

Robert C. Jnglin Wills

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Research Interests

Climate dynamics, large-scale circulation of the atmosphere and oceans, atmosphere-ocean interactions, climate variability, climate feedbacks and climate change, Earth system modeling, idealized models, spatiotemporal data analysis methods, hydrological cycle, heat waves, biogeochemical cycles, sea ice

Education

- Ph.D., Environmental Science and Engineering** 2016
California Institute of Technology, Pasadena, CA
Dissertation: *Stationary eddies & zonal variations of the global hydrological cycle in a changing climate*
- M.Sc., Environmental Science and Engineering** 2013
California Institute of Technology, Pasadena, CA
- B.S., Engineering Physics, Highest Honors**, University of California, Berkeley, CA 2011

Academic Appointments & Research Experience

- University of Washington, Seattle, WA**
Research Scientist, Department of Atmospheric Sciences Jan. 2021 – present
Data Science Postdoctoral Fellow, eScience Institute 2019 – 2021
Postdoctoral Scholar, Department of Atmospheric Sciences 2017 – 2021
- ETH Zürich, Zurich, Switzerland**
Postdoctoral Researcher, Department of Earth Sciences 2016
Visiting Graduate Student, Department of Earth Sciences 2013 – 2016
- California Institute of Technology, Pasadena, CA**
Graduate Student, Environmental Science and Engineering 2011 – 2016
Advisor: Prof. Tapio Schneider
- University of California, Berkeley, CA**
Undergraduate Research Assistant, Nuclear Engineering 2010 – 2011
- MIT Plasma Science and Fusion Center, Cambridge, MA**
National Undergraduate Fellow, Plasma Physics 2010
- Sandia National Laboratories, Albuquerque, NM**
Undergraduate Research Assistant, Nuclear Fusion Energy 2009

Teaching Experience

- University of Washington, Seattle, WA**
Instructor of record for ATM S 341, *Atmospheric Radiative Transfer* Spring 2021
Guest lecturer for ATM S 220, *Exploring the Atmospheric Sciences* 2017, 2020, 2021
Guest lecturer for ATM S 501, *Fundamental Physics & Chemistry of the Atmosphere* 2019
Guest lecturer for ATM S 552, *Objective Analysis* 2019
Guest lecturer for ATM S 587, *Fundamentals of Climate Change* 2018
Guest lecturer for OCEAN 423, *Ocean Circulation & Climate* 2018

ETH Zürich, Zurich, Switzerland

Teaching assistant for course 651-2124, *Atmospheric General Circulation Dynamics* 2015
Guest lecturer for course 651-2124, *Atmospheric General Circulation Dynamics* 2014
Teaching assistant for course 651-4911, *Climate & the Global Circulation of the Atmosphere* 2013

California Institute of Technology, Pasadena, CA

Teaching assistant for CNS 107, *Writing about Scientific Research* 2012

University of California, Berkeley, CA

Teaching assistant for Physics 7a, *Physics for Scientists and Engineers* 2010
Completed pedagogical course: *Instruction Techniques in Astronomy and Physics* 2010
Physics tutor, Student Learning Center 2009 – 2010

Honors and Awards

Data Science Postdoctoral Fellowship, UW eScience Institute (\$2,000) 2019
Travel Award, CLIVAR Large Ensembles Workshop 2019
UW College of the Environment Travel Fund Award to attend AMS-AOFD 2019
Travel Award, Advanced Climate Dynamics Course 10-Year Anniversary Conference 2019
Science Editor's Spotlight: *Disentangling global warming, multidecadal variability, and El Niño in Pacific temperatures* 2018
Travel Award, 7th International Workshop on Climate Informatics 2017
AGU Editor's Spotlight: *Thermodynamic and dynamic controls on changes in the zonally anomalous hydrological cycle* 2016
Robert and Diane Lang Graduate Fellowship (1 year, 100% plus expenses), Caltech 2012
Engineering & Applied Science Division Fellowship (9 months, 100%), Caltech 2011
Outstanding Student Poster Award, APS Division of Plasma Physics Meeting 2010
National Undergraduate Fellowship (3 months, 100%), MIT Plasma Science and Fusion Center 2010

Grants

Contributor, *Variability in the Rate and Pattern of Global Warming: Forced and Unforced Components*, National Science Foundation, Climate and Large-Scale Dynamics (PI David Battisti), USD 282,370, 2019-2021. (*I wrote the proposal but was not eligible to be a PI at the time of submission to NSF*)

