



AOS & CIMES Newsletter

Program in Atmospheric and Oceanic Sciences (AOS) &
The Cooperative Institute for Modeling the Earth System (CIMES)



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Isaac Held Elected AAAS Fellow



The American Association for the Advancement of Science (AAAS) has elected AOS Senior Meteorologist Isaac Held as an AAAS Fellow. Fellows are elected each year for their contributions to STEM disciplines, including pioneering research, leadership within a given field, teaching and mentoring, fostering collaborations, and advancing public understanding of science. The public announcement came in the AAAS News & Notes section of the journal *Science* on Nov. 27.

Held is recognized in the Atmospheric and Hydrospheric Science Section for his major scientific advances in atmosphere science, climate, and geophysical fluid dynamics.

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Avery Barnett Earns SACNAS Presentation Award



2020 CIMES intern Avery Barnett (Grinnell College) was recently awarded an undergraduate poster Presentation Award at the 2020 Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) – National Diversity in STEM Virtual Conference for her poster, “Validation of Wavewatch III Simulations under Hurricanes in Shallow and Deep Water.” The winning presentation developed out of her research conducted remotely over the summer with former AOS Research Scholar Brandon Reichl (GFDL). Avery was one of only three undergraduates to receive a

Presentation Award in geosciences.

The SACNAS Presentation Awards recognize the next generation of scientists and STEM leaders from historically excluded populations, while

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Welcome!

As we approach the final days of the fall semester, we thank you all for your continued commitment and dedication to your work, despite the ongoing challenges and uncertainty. We are optimistic that we are nearing the light at the end of the tunnel, and we will return to campus not only absurdly adept on Zoom, but also with a greater appreciation of our CIMES and AOS community.

In this issue, we share news of well-deserved recognition for three of our esteemed colleagues and an impressive CIMES intern. We talk to a CIMES alum about his research and time at Princeton. We highlight the GO-BGC Array and a modeling climate impacts project, and applaud the success of our virtual AOS Program Retreat. We welcome all those new to our AOS/CIMES community and extend to you all our deepest wishes for a happy and healthy holiday season!

Gabe Vecchi, Director, CIMES
Stephan Fueglistaler, Director, AOS

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giving visibility to their research and home institutions. The awards also encourage students to continue pursuing the STEM fields and celebrate presenters who make STEM accessible and inclusive. Out of 930 total presenters during the six-day virtual conference, 742 were first-time presenters and 503 are first-generation college students.

“Avery joined us remotely this summer and we dealt with numerous challenges related to the COVID-19 pandemic that could easily have derailed a research project,” said Reichl. “In spite of these challenges, Avery persevered and worked very hard to produce some important results to evaluate the wave model’s skill in shallow water under hurricanes. I’m thrilled with

Avery’s accomplishments during our time working together, and she is very deserving of this recognition from SACNAS.”

SACNAS is an inclusive organization dedicated to fostering the success of Chicanos/Hispanics and Native Americans, from college students to professionals, in attaining advanced degrees, careers, and positions of leadership in STEM.

Image Credit: SACNAS

GFDL Director Selected to Deliver Jule Gregory Charney Lecture at AGU

Contributed by Maria Setzer, GFDL Communications Director

V. “Ram” Ramaswamy, GFDL’s Director, has been selected to give the 2020 Jule Gregory Charney Lecture at the Fall meeting of the American Geophysical Union (AGU). Each year, AGU chooses a “prominent scientist who has made exceptional contributions to the understanding of weather and climate” to deliver the Charney Lecture. Ram was selected in recognition of the leadership role he has played in a range of problems central to climate modeling and the study of climate change, especially in the areas of fundamental radiative transfer, radiative forcing due to ozone and aerosols, radiative signatures of climate change agents, and the contrasting climatic effects of aerosols and greenhouse gases.



The Charney Lecture honors the memory of Jule G. Charney, a dominant figure in atmospheric science over the three decades following World War II. He influenced the change in meteorology from an art to a science and demonstrated commitment to the people and programs in this field.

