



AOS & CICS Newsletter

Fall 2012

Volume 6, Number 3

Philander Honored at Five Controversies in Climate Science Symposium

A symposium in celebration of Knox Taylor Professor of Geosciences S. George Philander's contributions to atmospheric and oceanic science research and graduate student and postdoctoral education was held in Dodds Auditorium, Robertson Hall on September 6 -7, 2012, with nearly 200 people in attendance.



Symposium attendees gather in front of Robertson Hall, Woodrow Wilson School

The goal of the symposium was to contribute to an improved capability to predict future climate changes by assessing certain scientific disputes, and identifying ways to resolve them. Hosted by the AOS Program with support from the National Science Foundation (NSF), the symposium centered around five controversial climate science questions, with invited talks providing background and perspective for panel discussions.

Session topics included the ocean circulation, the seasonal cycle today, ocean-atmosphere interactions and climate fluctuations, paleoclimates and the testing

of climate models, and the current polarization of global warming. The sessions were chaired by AOS Senior Scientists Kirk Bryan and Isidoro Orlanski, David Halpern of JPL, Peter Demenocal of Columbia University, and GFDL Director V. Ramaswamy, respectively, with invited talks by colleagues, former students, and postdocs.



Knox Taylor Professor of Geosciences S. George Philander addressing Symposium attendees

AOS Director Jorge Sarmiento said, "It is gratifying to have this opportunity to honor George for his lifetime of scholarly contributions to our field. Not only has he been a true presence in the AOS Program, inspiring colleagues and students alike with his commitment and passion for his work, but a global presence in our field as well."

From 2007 to 2010, Philander divided his time between Princeton and the University of Cape Town, South Africa. There he was research director of the African Centre for Climate and Earth System Science (ACCESS), which is supported jointly by several universities and government agencies in South Africa. This center engages in research and education related to climate and environmental issues.

Philander joined the Princeton faculty in 1990, after spending 19 years at GFDL.

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

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TigerTransit/Shuttle Services
Operating on Fall Schedule
<http://www.princeton.edu/transportation/ForrestalFall2012.pdf>

During his tenure, he served 16 years as Director of the AOS Program. His research includes studies of the oceanic circulation, interactions between the ocean and atmosphere that result in phenomena such as El Niño and La Niña, paleoclimates (including the recurrent Ice Ages of the past three million years), and future global climate changes. A recognized authority in oceanic and atmospheric sciences, Philander is a member of the National Academy of Sciences and a Fellow of the American Meteorological Society, the American Geophysical Union, and the American Academy of Arts and Sciences.

Reflecting on the symposium, Philander said, “The 2-day symposium confirmed that, because of the need to address challenging new questions, the earth sciences are entering an exciting new phase with excellent opportunities for students new to the field. My sincere thanks to the organizers and supporters of the meeting, and to all the participants who contributed to the stimulating discussions of the facts and theories of science, and also its curious methods involving debates and disputes.”

The symposium was organized by Committee Members and Former AOS Students Jim Carton, Department Chair and Professor, Department of Atmospheric and Oceanic Science, University of Maryland, Ping Chang, Professor of Atmospheric Sciences and Oceanography and Director, Texas Center for Climate Studies and holder of the Louis and Elizabeth Scherck Chair in Oceanography, Texas A&M University, Lisa Goddard, Director of the International Research Institute for Climate and Society (IRI) and Adjunct Associate Professor, Department of Earth and Environmental Sciences of Columbia University, David Neelin, Professor of Atmospheric and Oceanic Sciences, and Institute of Geophysics and Planetary Physics, UCLA and GFDL Scientist Andrew Wittenberg. ■

Bollasina and Coauthors Honored by WMO

A paper authored by Massimo Bollasina, Yi Ming, and V. “Ram” Ramaswamy, that tied weaker South Asian summer monsoons to human activities, has won the

World Meteorological Organization’s Norbert Gerbier-MUMM International Award for 2013. The paper, “Anthropogenic aerosols and the weakening of the South Asian Summer Monsoon” was published in the journal *Science* in September 2011.

