS associate research scholar, **Yalin Fan** has taken a position with the Naval Research Lab, Mississippi. She will be leaving Princeton in early July. Among her

research interests is wind-wave-current interaction under extreme wind conditions (i.e. tropical cyclones); surface gravity wave prediction; tropical cyclone prediction using regional and global models; and ocean responses to tropical cyclones.

**Tim Merlis**, a PCTS associate research scholar and colleague, has accepted a faculty position at McGill University. He will be leaving Princeton on July 15<sup>th</sup>. Tim studies topics in climate dynamics including the general circulation of the atmosphere, tropical meteorology, and hurricanes from a theoretical perspective.

## Birth Announcements

Congratulations to AOS Consultant **Cheryl Logan** and her husband, Salvador, on the birth of their son, Milo Alexander Jorgensen, on April 10, 2013, weighing 7lbs. 12oz.

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