A Timely Topic: Large, Delayed Outbreaks of Endemic Diseases Possible Following COVID-19 Controls

Social distancing and mask wearing to reduce the spread of COVID-19 have also protected against many other diseases, including influenza and respiratory syncytial virus (RSV, a disease often fatal in small children). But susceptibility to those other diseases could be increasing, resulting in large outbreaks when masking and distancing stop, say a team of Princeton University researchers.

“Although the detailed trajectory of both RSV and influenza in the coming years will be complex, there are clear and overarching trends that emerge when one focuses on some essential effects of non-pharmaceutical interventions (NPIs) and seasonality on disease dynamics,” said co-author Gabriel Vecchi, the director of CIMES and an AOS faculty member.

The [paper](#), “The impact of COVID-19 non-pharmaceutical interventions on the future dynamics of endemic infections” was published online Nov. 9 by the Proceedings of the National Academy of Sciences. This work was supported by CIMES, HMEI, and PIIRS. [Learn more](#).

Isaac Held continued from Page 1

AAAS fellows customarily attend an in-person ceremony in the February after the announcement, but this year's inductees will be honored at a virtual Fellows Forum on Feb. 13, 2021. The honorees will also receive an official certificate and a gold and blue rosette pin (representing science and engineering, respectively) to commemorate their election.

A leader in the field of climate dynamics for over four decades, Held has made fundamental and original contributions to the study of the dynamics of Earth's climate, ranging from theory of the atmospheric circulation, planetary wave dynamics, climate sensitivities, and geophysical turbulence to leadership in the development of the current generation of climate models. His advocacy and practice of hierarchical modeling, spanning the gap between theories and computationally intensive simulations, and using insights from theoretical atmospheric dynamics to understand the forces maintaining the current climate and those at work under climate change have inspired many across the fields of atmospheric dynamics and climate dynamics.

Held is a member of the National Academy of Sciences, a Fellow of the American Geophysical Union (AGU) and the American Meteorological Society (AMS), and has received numerous distinctions throughout his career, including the Roger Revelle Medal from AGU, the Carl-Gustaf Rossby Research Medal from AMS, their highest award for atmospheric science, and the BBVA Foundation Frontiers of Knowledge Award in Climate Change, among others.

AAAS is the world's largest multidisciplinary scientific society and a leading publisher of cutting-edge research through its Science family of journals. AAAS was founded in 1848 and includes more than 250 affiliated societies and academies of science, serving 10 million individuals. The nonprofit AAAS is open to all and fulfills its mission to "advance science and serve society" through initiatives in science policy, international programs, science education, public engagement, and more.

Rong Zhang Named AMS Bernhard Haurwitz Memorial Lecturer

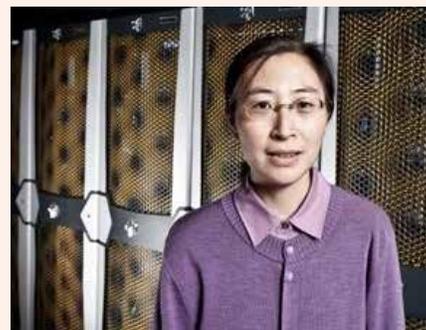
AOS Faculty Member Rong Zhang, a GFDL senior scientist with expertise in Atlantic Meridional Overturning Circulation and Atlantic Multidecadal Variability, has been selected by the American Meteorological Society (AMS) to deliver the Bernhard Haurwitz Lecture. She was cited by AMS for "advancing scientific understanding of the causes and impacts of Atlantic multidecadal variability and Arctic sea ice variations through insightful analysis of models and observations."

Intended to recognize outstanding mid-career scientists, the Bernhard Haurwitz Memorial Lecturer is selected in recognition of significant contributions to the understanding of atmospheric and oceanic fluid dynamics, the circulation of the middle atmosphere, or the dynamics of climate.