“The WMO award reinforces how honored I feel to work at GFDL, and to be able to take advantage of the unique tools that we have at our disposal,” said Bollasina, a Postdoctoral Research Associate with AOS since 2010.



GFDL Director V. “Ram” Ramaswamy, AOS Postdoc Massimo Bollasina, & GFDL Physical Scientist Yi Ming

This research answered an important question about decreasing rainfall during South Asian summer monsoons in the last half of the 20th century. Monsoon rains provide about 80 percent of the precipitation for this region of the world, so weaker monsoons could prove harmful to crops, livestock, water resources, and human and economic health. Policymakers and resource managers needed to know whether the decreased rainfall was part of a natural cycle or was influenced by human activity.

Using the latest GFDL global climate model, the authors compared model simulations with observed monsoon rainfall data and hydrological cycle theory. The results clearly pointed to human influences as the driving force behind decreasing monsoons. However, increased concentrations of greenhouse gases in the atmosphere were not to blame for this observed phenomenon. Aerosols, or tiny particles emitted by the burning of fossil fuels, were. This research indicates the prominent role that aerosols can play in altering regional climate.

“For many years, my research has been devoted to studying monsoons and this research is a fitting culmination of that

work. Much of India is still agricultural and heavily dependent on this rainfall, so new insights about the variability of monsoons are crucial for their society,” said Bollasina.

The three authors will receive the award next spring at the World Meteorological Organization in Geneva. The WMO is the United Nations’ agency for weather, climate, and water and serves the world community.

The WMO established the annual Norbert Gerbier–MUMM International Award to “reward an original scientific paper on the influence of meteorology in a particular field of the physical, natural or human sciences, or on the influence of one of these sciences on meteorology.” The award was named for the late Norbert Gerbier, who served as president of the WMO Commission for Agricultural Meteorology from 1979 to 1985.

To read more about these findings, visit the GFDL website, <<http://www.gfdl.noaa.gov/news-app/story.30>>. ■

AOS Graduate Students Welcomed at New Student Orientation

The Department of Geosciences and the AOS Program held their graduate student orientation programs on Tuesday, September 11th. The programs provide incoming students with information designed to help navigate graduate studies in Princeton’s Geosciences Department and AOS Program. The joint welcome session began with a breakfast in the Great Hall of Guyot Hall, followed by introductions by Allan Rubin, Chair, Department of Geosciences, Knox Taylor Professor of Geosciences George Philander, and AOS Graduate Work Committee (GWC) Member Stephan Fueglistaler.

Following the welcome, four new AOS students returned to the Forrestal Campus for a presentation by the AOS GWC. AOS staff introductions took place, prior to an outdoor lunch with current students and

faculty. Students were then given a tour of GFDL, and a presentation by AOS Senior Professional Technical Specialist V. Balaji provided a brief introduction to GFDL's computing capabilities. Students subsequently met with faculty advisors to discuss areas of possible mutual research interest. In a meeting with AOS Graduate Administrator Anna Valerio, common aspects of the graduate student experience were covered, including Program-specific support/resources and administrative topics.

The day ended with a return trip to Main Campus for a combined picnic dinner behind Guyot and Eno Halls. The Program extends a warm AOS welcome to its newest students: Jane Baldwin, Nicolas Lutsko, Robert Nazarian, and Anna Trugman. ■

Study Examines Impacts of Climate Change on Eastern Pacific Leatherback Turtles

According to a recent study published in the journal *Nature Climate Change*, climate change could exacerbate existing threats to eastern Pacific populations of leatherback turtles and nearly wipe out the population by the century's end. If the study projections hold true, the eastern Pacific population of leatherback turtles will decline by 75 percent by the year 2100.