Peer-Reviewed Publications

ORCID: [0000-0002-7776-2076](https://orcid.org/0000-0002-7776-2076)

[Google Scholar](#)

18. Årthun, M, **R.C.J. Wills**, H. Johnson, L. Chafik, and H.R. Langehaug, 2021: *Mechanisms of decadal North Atlantic climate variability and implications for the recent cold anomaly*. Journal of Climate, in press, <https://doi.org/10.1175/JCLI-D-20-0464.1>.
17. Nilsson, J., D. Ferreira, T. Schneider, and **R.C.J. Wills**, 2021: *Is the surface salinity difference between the Atlantic and Indo-Pacific a signature of the Atlantic Meridional Overturning Circulation?* Journal of Physical Oceanography, 51, 769–787.
16. Rae, J.W.B., W.R. Gray, **R.C.J. Wills**, I. Eisenman, B. Fitzhugh, E.F.M. Littlely, P. Rafter, R. Rees-Owen, A. Ridgwell, B. Taylor, and A. Burke, 2020: *Overturning circulation, nutrient limitation, and warming in the glacial North Pacific*. Science Advances, 6, eabd1654.

15. **Wills, R.C.J.**, D.S. Battisti, K.C. Armour, T. Schneider, and C. Deser, 2020: *Pattern recognition methods to separate forced responses from internal variability in climate model ensembles and observations*. *Journal of Climate*, 33, 8693–8719.
14. Parsons, L.A., M.K. Brennan, **R.C.J. Wills**, and C. Proistosescu, 2020: *Magnitudes and spatial patterns of interdecadal temperature variability in CMIP6*. *Geophysical Research Letters*, 47, e2019GL086588.
13. Gray, W.R., **R.C.J. Wills**, J.W.B. Rae, A. Burke, R. Ivanovic, W.H.G. Roberts, D. Ferreira, and P.J. Valdes, 2020: *Wind-driven evolution of the North Pacific subpolar gyre over the last deglaciation*. *Geophysical Research Letters*, 47, e2019GL086328.
12. **Wills, R.C.J.**, R.H. White, and X.J. Levine, 2019: *Northern Hemisphere stationary waves in a changing climate*. *Current Climate Change Reports*, 5, 372–389.
11. **Wills, R.C.J.**, D.S. Battisti, C. Proistosescu, L. Thompson, D.L. Hartmann, and K.C. Armour, 2019: *Ocean circulation signatures of North Pacific decadal variability*. *Geophysical Research Letters*, 46, 1690–1701.
10. **Wills, R.C.J.**, K.C. Armour, D.S. Battisti, and D.L. Hartmann, 2019: *Ocean-atmosphere dynamical coupling fundamental to the Atlantic Multidecadal Oscillation*. *Journal of Climate*, 32, 251–272.
9. **Wills, R.C.J.** and T. Schneider, 2018: *Mechanisms setting the strength of orographic Rossby waves across a wide range of climates in a moist idealized GCM*. *Journal of Climate*, 31, 7679–7700.
8. Gray, W.R., J.W.B. Rae, **R.C.J. Wills**, A.E. Shevenell, G.L. Foster, C.H. Lear, and B. Taylor, 2018: *Deglacial upwelling, productivity and CO₂ in the North Pacific Ocean*. *Nature Geoscience*, 30, 340–344.
7. Ferreira, D., P. Cessi, H. Coxall, A. de Boer, H.A. Dijkstra, S.S. Drijfhout, T. Eldevik, N. Harnik, J.F. McManus, D.P. Marshall, J. Nilsson, F. Roquet, T. Schneider, **R.C. Wills**, 2018: *Atlantic-Pacific asymmetry in deep water formation*. *Annual Reviews of Earth and Planetary Sciences*, 46, 327–352.
6. **Wills, R.C.**, T. Schneider, J.M. Wallace, D.S. Battisti, and D.L. Hartmann, 2018: *Disentangling global warming, multidecadal variability, and El Niño in Pacific temperatures*. *Geophysical Research Letters*, 45, 2487–2496.
5. **Wills, R.C.**, D.S. Battisti, D.L. Hartmann, and T. Schneider, 2017: *Extracting modes of variability and change from climate model ensembles*. *Proceedings of the 7th International Workshop on Climate Informatics: CI 2017*, V. Lyubchich, N.C. Oza, A. Rhines, and E. Szekely, Eds., NCAR Technical Note NCAR/TN-536+PROC, 25-28.
4. **Wills, R.C.**, X.J. Levine, and T. Schneider, 2017: *Local energetic constraints on Walker circulation strength*. *Journal of the Atmospheric Sciences*, 74, 1907-1922.
3. **Wills, R.C.**, M.P. Byrne, and T. Schneider, 2016: *Thermodynamic and dynamic controls on changes in the zonally anomalous hydrological cycle*. *Geophysical Research Letters*, 43, 4640–4649.
2. **Wills, R.C.** and T. Schneider, 2016: *How stationary eddies shape changes in the hydrological cycle: Zonally asymmetric experiments in an idealized GCM*. *Journal of Climate*, 29, 3161–3179.
1. **Wills, R.C.** and T. Schneider, 2015: *Stationary eddies and the zonal asymmetry of net precipitation and ocean freshwater forcing*. *Journal of Climate*, 28, 5115–5133.

