Dr. Spencer Alan Hill

Postdoctoral Research Fellow | UCLA AOS and Caltech GPS

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Current position

NSF Atmospheric and Geospace Sciences Postdoctoral Research Fellow | 2016-2018
Caltech Foster and Coco Stanback Postdoctoral Fellow | deferred to 2018-2020
UCLA Department of Atmospheric and Oceanic Sciences (AOS)
Caltech Division of Geological and Planetary Sciences
Advisers: Jonathan Mitchell, UCLA and Westmont College | Simona Bordoni, Caltech

Education

Ph.D. | Princeton University | Program in Atmospheric and Oceanic Sciences

Conferred September 2016 | Adviser Yi Ming | Committee members: Isaac Held, Leo Donner, Ming Zhao

B.S. | UCLA | Dept. of AOS and Dept. of Applied Mathematics

AOS/Applied Mathematics double major | Conferred June 2011 | Magna Cum Laude | Phi Beta Kappa | UCLA College Honors

Publications

In preparation

1. **Hill, Spencer A.**, Yi Ming, Isaac M. Held, and Ming Zhao. "Towards emergent constraints on future rainfall in the Sahel."

2. Smyth, Jane, **Spencer A. Hill**, and Yi Ming. "Simulated tropical circulation responses to orbital precession and their sensitivity to ocean thermodynamics."

3. Xue, Yongkun, Yi Ming, Jianping Huang, and **Spencer A. Hill**. "Precipitation changes over China in response to a warming ocean."

Submitted/in revision

1. Brown, Patrick T., Yi Ming, Wenhong Li, and **Spencer A. Hill**. "Change in the magnitude and mechanisms of unforced low-frequency surface temperature variability in a warmer climate." Submitted to *Nature Climate Change*.

Peer-reviewed

1. (2017) **Hill, Spencer A.**, Yi Ming, Isaac M. Held, and Ming Zhao. "A moist static energy budget-based analysis of the Sahel rainfall response to uniform oceanic warming." In press, *Journal of Climate*. doi: 10.1175/JCLI-D-16-0785.1

2. (2015) **Hill, Spencer A.**, Yi Ming, and Isaac M. Held. "Mechanisms of forced tropical meridional energy flux change." *Journal of Climate*, **28**, 1725-1742. doi: 10.1175/JCLI-D-14-00165.1.

    - Corrigendum: `https://dx.doi.org/10.1175/JCLI-D-16-0485.1`.

3. (2012) **Hill, Spencer A.** and Yi Ming. "Nonlinear climate response to regional brightening of tropical marine stratocumulus." *Geophysical Research Letters*, **39**, L15707, 5 pp. doi: 10.1029/2012GL052064.

Non peer-reviewed

1. (2012) **Hill, Spencer A.** "A head in the clouds elucidates" (book review of Atmosphere, Clouds, and Climate by David Randall). *Science*, **337**, 1 pp., doi: 10.1126/science.1225615.

PhD thesis

(2016) **Hill, Spencer A.** "Energetic and hydrological responses of Hadley circulations and the African Sahel to sea surface temperature perturbations." PhD Thesis, Princeton University Program in Atmospheric and Oceanic Sciences. Proquest.

Technical/software

1. (2016) Hoyer, Stephan et al. "xarray: v0.8.0." 10.5281/zenodo.59499.

2. Hill, Spencer A. and Spencer Clark. "aospy: automated climate data analysis and management." `http://aospy.readthedocs.io/en/latest/`.

Research and Professional Experiences

12/2016	Co-chair, "Tropical circulations and their sensitivities to changes in climate" session, AGU Fall Meeting 2016
11/2016	Co-chair, "Tropical convection and radiative convective equilibrium" session, WCRP Model Hierarchies Workshop
9/2016-8/2019	Postdoc, California Institute of Technology and UCLA Advised by Simona Bordoni and Jonathan Mitchell
6-8/2015	Organizer, Princeton AOS convection journal club
6/2013–10/2015	Organizer, GFDL Climate Sensitivity Journal Club
9/2012–8/2013	Organizer, Princeton AOS Student/Postdoc Seminar Series
9/2012–8/2013	Princeton AOS Program Student Representative to the Faculty
4/2012–5/2013	Member, Princeton Energy and Climate Scholars
7/2012	Participant, GFDL Summer School on Atmospheric Modeling
6–8/2011	Research Intern, UCLA California Research Training Program in Computational and Applied Mathematics, Slurry Flows Group.

1/2011 Invited Student Secretary, International Geosphere-Biosphere Program Workshop on Ecosystems Impacts of Geoengineering, Scripps Institution of Oceanography, UCSD, La Jolla, CA.

6–8/2010 Research Intern, National Oceanic and Atmospheric Administration Geophysical Fluid Dynamics Laboratory, Princeton, NJ. Advisor Dr. Yi Ming.

Major Honors and Awards

2016 NSF Atmospheric and Geospace Sciences Postdoctoral Research Fellowship

2016 California Institute of Technology Foster and Coco Stanback Postdoctoral Fellowship, deferred to 2018

2013 Department of Defense National Defense Science and Engineering Graduate Fellowship

2012 Princeton University Elliotte Robinson Little '25 Fellowship

2012 American Meteorological Society Climate Change Travel Scholarship for Graduate Students to 92nd AMS Annual Meeting

2012 NSF Graduate Research Fellowship Honorable Mention

2009 National Oceanic and Atmospheric Administration Ernest F. Hollings Undergraduate Scholarship

2007 United States Presidential Scholar. Honored by President George W. Bush at the White House as part of the Presidential Scholars National Recognition Week.