AOS Visiting Research Collaborator Vince Saba

Dr. Vincent Saba, the study's lead author, an AOS visiting research collaborator and

research fishery biologist with NOAA's National Marine Fisheries Service, conducted the study with researchers from Princeton, Drexel University, Indiana-Purdue University, and NOAA. "We used three models of this leatherback population to construct a climate-forced population dynamics model. Two parts were based on the population's observed sensitivity to the nesting beach climate and one part was based on its sensitivity to the ocean climate," Saba said. The researchers examined turtle populations at Playa Grande, a nesting beach in Costa Rica, which once hosted over 1000 nesting females per year in the 1990's. Now there are only 40 or so nesting females per year. Pairing climate models with twenty years of population data, resulted in projections for warmer, drier years becoming increasingly frequent in Central America. According to the study, high egg and hatchling mortality within leatherback nests associated with warmer, drier beach conditions was the most significant cause of the projected population decline.

"Leatherbacks are long-lived species that mature around age 15 to 22 years. Therefore, this species may not be able to adapt via evolutionary means to the rapid warming of the nesting beaches," explained Saba.

Leatherbacks, the largest sea turtle species, are among the most critically endangered due to a combination of threats, both historical and ongoing, including egg poaching at nesting beaches and juvenile and adult turtles being incidentally caught in fishing operations. Although turtle egg poaching was once a widespread problem and a likely cause of the initial decline, Playa Grande has been protected from poachers since the early 1990's and has not seen a recovery in its population.

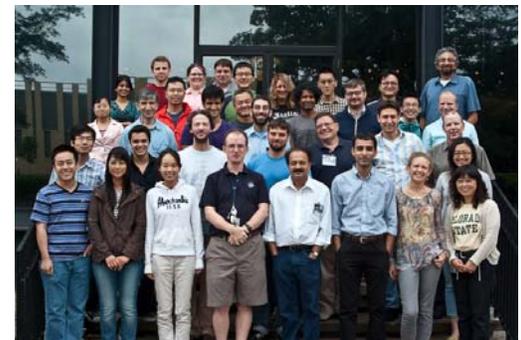
"It is likely that artisanal fishery bycatch off the coasts of Peru and Chile is still a significant source of mortality to this population," Saba said.

Saba will continue this research in October, at the start of the nesting season. Researchers plan on taking eggs to a hatchery to shade them, and will irrigate nests to determine how this affects the temperature of the nest as well as the number of hatchlings produced, a technique that has already been successfully employed in the Caribbean with positive results.

"By artificially cooling nests through shading and irrigation, we may be able to preserve present-day nest success and prevent the climate-forced decline," Saba added.

The study was published online July 1 and was funded by the Cooperative Institute for Climate Science (CICS), Earthwatch Institute, the Betz Chair Endowment of Drexel University, and the Leatherback Trust. ■

SSAM-2012: A Huge Success



SSAM-2012 Participants gather at the entrance of GFDL

The Summer School on Atmospheric Modeling (SSAM-2012) was held at GFDL from July 16th to 20th and according to its organizer, AOS Senior Professional Technical Specialist V. Balaji, appeared to be a "huge success." The course was designed to introduce users to the GFDL AM3 atmospheric model, taking students through the steps involved in configuring, running, and analyzing results from GFDL's climate model running on parallel supercomputers and attached to large-scale data archives. It also provided an overview of the atmospheric model's (AM3) scientific formulation.

Lectures in the morning, to introduce aspects of the model dynamics and physics, were followed by hands-on practice sessions in afternoon. Mid-day or "bridge" sessions connected the science to the software. In addition to expressing gratitude to all the students of SSAM-2012, Balaji offered his thanks to the many GFDL scientists and modeling services staff who acted as science and technical instructors for the course and to the many people who worked behind the scenes. "In

putting this list together, I see what amazing teamwork this represents ...," he said.

"These schools are not easy; there are many unknowns and challenges, and the synchronization of the lectures with hands-on computing is never ever a simple matter. This being the first-ever summer course of GFDL's history - at least in this century - the results, as indicated by the surveys, are fantastic," GFDL Director V. "Ram" Ramaswamy noted. One student summed up his impressions at the conclusion of the school, "I hope that GFDL will hold the second, third, ... SSAM in the following years. Thank you so much!"