Other Publications

2. **Wills, R.C.J.**, S. Sippel, and E. A. Barnes, 2020: *Separating forced and unforced components of climate change: The utility of pattern recognition methods in large ensembles and observations*. US CLIVAR Variations, 18.2, 1–10.
1. **Wills, R.C.** 2016: *Stationary eddies and zonal variations of the global hydrological cycle in a changing climate*. Ph.D. Thesis, California Institute of Technology.

Submitted Manuscripts

* co-advised student

*Oldenburg, D., **R.C.J. Wills**, K.C. Armour, L. Thompson, and L.C. Jackson: *Mechanisms of low-frequency variability in Atlantic northward ocean heat transport and AMOC*. In review at Journal of Climate.

*Bonan, D.B., T. Schneider, I. Eisenman, and **R.C.J. Wills**: Constraining the date of a seasonally ice-free Arctic. Submitted to Nature Climate Change.

Wills, R.C.J., K.C. Armour, D.S. Battisi, C. Proistosescu, and L.A. Parsons: *Slow Modes of Global Temperature Variability in Regions of Weak Radiative Feedbacks and their Impact on Climate Sensitivity Estimates*. In review at Journal of Climate.

Mentoring

Dylan Oldenburg, Graduate Student, Oceanography, University of Washington (2018-present)
Co-advised with Kyle Armour and LuAnne Thompson

David Bonan, Graduate Student, Environmental Science and Engineering, Caltech (2019-present)
Co-advised with Tapio Schneider and Ian Eisenman

He Huang, Visiting Undergraduate Researcher from Lanzhou University (UW, Summer 2020)

Tina Chen, Visiting Undergraduate Researcher from Middlebury College (ETH Zurich, Summer 2015)
Co-advised with Tapio Schneider

Invited Presentations

24. Max Planck Research Group Selection Symposium, Chemistry, Physics, and Technology Section: *Novel data science and modeling approaches to improve process understanding and prediction of a noisy climate system*. Virtual, Feb. 2021.
23. AGU Fall Meeting: *Mechanisms of stationary Rossby wave change in comprehensive and idealized GCMs*. Virtual, Dec. 2020.
22. National Center for Atmospheric Research, Climate and Global Dynamics Seminar: *Decadal variability of Earth's energy balance in CMIP6*. Boulder, CO (virtual), Oct. 2020.
21. CLIVAR Variations Webinar: *Separating forced and unforced components of climate change: The utility of pattern recognition methods in large ensembles and observations*. Sept. 2020.
20. Duke University, Nicholas School of the Environment Seminar: *Decadal variations in ocean circulation and climate*. Durham, NC (virtual), June 2020.
19. European Geophysical Union (EGU) General Assembly, Virtual Session on Large Ensemble Climate Model Simulations: *Separating climate variability and climate change with fewer ensemble members using pattern recognition*. May 2020.