Zhang's research examines the broad role that Atlantic Multidecadal Variability plays in climate phenomena around the world, and on a regional level, including seasonal Atlantic hurricane activity, the Sahel and Indian monsoons, and northern hemisphere mean temperatures. Her work has advanced our understanding of the mechanisms of multidecadal climate variability and its importance in shaping the climate record of the Atlantic basin and northern hemisphere.

In addition to her research endeavors, Zhang teaches AOS 573 Physical Oceanography and heads GFDL's Oceans and Cryosphere Division.

Zhang will present her lecture, "The Role of AMOC in Atlantic Multidecadal Variability and Associated Decadal Predictability," at the 101st AMS Annual Meeting in January 2021.



Q&A with CIMES Alum Wouter Mostert, assistant professor at Missouri University of Science and Technology (S&T)

Can you tell us about your research and what lead you to your field?

My research is in modeling air-sea interaction processes at small scales. I run computational simulations to understand the physics of processes like breaking ocean waves, at the level of individual waves (or smaller!), and then use this understanding to build and improve on models that can be used for larger-scale problems (such as regional wave modeling) in Earth system modeling. More generally, these kinds of flows are a subset of problems known as turbulent multiphase flows, which have application across many areas in energy and the environment.

I moved to this field quite recently when I joined the Deike lab at Princeton. Because it's a part of the larger field of Earth system modeling, there's a real chance to interact with a very large community, having a sense that my work is making a difference to other researchers in the university, in the country, and around the world. And of course, it helps us understand better the natural processes governing the Earth's weather and climate.

When it came time for your postdoctoral work, why Princeton?

I actually came to Princeton from another postdoc I did at Caltech, which was related to different kinds of problems such as certain kinds of fusion energy flows. At Princeton, I was attracted by Prof. Deike's research into multiphase turbulent flows in air-sea interaction for their impact on the research community like I mentioned before, but also especially the way he approaches these kinds of problems: a combined effort of theory, computation, and experiment. I appreciated the opportunity to work more closely with other research methodologies besides computation – aside from how it can improve the quality of research; it also helps one understand more directly the strengths and limitations of each methodology.

What was the best thing about doing science here?

The collaborative spirit, along with a genuine curiosity for research, is unparalleled. Every researcher in the department is interested in something that someone else is doing, even if it's just for its own sake – and every researcher is thinking about working with someone else to accomplish something great.

How did your time at Princeton influence your career and research trajectory? What can you add about the interdisciplinary nature of your work while being affiliated with CIMES?

I appreciated having the opportunity to interact with many people in the large research community of Earth system modeling, and to expand my research agenda across a broader set of disciplines. Not only did it add to my existing expertise in fluid mechanics, it also exposed me to the opportunities and challenges that exist when talking to other researchers who have the same overarching goal as you, but who work with different methodologies and frameworks to get it done. In communicating ideas and results in an interdisciplinary context, there are challenges in bridging terminology and jargon, underlying assumptions, and so on – it's hard work, but can be tremendously rewarding when a group of people understand a problem and its possible solution, each from their own perspective. A fluid mechanician and an oceanographer walked into a bar...

How did your postdoc training at Princeton make you competitive for an academic position? Any advice for maximizing your time here? What advice do you have for our postdocs who hope to find a faculty position?

The biggest benefit to me was being given the opportunity to talk to so many people, and being trained, through force of practice, that persistent and pervasive communication is an inherent part of research, and that this is actually necessary to understand the full strength of your own work. Beyond just journals and conference presentations, everyday talking to people about research ideas, methods, and agendas, is effective in a way that's hard to quantify. It really helps nail down your understanding of your own research, where it sits in the community, and how you're placed to answer your research questions; in practical terms, it yields ideas to build your own agenda when preparing for the next step. So my advice would be to talk to anyone and everyone about anything and everything (research-related, presumably!), and think about how you're best placed to answer the questions that are in front of you. If you can communicate it to a friend of a friend over coffee, and if you can communicate it to a professor in a different field in the department, then you can write a faculty application and power through the interviews too.