In total, 30 students enrolled in the course, many of whom were affiliated with NOAA labs, Princeton University, and other universities or foreign research institutes. International attendees hailed from three different countries, including Saudi Arabia, Canada, and China. Although a general background in climate science was required for acceptance into the course, knowledge of climate modeling or High Performance Computing was considered beneficial, but not necessary. "The most thrilling part for me was the student presentations on the last day, where many students were able to show results from the runs they'd just done – properly framed around a nice hypothesis," Balaji said. ■

Spencer Hill Selected for PECS Group

AOS Graduate Student Spencer Hill was recently selected for the Princeton Energy Scholars (PEC) group. He is among the seven new graduate student members selected for the 2012-2013 academic year.

He joins current PECS members and AOS Graduate Students Joe Majkut and Geeta Persad. 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 as citizens. PECS students along with members of the

Faculty Board are presented with a unique opportunity to thoughtfully approach the multifaceted energy challenges of the 21st century.



AOS Graduate Student Spencer Hill

Meeting over lunch or dinner once a month, the students share research results and introduce their work to one another through informal discussions. During the semester, on at least two occasions, PECS also convenes dinner conversations with faculty, bringing together PECS students, members of the PECS Faculty Board, as well as invited guests from within or outside of the University community. Included among the Faculty Board is new member Assistant Professor Stephan Fueglistaler and current members AOS Senior Scientist Syukuro (Suki) Manabe and Assistant Professor David Medvigy. On other occasions during the semester, social events at local venues will bring together students, faculty, and PECS alumni for informal conversations. PECS alumni include Former AOS Graduate Student Ian Lloyd (2009-2011) and Ilissa Ocko (2010), a current graduate student in the AOS Program.



"I'm thrilled to be a part of PECS. It's a unique opportunity both to consider my own climate research from a fresh perspective and to learn from and collaborate with students from other departments," Hill said.

PECS is supported by the Siebel Energy Grand Challenge. ■

AOS Holds Graduate Student Retreat

On Friday, September 14th, 2012 AOS graduate students and faculty gathered for a one-day retreat at Mountain Lakes House in Princeton. The retreat was the first of its kind solely organized by AOS students and faculty to promote scientific and social interactions among students and faculty and to welcome the incoming students.



AOS students & faculty engage in conversation underneath the Mountain Lake House canopy

The organizational committee, comprised of AOS Graduate Students Jeff Strong and Hannah Zanowski, and Faculty Members Stephan Fueglistaler and Steve Garner, oversaw the planning and the organization of the scientific and social activities at the retreat. The scientific sessions included an interactive poster session, highlighting provocative questions/discoveries the faculty has come across in their research, and a light-hearted "career" panel discussion led by selected faculty, including Stephan Fueglistaler, David Medvigy, Gabriel Lau, Sonya Legg, and Gabriel Vecchi. The gathering also provided an opportunity for students to interact through team activities designed to foster relationships and afforded an occasion for improved student/faculty communication.

"The inaugural AOS department retreat was a resounding success with students and faculty enjoying a gorgeous day together away from work. The event, although lasting only a few hours, made definite strides in bringing together the AOS community through mixed academic and lively activities. Following feedback and lessons learned from the afternoon, we hope to turn this retreat into a long-lived AOS tradition," Strong said. ■

CICS Sponsors QUEST Summer Institute

In July, fifteen New Jersey teachers of grades 3-8 from seven school districts participated in a CICS-sponsored summer institute in weather and climate. The program is hosted by the University's Program in Teacher Preparation, in collaboration with CICS. It is designed to enhance teachers' knowledge of science through inquiry-based experiences, emphasizing self-directed investigation rather than textbook learning.