18. Purdue University, Earth, Atmospheric, and Planetary Sciences Colloquium: *Atmosphere-ocean dynamics of decadal climate variability*. Lafayette, IN (virtual), Mar. 2020.
17. University of California Irvine, Earth System Science Department Seminar: *Distinguishing climate signals from climate noise using pattern recognition*. Irvine, CA (virtual), Mar. 2020.
16. University of Oxford, Atmospheric, Oceanic and Planetary Physics Seminar: *Physics of future changes in the large-scale atmospheric circulation*. Oxford, UK, Mar. 2020.
15. University of Reading, Meteorology Department Seminar: *Atmosphere-ocean dynamics and global energetics of decadal climate variability*. Reading, UK, Mar. 2020.
14. University of Oxford, Atmospheric, Oceanic and Planetary Physics Seminar: *Atmosphere-ocean dynamics and global energetics of decadal climate variability*. Oxford, UK, Mar. 2020.
13. University of Maryland Baltimore County, Physics Colloquium: *Physical controls on future changes in the large-scale atmospheric circulation*. Baltimore, MD, Feb. 2020.
12. Max Plank Institute for Meteorology, Oceans in the Earth System Seminar: *Distinguishing climate signals from climate noise using pattern recognition methods*. Hamburg, Germany, Nov. 2019.
11. ETH Zurich, Institute for Atmospheric and Climate Science Seminar: *Separating climate variability and climate change: Reducing the needed ensemble size with pattern filtering*. Zurich, Switzerland, Sept. 2019.
10. Climate and Wave Dynamics Workshop: *Reduced midlatitude SST variability in warmer climates: Atmospheric and oceanic mechanisms*. Eilat, Israel, Sept. 2019.
9. National Center for Atmospheric Research, Climate and Global Dynamics Seminar: *The role of ocean-atmosphere dynamical coupling in decadal climate variability*. Boulder, CO, July 2019.
8. MIT Department of Earth, Atmospheric and Planetary Sciences, Lunch Seminar: *Decadal variations in ocean circulation and climate*. Cambridge, MA, June 2019.
7. University of Toronto, Department of Physics: *Decadal variations in ocean circulation and climate*. Toronto, ON, Canada, Apr. 2019.
6. Cornell University, Earth and Atmospheric Sciences Seminar: *Atmosphere-ocean dynamics of multidecadal climate variability*. Ithaca, NY, Mar. 2018.
5. GEWEX Hydro-Climate Sensitivity Workshop: *The sensitivity of the zonally anomalous hydrological cycle: Dynamic and thermodynamic mechanisms*. Exeter, UK, June 2016.
4. Geophysical Fluid Dynamics Laboratory seminar series: *Stationary-eddy influence on changes in the hydrological cycle*. Princeton, NJ, June 2016.
3. Stockholm University, Department of Meteorology: *Stationary-eddy influence on changes in the hydrological cycle*. Stockholm, Sweden, May 2016.
2. Scripps Institute of Oceanography, CASPO Department Seminar: *Asymmetries in the hydrological cycle and the influence on sea surface salinity*. La Jolla, CA, Dec. 2013.
1. Rice University, FESD Project Workshop: *Continent-Island Arc Fluctuations: Linking Deep Earth Dynamics to Long-Term Climate: Why does it rain where it rains?* Houston, TX, Oct. 2013.

Contributed Presentations

39. WCRP-CLIVAR Workshop on: *Climate Interactions Among the Tropical Basins: Pattern recognition methods to separate forced and unforced components of SST pattern changes*. Virtual, Feb. 2021.

