

David J. Farnham

Education

- 2018 **Ph.D.**, *Columbia University*, New York, NY
Earth and Environmental Engineering Department

Adviser Upmanu Lall, Columbia Water Center

Thesis *Identifying and modeling spatio-temporal patterns in high dimensional climate and weather datasets with applications to water and energy resource management*
- 2015 **M.S., Earth Resources Engineering**, *Columbia University*, New York, NY

Concentration Water Resources and Climate Risks

Thesis *Predictive Statistical Models Linking Antecedent Meteorological Conditions and Waterway Bacterial Contamination in Urban Waterways*
- 2012 **B.S., Civil Engineering**, *SUNY-Buffalo*, Buffalo, NY
Summa Cum Laude, Honors College member
- 2012 **B.A., Mathematics**, *SUNY-Buffalo*, Buffalo, NY
Summa Cum Laude, Honors College member

Experience

Research

- 2018–Present **Postdoctoral Research Scientist**, *Carnegie Science & Department of Global Ecology*, Stanford University, Stanford, CA
- 2012–2018 **Graduate Student Researcher**, *Columbia Water Center & Department of Earth and Environmental Engineering*, Columbia University, New York, NY
- 2012 **Student Researcher**, *Department of Civil and Environmental Engineering*, SUNY-Buffalo, Buffalo, NY
- 2012 **Student Researcher**, *Ecosystem Restoration through Interdisciplinary Exchange*, NSF IGERT REU, SUNY-Buffalo, Buffalo, NY

Teaching

- 2015 **Teaching Assistant/Guest Lecturer: Environmental Data Analysis (Graduate level)**, *Department of Earth and Environmental Engineering*, Columbia University, New York, NY
- 2015 **Teaching Assistant: Better Planet By Design (Undergraduate level)**, *Department of Earth and Environmental Engineering*, Columbia University, New York, NY
- 2014–2016 **Lead Module Developer: HydroViz Web Modules: Teleconnections Module**, *www.hydroviz.org*

Journal Reviewer

- 2017–Present Geophysical Research Letters, Hydrology and Earth System Sciences, International Journal of Geographical Information Science, Science of the Total Environment, Water Research, and Water Resources Research

Student Mentorship/Advisement

- 2017–Present Zeyu Xue, Jianan Cao, Bingquan Wu (all master's students at Columbia University)
- 2016–2017 Caroline Schwab (high school)

Professional Affiliations

Publications and Presentations

Peer-reviewed Journal Articles Published, In Press, or Accepted

- [1] Doss-Gollin, J., **Farnham, D. J.**, Steinschneider, S., Lall, U., “Robust Adaptation to Multi-Scale Climate Variability”. In: *Earth’s Future* (2019), 2019EF001154. doi: 10.1029/2019EF001154.
- [2] **Farnham, D. J.**, Doss-Gollin, J., Lall, U., “Regional extreme precipitation events: robust inference from credibly simulated GCM variables”. In: *Water Resources Research* (2018).
- [3] Hamidi, A., **Farnham, D. J.**, Khanbilvardi, R., “Uncertainty Analysis of Urban Sewer System using Spatial Simulation of Radar Rainfall Fields: New York City Case Study”. In: *Stochastic Environmental Research and Risk Assessment* (2018).
- [4] Cooper, C. B., Larson, L. R., Holland, K. K., Gibson, R. A., **Farnham, D. J.**, Hsueh, D. Y., Culligan, P. J., McGillis, W. R., “Contrasting the Views and Actions of Data Collectors and Data Consumers in a Volunteer Water Quality Monitoring Project : Implications for Project Design and Management”. In: *Citizen Science: Theory and Practice* 2.2 (2017), pp. 1–14.
- [5] **Farnham, D. J.**, Steinschneider, S., Lall, U., “Zonal Wind Indices to Reconstruct CONUS Winter Precipitation”. In: *Geophysical Research Letters* 44.24 (Nov. 2017), pp. 12, 236–12, 243. doi: 10.1002/2017GL075959.
- [6] **Farnham, D. J.**, Gibson, R. A., Hsueh, D. Y., McGillis, W. R., Culligan, P. J., Zain, N., Buchanan, R., “Citizen science-based water quality monitoring: Constructing a large database to characterize the impacts of combined sewer overflow in New York City”. In: *Science of The Total Environment* (2016). doi: 10.1016/j.scitotenv.2016.11.116.
- [7] **Farnham, D. J.**, Lall, U., “Predictive statistical models linking antecedent meteorological conditions and waterway bacterial contamination in urban waterways”. In: *Water Research* 76 (2015), pp. 143–159. doi: 10.1016/j.watres.2015.02.040.