2012 Quest Participants

In addition to enhancing participants' knowledge, the well established Quest program aims to inspire new ways to present material to their students. Participants perform experiments as well as discuss pedagogy and underlying content with colleagues and the faculty, developing skills for instructing inquiry based science. Under the guidance of Dr. Steven Carson, formerly of GFDL and currently a science teacher at Witherspoon Middle School, Princeton, participants explored the fundamentals of weather and climate through hands-on activities and demonstrations. "In QUEST teachers learn the principles of weather and climate through hands-on activities that they can then use with their students. The teachers' increased understanding and the available activities help them convey the importance of the interactions between humans and Earth's atmosphere," Carson said.

Topics addressed included: air pressure, temperature, seasons, the greenhouse effect, climate change, humidity, clouds, wind, the Coriolis effect, and storms. Guest Speaker Mike Winton, a GFDL scientist,

was invited to speak about climate change, a topic that is addressed throughout the week within lectures, demonstrations, and experiments.

According to Anne Catena, Program Associate/Director of Professional Development Initiative, Program in Teacher Preparation, the feedback from the participants was overwhelmingly positive. "CICS' support of QUEST has been instrumental in developing teachers' understanding of current research and teachers' ongoing professional growth," said Catena.

"It's gratifying to know that CICS plays a role in the professional development of our local teachers; I am pleased that we have the opportunity to support their growth," CICS Director Jorge Sarmiento added.

The workshop took place between July 16th and the 20th. ■

Balaji at the Forefront of "Exascale" Supercomputing

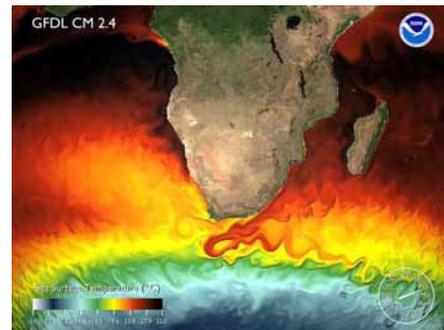
AOS Senior Professional Technical Specialist V. Balaji joins William Tang, head of the Fusion Simulation Program at PPPL, and Jeroen Tromp, the Blair Professor of Geology and director of PICSciE, as recipients of grants from the Group of Eight's (G-8) Research Councils Initiative on Multilateral Research Funding to aid in the development of the advanced software that will put the coming new generation of computers to work on solving problems of global interest.

Operating at a speed called "exascale," these supercomputers will produce realistic simulations of exceedingly complex phenomena in nature, including climate change. Balaji plans on using his \$313,000 G-8 grant to design software that will organize the massive but oftentimes unmanageable archives of climate data from around the globe. According to the climate modeler, producing accurate forecasts of a changing climate, particularly on the regional scale, is of fundamental interest to those managing environmental impacts and effects on public health.



AOS Senior Professional Technical Specialist V. Balaji,
(Photo by Elle Starkman)

In producing such predictions, different research groups have constructed different mathematical models to use. This further complicates matters, according to Balaji. There is a "giant data archive" that exists. But, with 20 different models in use, he explained, scientists could come up with 20 different predictions. "We have to run them all and analyze them as an ensemble to know where there is scientific consensus, and where there is uncertainty, and how to quantify that uncertainty" he added.



A plot of a region of sea surface temperatures from a high-resolution global coupled climate model. Pictured are the Agulhas rings, a well-known feature of the currents around Southern Africa (Image courtesy of NOAA/GFDL)

The data is out there, but it will take exascale computing to organize it, Balaji noted. He is focused on designing software to organize climate data from a massive archive that includes numerous models worldwide. His group is developing computer language that would instruct powerful computers to coordinate and streamline the analysis of probable outcomes from many models and multiple scenarios.

"There is recognition that science is international in scope and that there is an advantage to scientists from different countries partnering together," said Marc

Rigas, staff associate for planning and coordination of the Office of Cyberinfrastructure at the National Science Foundation, which selected and funded the U.S.-based grantees for the G-8 council.