38. AGU Fall Meeting: *Decadal variability of Earth's energy balance in CMIP6*. Virtual, Dec. 2020.
37. UW Program on Climate Change Summer Institute: *How regional differences in precipitation minus evaporation shape the ocean circulation*. Virtual, Sept. 2020.
36. AGU Ocean Sciences Meeting: *Atlantic SST variance changes in warmer climates: Atmospheric and oceanic mechanisms*. San Diego, CA, Feb. 2020.
35. University of Washington eScience Lunch Seminar: *Distinguishing climate signals from climate noise using pattern recognition*. Seattle, WA, Feb. 2020.
34. AGU Fall Meeting: *Slow modes of global temperature variability in regions of weak radiative feedbacks*. San Francisco, CA, Dec. 2019.
33. University of Washington, Atmospheric and Climate Dynamics Seminar: *Pattern filtering methods separate climate signals from climate noise with fewer ensemble members*. Seattle, WA, Oct. 2019.
32. CLIVAR Large Ensembles Workshop: *Separating climate variability and climate change: How many ensemble members are needed?* Boulder, CO, July 2019.
31. AMS Atmosphere and Ocean Fluid Dynamics Meeting: *Coupled atmosphere-ocean dynamics of North Pacific decadal variability*. Portland, ME, June 2019.
30. AMS Atmosphere and Ocean Fluid Dynamics Meeting: *Mechanisms of stationary Rossby wave change in comprehensive and idealized GCMs*. Portland, ME, June 2019.
29. Advanced Climate Dynamics Course 10-Year Anniversary Conference: *Preferred patterns of ocean variability and change: From decadal to centennial timescales and beyond*. Otta, Norway, Mar. 2019.
28. PAGES Climate Variability Across Scales Workshop: *Characterizing low-frequency variability in climate models: Towards better attribution of observed climatic changes*. Seattle, WA, Jan. 2019.
27. AGU Fall Meeting: *Characterizing unforced low-frequency variability of global temperature and global energy imbalance in climate models*. Washington, DC, Dec. 2018.
26. International AMOC Meeting: *Ocean-atmosphere dynamical coupling fundamental to the Atlantic Multidecadal Oscillation*, Miami, FL, July 2018.
25. AGU Ocean Sciences Meeting: *The role of the ocean in low-frequency internal variability of global temperature and energy imbalance*. Portland, OR, Feb. 2018.
24. University of Washington, PCC Current Research in Climate Change Seminar: *How important is climate variability for historical and future warming?* Seattle, WA, Jan. 2018.
23. AGU Fall Meeting: *The oceanic contribution to Atlantic multi-decadal variability*. New Orleans, LA, Dec. 2017.
22. University of Washington, Atmospheric and Climate Dynamics Seminar: *Identifying the atmosphere-ocean mechanisms of low-frequency temperature variability and change*. Seattle, WA, Oct. 2017.
21. 7th International Workshop on Climate Informatics: *Extracting modes of variability and change from climate model ensembles*. Boulder, CO, Sept. 2017.
20. AMS Atmosphere and Ocean Fluid Dynamics Meeting: *Isolating the decadal component of the Pacific Decadal Oscillation*. Portland, OR, June 2017.
19. University of Washington, Atmospheric Sciences Colloquium: *Understanding stationary-eddy circulations and their role in the hydrological cycle*. Seattle, WA, Feb. 2017.
18. AMS Annual Meeting: *Stationary-eddy influence on changes in the hydrological cycle*. Seattle, WA, Jan. 2017.

17. EGU General Assembly: *Thermodynamic and dynamic controls on the amplitude of the zonally anomalous hydrological cycle*. Vienna, Austria, Apr. 2016.
16. AGU Fall Meeting: *The response of idealized stationary-eddy circulations to climate change*. San Francisco, CA, Dec. 2015.
15. Bolin Centre Workshop on the Atlantic Meridional Overturning Circulation in a Global Perspective: *Subpolar ocean salinity budgets in glacial climates: Pacific vs. Atlantic*. Stockholm, Sweden, Sept. 2015.
14. SPARC Workshop on Storm Tracks: *Orographically forced stationary eddies and the localization of storm tracks across a wide range of climates*. Grindelwald, Switzerland, Aug. 2015.
13. AMS Atmosphere and Ocean Fluid Dynamics Meeting: *Mechanisms of changing orographic stationary Rossby wave forcing*. Minneapolis, MN, June 2015.
12. AMS Atmosphere and Ocean Fluid Dynamics Meeting: *Zonal hydrological-cycle variations in idealized model experiments*. Minneapolis, MN, June 2015.
11. AGU Fall Meeting: *Mechanisms of stationary Rossby wave change in a changing climate*. San Francisco, CA, Dec. 2014.
10. GEWEX: 7th International Conference on the Global Water and Energy Cycle: *Circulation-dominated zonal precipitation variations*. Den Haag, Netherlands, July 2014.
9. Latsis Symposium on Atmosphere and Climate Dynamics: *Circulation-dominated zonal precipitation variations*, Zurich, Switzerland, June 2014.
8. AGU Fall Meeting: *Triggering deglaciations – a potential mechanism based on ice sheet induced freshwater forcing changes and North Pacific deep-water formation*. San Francisco, CA, Dec. 2013.
7. AGU Fall Meeting: *Climatic control of large-scale relief – a case study in the Andes from the ITCZ to Patagonia*. San Francisco, CA, Dec. 2013.
6. Caltech, Environmental Science and Society Seminar: *Why does it rain where it rains?* Pasadena, CA, Dec. 2013.
5. Davos Atmosphere and Cryosphere Assembly: *The influence of orographic stationary Rossby waves on large-scale precipitation and erosion climatology*. Davos, Switzerland, July 2013.
4. AMS Atmosphere and Ocean Fluid Dynamics Meeting: *The effect of topographic stationary Rossby waves on precipitation climatology*. Newport, RI, June 2013.
3. EGU General Assembly: *The role of topography in local climate change*. Vienna, Austria, Apr. 2013.
2. Advanced Climate Dynamics Course on Landscapes and Climate: *Zonal asymmetries in the atmospheric energy budget*. Snøheim, Norway, Aug. 2012.
1. APS Division of Plasma Physics Meeting: *Density profile measurements in LDX using microwave reflectometry*. Chicago, IL, Nov. 2010. (**Outstanding Student Poster Award**)