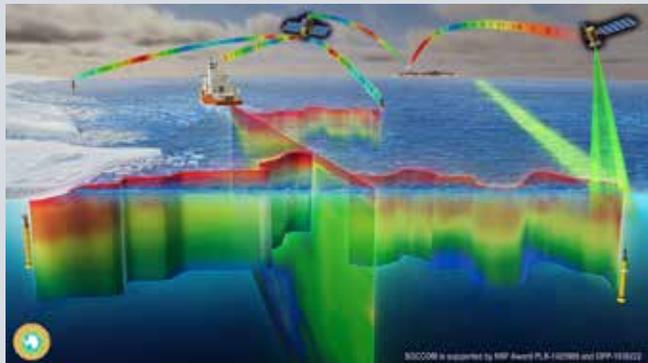
Are you teaching this semester? If so, what are you teaching?

I'm teaching an introductory junior-level course on fluid- and aero-dynamics. It's a lot of fun!

What are enjoying most about your current position and why?

My favorite aspect of it is the freedom to structure my time in an effective way. I like optimizing things, and working in a tenure-track position is an exercise in optimizing time-management, since it involves so many responsibilities. I also appreciate how even though there are so many things to focus on, they all work together in a concerted whole in supporting one's mission as a member of the faculty. It's tremendously satisfying to sit back at the end of the day and realize that a lot was accomplished across an array of different things.

Princeton project expanded to create a worldwide fleet of robotic floats to monitor ocean health



Scientists at Princeton University, Monterey Bay Aquarium Research Institute (MBARI), University of Washington, Scripps Institution of Oceanography at UC San Diego and Woods Hole Oceanographic Institution will use a \$53 million grant to build and deploy 500 robotic ocean monitoring floats around the globe. The new program builds on the successful [Southern Ocean Carbon and Climate Observations and Modeling \(SOCCOM\) project](#) based at Princeton that has deployed similar floats in the ocean around Antarctica, proving their usefulness as year-round reporters of ocean chemistry and biological activity.

The new network of floats, called the [Global Ocean Biogeochemistry Array \(GO-BGC Array\)](#), will collect observations of ocean chemistry and biology between the surface and a depth of 2,000 meters.

“It’s exciting to see the transformative float technology proven in the SOCCOM project extended to all the world’s oceans,” said Jorge Sarmiento, Princeton’s George J. Magee Professor of Geoscience and Geological Engineering, Emeritus and former AOS Director, who is a co-principal investigator on the new project. “The GO-BGC array will give us an unprecedented 3-D view of global ocean biogeochemistry in real time and provide critical information we need to predict future changes in climate and ecosystems.”

Data streaming from the float array will be made freely available within a day of being collected, to be used by scores of researchers, educators and policy makers around the world.

These data will allow scientists to pursue fundamental questions about ocean ecosystems, observe ecosystem health and productivity, and monitor the elemental cycles

of carbon, oxygen and nitrogen in the ocean through all seasons of the year. Such essential data are needed to improve computer models of ocean fisheries and climate, and to monitor and forecast the effects of ocean warming and ocean acidification on sea life, said the researchers.

Although scientists can use earth-orbiting platforms and research vessels to monitor the ocean, satellites can only monitor near-surface waters, and the small global fleet of open-ocean research ships can only remain at sea for relatively short periods of time. As a result, ocean health observations only cover a tiny fraction of the ocean at any given time, leaving huge regions unvisited for decades or longer.

A single robotic float costs the same as two days at sea on a research ship. But floats can collect data autonomously for more than five years, in all seasons, including during winter storms when shipboard work is limited. Floats in NOAA’s Argo array have been measuring ocean temperature and salinity since 1999; until recently there were few float-based observations of ocean biogeochemical properties.