Teaching & Mentoring

Princeton Graduate Teaching Transcript certification

Administered by the McGraw Center for Teaching & Learning. Requirements include two-day teacher training, lectures and workshops on pedagogy, and video recording and subsequent analysis of teaching as a TA. Completed August 2016.

Teaching Assistant

Princeton University, Fall 2014, Geosciences 361, "Physics of Earth: The Habitable Planet." Professor George Philander.

Mentorship

Assistant mentor to summer interns at NOAA GFDL: Jane Smyth (2015), Marjahn Finlayson (2014), Colin Raymond (2013)

Public Outreach

[2015-04-10] "Introduction to weather and climate." 45 minute presentation + Q&A to 7th grade class at Forrestdale Middle School, Rumson, NJ. Co-presented with Sarah Schlunegger.

[2015-06-19] "Introduction to climate models." 20 minute presentation to New Jersey Japanese School during their visit to NOAA Geophysical Fluid Dynamics Laboratory, Princeton, NJ.

Reviewing

Reviewer for *Nature Climate Change*, *Journal of Climate* (x3), *Journal of the Atmospheric Sciences*, *Climate Dynamics*, *Journal of Geophysical Research - Atmospheres*, and GFDL internal manuscript review.

Selected Presentations

[2017-01-24] "Automate your climate and weather data analysis with aospy." Oral. AMS Annual Meeting, Seattle, WA.

[2017-01-24] "Energetic and precipitation responses in the Sahel to sea surface temperature perturbations." Oral. AMS Annual Meeting, Seattle, WA.

[2016-12-16] "Robust drying influence of mean ocean surface warming on The Sahel and implications for constraining future rainfall change." Oral. AGU 2016 Fall Meeting, San Francisco, CA.

[2016-11-02] "A hierarchy of perturbation complexites: Case study of Sahel rainfall response to global warming." Poster. WCRP Model Hierarchies Workshop, Princeton University, Princeton, NJ.

[2016-10-26] "Tropical energetic and precipitation responses to sea surface temperature perturbations: Zonal mean and the African Sahel." Oral. Caltech GPS formal seminar series.

[2016-10-13] "The fate of rainfall in the African Sahel under global warming." Invited oral. Westmont College, Santa Barbara, CA.

[2016-10-05] "Tropical energetic and precipitation responses to sea surface temperature perturbations: Zonal mean and the African Sahel." Oral. UCLA AOS formal seminar series.

[2015-12-14] "Towards constraining future rainfall in the Sahel using the moist static energy budget." Oral. AGU 2015 Fall Meeting, San Francisco, CA.

[2015-05-21] "Towards constraining Sahel rainfall responses to global mean temperature changes." Invited oral. Linde Center for Global Environmental Science "Monsoons: Past, Present and Future" workshop, California Institute of Technology, Pasadena, CA.

[2015-03-13] "Radiative and dynamical controls on the Sahel rainfall response to uniform ocean warming." Oral. Princeton AOS dynamics seminar series.

[2015-03-06] "Mechanisms of forced ITCZ shifts and of rainfall responses in the African Sahel to SST warming." Invited oral. New York University AOS student seminar series.

[2015-01-06] "Convection scheme, cloud, and stability effects on Sahel rainfall response to uniform warming." Poster. AMS Annual Meeting, Phoenix, AZ.

[2014-12-15] "Convection scheme, cloud, and stability effects on Sahel rainfall response to uniform warming." Poster. AGU Fall Meeting, San Francisco, CA.

[2014-10-09] "Mechanisms of forced ITCZ shifts and Sahelian drought in GCMs." Invited oral presentation. Yale University, New Haven, CT.

[2014-06-19] "Mechanisms of forced tropical meridional energy flux change." Poster presentation. Latsis Symposium, ETH Zurich, Zurich, Switzerland.

[2014-02-05] "Mean and extreme tropical precipitation changes caused by the uniform and spatially varying components of anthropogenic forcing." Oral presentation. AMS 2014 Annual Meeting, Atlanta, GA.

[2013-12-13] "Mechanisms of forced tropical meridional energy flux change." Oral presentation. AGU 2013 Fall Meeting, San Francisco, CA.

[2013-11-02] "Mechanisms of forced tropical meridional energy flux change." Oral presentation. Graduate Climate Conference, Woods Hole Oceanographic Institution, Woods Hole, MA.

[2013-07-09] "Mechanisms of forced tropical meridional energy flux change." Poster presentation. Gordon Research Conference, Colby-Sawyer College, New London, NH.

[2012-02-28] "Climate response to a geoengineered brightening of subtropical marine boundary clouds." Oral. Princeton AOS Program Student/Postdoc Seminar Series.

[2012-01-22] "Climate response to a geoengineered brightening of subtropical marine boundary clouds." Poster. 11th Annual Student Conference at the AMS Annual Meeting, New Orleans, LA.

[2011-11-11] "Climate response to a geoengineered brightening of subtropical marine boundary clouds." Oral. Princeton University Department of Geosciences Graduate Research Symposium, Princeton, NJ.

[2010-12-16] "Climate response to a geoengineered brightening of subtropical marine boundary clouds." Poster. Session GC31A: "Can We Counteract Global Warming?" American Geophysical Union Fall Meeting. San Francisco, CA.

[2010-10-26] "Climate response to a geoengineered brightening of subtropical marine boundary clouds." Oral. Special Symposium on Aerosols in Geoengineering at the American Association for Aerosol Research 29th Annual Conference. Portland, OR.

[2010-08-03] "Investigating climate response to geoengineering using a global climate model." Oral. National Oceanic and Atmospheric Administration Office of Education Science Symposium, Silver Spring, MD.