“The G-8 gives us a unique opportunity to have science agencies around the world work together,” Balaji said. He will be collaborating with peers in Canada, France, Germany, the United Kingdom, and the United States.

The three-year awards for the Princeton researchers are part of a pilot program established by the G-8, an organization involving leaders of various industrialized nations, including Canada, France, Germany, Italy, Japan, Russia, the United Kingdom, and the United States, in 2010 to foster multinational collaboration among scientists. The Princeton grants were among six winning proposals chosen from 100 international applicants’ submissions.

Feds and Friends Feed Families Food Drive

Contributed by Marian Westley

GFDL and AOS teamed up to participate in the Feds Feed Families Program with a food drive to benefit the Mercer Street Friends Community Food Bank in Ewing, NJ. Boxes were placed in GFDL's main lobby and computer room and the lobby of Sayre Hall, home of the AOS Program.



GFDL's Marian Westley & Steve Mayle

Over a two week period, 309 pounds of food and personal hygiene items were collected. GFDL's Steve Mayle and Marian Westley delivered the donations to the food bank where they learned that food banks in New Jersey are struggling with cuts in

federal food subsidy funding but no reduction in the needs of hungry people in the community.

The Feds Feed Families program is a government-wide, year-round campaign. The Department of Commerce has a goal to exceed 25,000 pounds of donated items for 2012. The next food drive at GFDL takes place around the Thanksgiving Holiday. ■

CICS Funding Garners Local Media Coverage

The continuation of CICS funding recently received local media attention, after U.S. Senators Frank Lautenberg (D-N.J.) and Robert Menendez (D-N.J.) released a press release announcing the more than \$3 million in new federal funding that will go to the Institute to support climate science and education.

“Despite claims from misguided politicians, climate change is a real threat and addressing it is one of the most important challenges that confronts our nation,” said U.S. Senator Frank Lautenberg (D-N.J.) in the August 27th press release. “The extreme weather causing destruction in America and around the globe is simply a sign of things to come if we do not act to stem the worst effects of climate change. Princeton is home to some of the greatest scientists in the world and we're proud to help them advance climate change research.”

Joining in the announcement, Robert Menendez (D-N.J.) said, “There is great work being done by scientists right here in New Jersey that will help our state and our country adapt to our changing climate. These funds will help Princeton stay at the forefront of the research that will help us combat global warming and understand more fully the implications of our changing weather.”

CICS Director Jorge Sarmiento couldn't agree more. “It's a very fruitful program,” Sarmiento was quoted in the Times of Trenton as saying. “Many people that graduated from the CICS program have gone on to work for NOAA's Geophysical Fluid Dynamics Laboratory. It's been a



CICS Director Jorge Sarmiento

huge generator of highly talented and highly educated people working in the fields of climate science and weather prediction.”

Menendez said that the federal support will help Princeton retain the high quality of its climate research.

CICS was founded in 2003 and was created as an outgrowth of over 40 years of successful collaboration between the University and GFDL. ■

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 Gualtiero Badin who spent one year in the AOS Program.]

In late August, AOS Associate Research Scholar Gualtiero Badin left the AOS Program to join the Institut für Meereskunde at the University of Hamburg, Germany as a faculty member. During his stay in Princeton, he worked in Geoff Vallis's group on geophysical fluid dynamics issues. In particular, he worked on theoretical issues in ocean dynamics. His research in Princeton included the extension of an existing theory known as Surface Quasi-Geostrophy, which aims to understand the dynamics of the ocean interior from the knowledge of the ocean surface, to flows that are out of the geostrophic balance, such as filaments and fronts. This theory is particularly important to infer the ocean currents at depth from the knowledge of surface observations, for example of sea surface temperature -- that can be obtained from satellites. He has also

worked on the first observational study of water masses transformation in the Southern Ocean due to mixing. Results show that different factors, such as buoyancy fluxes at the surface of the ocean or mixing in the interior of the ocean, act on different water masses rather than compensate/reinforce one another. In addition, Gualtiero worked on a study on the passive role of western boundary currents in the wind driven ocean circulation, obtaining a mathematical model of the wind driven circulation in which the western boundary current can assume a totally passive role. He is currently working on issues concerning vertical heat transfer in quasi-geostrophic turbulence.