Since 2014, NSF’s Princeton-based SOCCOM project has deployed almost 200 robotic “biogeochemical” floats, based on the Argo design but also carrying sensors to monitor the chemical and biological properties of the ocean. SOCCOM floats have operated for nearly six years in the remote, stormy and often ice-covered Southern Ocean — arguably one of the harshest marine environments on Earth. These floats have already provided critical new information about how the Southern Ocean interacts with the Earth’s atmosphere and winter sea ice.

Similar to the SOCCOM floats, the new GO-BGC floats will carry a number of sensors in addition to the core Argo sensors for temperature, depth and salinity. These include instruments to measure oxygen concentration, pH (ocean acidity), nitrate (an essential nutrient for microscopic algae), sunlight (required for algal growth), chlorophyll (an indicator of algal populations) and particles in the water (including microscopic algae).

The instruments on these floats will allow researchers to monitor the health of the ocean, including the growth and respiration of phytoplankton — drifting algae and microbes that use sunlight as a source of energy — and the nutrients and light that control these processes. The new floats will also provide first-hand data on long-term changes in the ocean, including ocean acidification and the expansion of low-oxygen zones.

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GO-BGC Array continued from Page 5

Participants at Princeton will contribute to the array design and project management, ensuring that the data are linked to global computer models of the Earth's ocean and climate, and participate in a broad public outreach program, including workshops, online curricula and hands-on activities, which will help scientists, teachers, students, and others use these data.



AOS Alum Hannah Zanowski
Image Credit: SOCCOM

The researchers hope that GO-BGC will inspire other countries to contribute similarly instrumented floats, as part of the new global biogeochemical Argo effort. Ideally, this expanded network would double to a sustained array of 1,000 biogeochemical floats uniformly distributed around the world ocean, spaced about 1,000 kilometers (620 miles) apart.

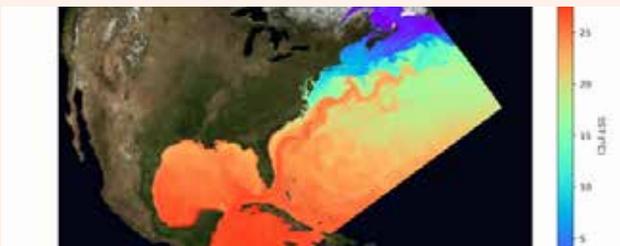
“A global biogeochemical float-based monitoring system would enable a transformative leap in our understanding of the role of the ocean in climate change, the global carbon cycle and marine life,” said Sarmiento. “The observing system will make it possible for scientists around the world to monitor the health and carbon uptake of the global ocean, providing early warning of ecosystem threats/changes and critical guidance for carbon policy.”

Funding for the GO-BGC Array is provided through the NSF's Mid-scale Research Infrastructure-2 Program (MSRI-2).

Enhancing Climate Models for Northeast U.S. Large Marine Ecosystem

Contributed by Maria Setzer, GFDL Communications Director

Charles Stock (Research Oceanographer at GFDL) and Andrew Ross (AOS Associate Research Scholar) have been awarded funding from NOAA's Climate Program Office for their modeling climate impacts project, “Seasonal to interannual ocean habitat forecasts for the Northeast U.S. Large Marine Ecosystem.”



Snapshot of sea surface temperature from a prototype MOM6 hindcast simulation

Many fisheries management decisions are made weeks to months in advance. Therefore, providing skillful climate and ocean forecasts may improve both fisheries yields and sustainability. Although modern global climate forecast

systems can skillfully forecast sea surface temperature and other relevant variables for many parts of the world, forecast systems are less skillful in the Northeast United States Large Marine Ecosystem (NEUS-LME). It is hypothesized that higher resolution models capable of resolving the propagation of ocean-basin scale climate variations to the NEUS shelf can improve forecast skill.