Workshops and Professional Training

University of Washington Program on Climate Change Summer Institute: *Climate Extremes/Climate and Environmental Equity*. Virtual, Sept. 2020.

Workshop on Active and Inclusive Learning, University of Washington Department of Atmospheric Sciences. Seattle, WA, Aug. 2020. (**Organizer**)

CMIP6 Python Hackathon. Seattle, WA, Oct. 2019. (**Lead local organizer**)

CLIVAR Large Ensembles Workshop. Boulder, CO, July 2019.

Science Communications Training, University of Washington College of the Environment. Seattle, WA, May 2019.

University of Washington Program on Climate Change Summer Institute: *Sources of Uncertainty in Long-Term Climate Projections*. Friday Harbor, WA, Sept. 2018.

7th International Workshop on Climate Informatics. Boulder, CO, Sept. 2017.

University of Washington Program on Climate Change Summer Institute: *Climate Change and Population Health*. Friday Harbor, WA, Sept. 2017.

Bolin Centre Workshop on the Atlantic Meridional Overturning Circulation in a Global Perspective. Stockholm, Sweden, Sept. 2015.

WCRP Summer School on Detection and Attribution of Extreme Events. Trieste, Italy, Aug. 2014.

Advanced Climate Dynamics Course: *Landscapes and Climate*. Snøheim, Norway, Aug. 2012. (*Including outreach event on weather and climate for Norwegian high school students*)

Professional Service

Organizer of a University of Washington Department of Atmospheric Sciences Workshop on Active and Inclusive Learning, Aug. 2020.

Lead organizer of the University of Washington node of the CMIP6 Python Hackathon, planned in conjunction with the National Center for Atmospheric Research and Lamont-Doherty Earth Observatory, Oct. 2019.

Organizer of a University of Washington Program on Climate Change Mini-Symposium: *Using past observations to constrain future climate variability and change*, Feb. 2018.

Postdoc liaison, University of Washington Department of Atmospheric Sciences, 2019 – 2021.

Colloquium committee member, University of Washington Dept. of Atmospheric Sciences, 2020.

Volunteer judge for AGU Outstanding Student Presentation Awards, 2017 – 2020.

Committee member for AGU Honors Spilhaus Award, 2015 – 2017.

Proposal reviewer for the US National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), and the Israel Ministry of Science, Technology and Space

Reviewer for Journal of Climate, Geophysical Research Letters, Nature, Nature Geoscience, Climate Dynamics, Science Advances, Journal of Geophysical Research: Atmospheres, Journal of Geophysical Research: Oceans, Quarterly Journal of the Royal Meteorological Society, Climate of the Past, Tellus A: Dynamic Meteorology and Oceanography, and Progress in Oceanography.

Primary convener for sessions at the AGU Fall Meeting:

- *Large-scale atmosphere-ocean dynamics of climate variability and climate change*, Dec. 2020.
- *Mechanisms of low-frequency ocean-atmosphere variability and implications for Earth's energy budget*, Dec. 2018.
- *Atmospheric circulations and their role in the hydrological cycle: Monsoons, storm tracks, and the ITCZ*, Dec. 2015.

Convener for session at the AGU Fall Meeting: *Decadal to Multi-Decadal Climate Variability – Mechanisms, Predictability, and Impacts*, Dec. 2019.