Former Associate Research Scholar
Gualtiero Badin

“Gualtiero is a true intellectual oceanographer, a thinker who tries to address fundamental problems in original ways. Our loss is Hamburg’s gain,” said Vallis.

“I will miss the dynamic environment of AOS/GFDL as well as the intellectual environment of the town of Princeton. I will also miss the groundhog living in front of the AOS building and the news of bears around the town,” Gualtiero said. Gualtiero plans on continuing his collaborations, as well as friendships, with AOS/GFDL scientists. ■

AOS & CICS News

AOS Faculty member and NOAA/GFDL Senior Research Scientist **Isaac Held** was one of four climate scientists to participate in a panel discussion and debate on climate change, titled “Turning Up the Heat on Global Warming”: A Panel Discussion on Climate Change.” The event was held on September 20 and was hosted by The

American Whig-Cliosophic Society, the oldest college literary and debating club in the United States. Held joined Willie Soon of Harvard, Paul Falkowski of Rutgers, and David Legates of the University of Delaware in a discussion about the future of our planet and the controversy surrounding global warming.

A new paper from a team of researchers led by AOS Postdoctoral Research Associate **James Watson** has been singled out for commendation by the Faculty of 1000 (F1000). The study entitled, Changing seascapes, stochastic connectivity, and marine metapopulation dynamics, which examines how changes in ocean currents impact the population dynamics, and hence our management of nearshore marine species, was published in *The American Naturalist* in July 2012.

F1000 evaluator Frédéric Guichard of McGill University wrote in his review, “Watson et al. have gone back to basic metapopulation theory and brought simple models up to speed with the stochastic nature of connectivity. As the authors show, the simple theory of stochastic connectivity makes predictions that are relevant to more complex and quantitative simulations of particle transport. This paper provides an important link between ecological theories and our knowledge of movement in fluctuating environments.”

F1000 is a post-publication review group of thousands of experts worldwide who identify and evaluate the most important articles in biology and medical research publications.

Citation: Changing Seascapes, Stochastic Connectivity, and Marine Metapopulation Dynamics. James R. Watson, Bruce E. Kendall, David A. Siegel, and Satoshi Mitarai, July 2012. *The American Naturalist*, 180 (1): 99-112, doi: 10.1086/665992.

Arrivals

Julia Brandenburg, a visitor from Switzerland entering ETH in the spring as a graduate student, is working in Jorge Sarmiento’s group for two months as of August 30th.

Graduate Students:

Jane Baldwin
Nicholas Lutsko
Robert Nazarian
Anna Trugman

Thomas Flannaghan returned to AOS on September 18th to work with Stephan Fueglistaler as a senior research assistant.

Postdoctoral Research Associate **Carolina Dufour**, from LEGI (Laboratoire des Ecoulements Géophysiques et Industriels), began working in Jorge Sarmiento’s group on October 1st.

Senior Research Specialist **Xiaohua Lin** returned to AOS on October 1st to work Bob Key and Jorge Sarmiento.

Departures

Ryan Rykaczewski – August 2012
Assistant Professor
University of South Carolina

Gualtiero Badin – August 2012
Assistant Professor
Institut für Meereskunde at the University of Hamburg

Maarten Buijsman – August 2012
Assistant Professor
Louisiana State University

Yu-lin (Eda) Chang – October 2012
Assistant Professor
National Taiwan Normal University

Birth Announcements

Congratulations to Faculty Member **Gabe Vecchi** and his wife, Anna, on the birth of their daughter, Maja Evangelina, on September 7, 2012, weighing 7lbs.

Congratulations to AOS Postdoctoral Research Associate **Angélique Melet** and her husband on the birth of their son, Maël, on September 23, 2012, weighing 7lbs 4oz.

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