For this project, Stock and Ross, along with co-investigators Alistair Adcroft, Vincent Saba, and Enrique Curchitser and collaborators Mike Alexander and Keith Dixon, will use the new regional modeling capacity built into GFDL's Modular Ocean Model 6 (MOM6) to calibrate and evaluate a regional ocean model that includes the NEUS and the broader Northwest Atlantic Ocean (see Figure). This model will be used to downscale seasonal to interannual forecasts from NOAA's global climate prediction systems and to assess whether the higher resolution model improves the forecast skill.

After developing forecasts for temperature, salinity, and currents using MOM6, researchers will develop a set of biogeochemical forecasts to analyze how the mechanisms underlying the physical prediction skill translate to predictable patterns of acidification, chlorophyll, primary production, and oxygen.

AOS Program Retreat: A Virtual Success

Since its first iteration in 2012, the annual AOS Program Retreat has been consistently popular with students, researchers, and faculty from within the Program as a way to kick-start the academic year. The pandemic may have put an end to the in-person format for now – taking the retreat at Mountain Lake House off the table – but thanks to the ingenuity of the retreat organizing committee who were able to quickly transition the outdoor to a virtual format, the retreat went off without a hitch.



On Friday, October 2, nearly 40 attendees from the AOS Program, including graduate students, postdocs, and faculty, came together for a blend of virtual introductions, social icebreakers, and team-building activities.

The retreat served as a welcoming virtual space for introducing new students to current students, postdocs, and faculty and as an opportunity to become reacquainted with one another, following months of physical distancing. With their introductory slides as a backdrop, the retreat participants introduced themselves to the newest members of the AOS community, including AOS Graduate Students Maya Chung, Kaylie Cohanim, Sam Ditzkovsky, Cameron MacDonald, and Xinyue Wei. Likewise, the new students shared some insights about themselves.

“The introductions were a fun way to learn about people’s personalities,” said AOS Graduate Student Jane Smyth, a co-organizer of the event. “Most people shared a bit about their research interests, personal backgrounds, and hobbies.”

This informal interaction was a welcomed post-COVID-19 distraction, particularly for the new students, as they navigate transitioning to Princeton both virtually and on campus.

The attendees engaged in a rousing game of AOS trivia, pitting teams in breakout rooms against each other in categories such as, Princeton fun facts; Mystery round (guess the theme); AOS song titles; Viruses; and Atmos-fear.

Putting aside any concerns that the retreat would not be as fun or collaborative because of the virtual challenge, retreat organizers came up with a movie activity, challenging team members to bring climate science to the silver screen by pitching a climate-themed movie to the group. Three unrelated climate terms were assigned to each team to be incorporated in the movie pitches, which made for some creative plot twists, according to retreat organizers.

When all was said and done, the “Polar Opposites” team emerged the victors, but it was a win-win for the community, as everyone understood that at the heart of the activities was an understanding that everyone was there to connect. Winning team members included Andrew Ross, Chenggong Wang, Graeme MacGilchrist, Sarah Schlunegger, Ben Johnson, and Tsung-Lin Hsieh.



Winning Pitch: Polar Opposites

“I was glad to see so many AOS students, professors, and postdocs show up and participate with enthusiasm, Smyth said. “It reminded me that we have a wonderful community.”

Joining Smyth on the organizing committee were Shiv Priyam Raghuraman, an AOS graduate student, AOS Faculty Member Steve Garner, and Anna Valerio, the Program’s graduate administrator. They came together brainstorming ways to bring the virtual retreat to life.

“It was great learning about everyone in the AOS community from their slides,” said Raghuraman. “The activities we planned brought everyone together and reminded me of our in-person retreats.”

“I was pleased to see that despite the current restrictions on gathering in-person, the tradition was able to continue in a virtual format, forging new connections and carving out some much-needed social time,” said CIMES Director Gabe Vecchi, an AOS faculty member.

At its core, the event reminded everyone that it is the people who make up the community that make the difference, not the format or circumstances in which they come together.

Alumni News

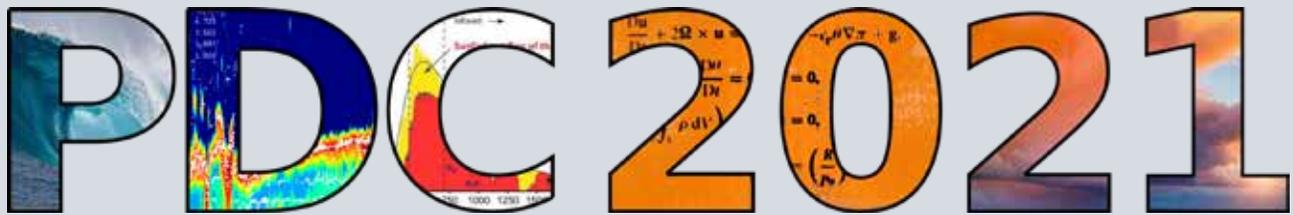
Hannah Zanowski *16 will be starting as an Assistant Professor with the Department of Atmospheric and Oceanic Sciences at the University of Wisconsin-Madison in fall 2021. After leaving Princeton, Hannah spent two years at the University of Washington and is currently at the University of Colorado, working primarily on modeling high latitude ice and consequent ocean freshening due to meltwater.

Geeta Persad *16 (UT Austin) has been selected for the [Editorial Board of the AGU Books program](#). She'll be covering "book" proposals for the Atmospheric Sciences section, and AGU is interested in expanding the scope of its book program to include innovative new media approaches to presenting scientific information. Any AOS alumni thinking

about publishing a textbook, monograph, special issue, or anything resembling a book are welcome to get in touch with [Geeta](#) to learn about the proposal process.

A recent [study](#) by former AOS Research Associate Eric Galbraith (McGill University) lays out an approach for the scientific study of humans that is intended to facilitate integration with non-human processes by striving for a consistent physical basis, for which the name Earth System Economics is proposed.

The approach is intended to provide a flexible and widely-applicable strategy for understanding the human-Earth system, appropriate for physically-based assessments of the past and present, as well as long-term model projections that are oriented towards improving human well-being.



PDC Workshop Rescheduled!

The Physics-Dynamics Coupling in Weather and Climate Models Workshop (PDC 2021) has been rescheduled to June 8-11, 2021 in the Brush Gallery and Auditorium of McDonnell Hall on Princeton's Main Campus. The abstract submission website has been reopened and all previously submitted abstracts are still available.

Co-sponsored by CIMES and GFDL, the workshop is the fourth in a series of biannual workshops aimed at bringing together the growing community of scientists who have an interest in discussing and improving process coupling in geophysical modeling.

The PDC 2021 workshop will provide a forum for an exchange of ideas and experiences on the following topics: Conceptual issues in model or process formulation, including conservation and consistency; Discretization of individual processes and process interactions; Solution sensitivity to static or dynamic adaptation in spatial and temporal resolutions; Test strategies, results, and intercomparisons; and Optimization, algorithmic efficiency and high-performance computing.

The scope of the workshop extends beyond the coupling between an atmospheric dynamical core and its physical parametrizations, according to the 2021 PDC Organizing committee. It also includes a discussion about optimal strategies for coupling processes in and/or between the different component models of the Earth system. Of particular

interest are contributions with a focus on the interactions of physical modules across Earth system components and the numerics of the coupling. In addition, the workshop may also include new approaches to Earth system modeling, including emulators and machine-learning approaches, according to GFDL Research Scientist Lucas Harris, a former AOS postdoc and member of the 2021 organizing committee.

"We are excited to be hosting the workshop in 2021," Harris said. "GFDL is a world leader in coupling technology and knowledge, and this workshop is a great chance for our scientists and engineers to cooperate with scientists and engineers from modeling centers all over the world. It was a difficult choice to postpone the workshop for a year, but it gives us a great opportunity to plan for another year and pick up additional speakers and to design a virtual workshop if the need arises."

The workshop will feature keynote lectures, oral presentations, and a poster session. The [abstract submission](#) deadline is now February 28, 2021 and [registration](#) will open in early 2021.

Additional information about the workshop and registration details can be found on the [PDC 2021 website](#). Workshop organizers will update the website with further information as details become available.

AOS & CIMES News

Congratulations to **Tsung-Lin Hsieh** who successfully defended his Ph.D. Thesis, "Theory and Hierarchical Modeling of Tropical and Extratropical Cyclones," on August 14. Tsung-Lin is continuing his research at Princeton, working with Gabe Vecchi as an HMEI postdoc.

Congratulations to **Elizabeth Yankovsky** who successfully defended her Ph.D. Thesis, "Modeling and Parameterizing Submesoscale Turbulence in Dense Arctic Flows," on August 28. Elizabeth accepted a postdoctoral position at NYU's Courant Institute of Mathematical Sciences, working with Laure Zanna and Shafer Smith.

Arrivals

Rebecca Beadling (UCAR) joined the Program in mid-August as an AOS visiting postdoctoral research associate.

Naser Mahfouz joined us in early October, from Carnegie Mellon University, to work with V. Ramaswamy and Yi Ming as a postdoc.

Jan-Erik Tesdal joined us in mid-October, from LDEO, Columbia University, to work with Steve Griffies and John Krasting as a postdoc.

Yongji Joh joined us in early November, from the Georgia Institute of Technology, to work with Tom Delworth as a postdoc.

Zun Yin joined us early November, from the Laboratoire de Météorologie Dynamique (LMD), to work with Kirsten Findell and Elena Shevliakova as a postdoc.

Hubert du Pontavice joined us in early December, from Agrocampus Ouest, France, to work with Vince Saba as a postdoc.

Enrico Zorretto joined us in early December, from Duke University, to work with Elena Shevliakova as a postdoc.

Departures

AOS Research Specialist **Ruth Moorman** (SOCCOM) left the Program in mid-August to pursue her graduate studies at Caltech.

AOS Postdoc **Gaurav Govardhan** left the Program in late August. He accepted a scientist position under the Ministry of Earth Science, India.

AOS Research Specialist **Benjamin Taylor** left the Program at the end of August to pursue his graduate studies at Scripps.

Lionel Arteaga, an AOS associate research scholar, accepted a position as an Earth Scientist at the NASA Global Modeling and Assimilation Office. His last day was August 31.

AOS Postdoc **Gan Zhang** left the Program in early September. He accepted a weather analyst position with Citadel Americas LLC at its branch in Greenwich, CT.

University Updates!

The [Spring Term 2021 website](#) provides comprehensive academic and campus life information and FAQ's for the spring term.

AOS faculty, staff, and students should check the [University's Princeton COVID Resources website](#) for collected public health information and guidance on COVID-19.

HOLIDAY OUTREACH

Help make the holiday bright for those in need this season:

The Giving Project



Now more than ever our neighbors need our help. Donate a gift, sponsor a family or child, or fulfill a holiday wish. Wish lists from local organizations who need our help can be found at community.princeton.edu

Grateful Greetings

Write a note of thanks to deployed troops, retired vets, first responders, and new recruits. Visit community.princeton.edu to: Download and print a card. Find tips on what to write in your card. Send cards to the Office of Community and Regional Affairs by Friday, December 18.



Virtual Food Drive



Support Arm in Arm Food Pantries. Donate an item or two from the comfort of your living room. <https://amplify.amyourgood.com/user/campaigns/3516>

Community Threads

Donate yarn to be spun into blankets for disabled veterans, infant caps for newborns in the hospital, and hats and scarves for those experiencing homelessness. Washable yarn only. Donations accepted through Friday, December 18. For donation locations visit community.princeton.edu



The Holiday Outreach Initiative is sponsored by the Office of Community and Regional Affairs and the Graduate School. Questions? email puora@princeton.edu