Articles In Review or Preparation

- [1] Doss-Gollin, J., **Farnham, D. J.**, Ho, M., Lall, U., “Bypass fatalist narratives to talk constructively about climate change adaptation (in revision at Journal of Water Resources Planning and Management)”.
- [2] **Farnham, D. J.**, Lall, U., “Is anthropogenic warming changing the Southwest US’s hydroclimate variability? (in prep)”.
- [3] **Farnham, D. J.**, Lall, U., Kwon, H.-H., “Long-term Trends, Decadal Variability, and Teleconnections associated with Sub-weekly Precipitation Extremes from a Multicentury Record (in prep)”.
- [4] **Farnham, D. J.**, Modi, V., Lall, U., “Decadal scale climate variation presents risks and opportunities for managing wind/solar power supply (submitted)”.
- [5] HUI, Y., **Farnham, D. J.**, Atkinson, J., Zhu, Z., Feng, Y., “Simulation of Circulation in Lake Ontario using Physical and Numerical Modeling (submitted)”.
- [6] Yuan, S., **Farnham, D. J.**, Lall, U., Modi, V., “Simultaneous increasing electricity demand for heating and reliance on wind energy: Demand side management using heat pumps during extreme cold events (in minor revision at Energy)”.

Conference Presentations, Posters, and Non-peer-reviewed Papers

- [1] Doss-Gollin, J., **Farnham, D. J.**, Steinschneider, S., Lall, U., “Robust Adaptation to Multi-Scale Climate Variability”. In: *American Geophysical Union Fall Meeting*. Washington, DC, Dec. 2018. doi: 10.13140/RG.2.2.28447.20649.
- [2] Faranda, D., Messori, G., Doss-Gollin, J., **Farnham, D. J.**, Lall, U., Yiou, P., “Dynamics and Thermodynamics of weather extremes: a dynamical systems approach”. In: *European Geosciences Union General Assembly*. 2018.
- [3] **Farnham, D. J.**, Lall, U., “Climate induced decadal variations in wind/solar energy generation potential and heating/cooling energy demand”. In: *AGU Fall Meeting*. Washington, DC, 2018.
- [4] Cao, J., **Farnham, D. J.**, Lall, U., “Spatial-temporal wind field prediction by Artificial Neural Networks”. In: vol. abs/1712.05293. 2017. arXiv: 1712.05293.

- [5] Doss-Gollin, J., **Farnham, D. J.**, Lall, U., "Designing and operating infrastructure for nonstationary flood risk management". In: *AGU Fall Meeting*. New Orleans, LA, 2017.
- [6] Faranda, D., Messori, G., Doss-Gollin, J., **Farnham, D. J.**, Lall, U., Yiou, P., "Dynamics and Thermodynamics of weather extremes: a dynamical systems approach". In: *AGU Fall Meeting*. New Orleans, LA, 2017.
- [7] **Farnham, D. J.**, Doss-Gollin, J., Lall, U., "Regional intense precipitation: inference from credibly simulated GCM variables". In: *North East Graduate Student Water Symposium*. Amherst, Mass, 2017.
- [8] **Farnham, D. J.**, Steinschneider, S., Lall, U., "Zonal wind indices to reconstruct United States winter precipitation during El Niño". In: *AGU Fall Meeting*. New Orleans, LA, 2017.
- [9] Gawthrop, E., **Farnham, D. J.**, Fiondella, F., Owusu, A. S., Thomson, M., Ambani, M., Percy, F., Chung, W., McKeown, K., "Media Analysis: Communication of the 2015/16 El Niño in Kenya". In: *97th American Meteorological Society Annual Meeting*. Seattle, WA, 2017.
- [10] Doss-Gollin, J., **Farnham, D. J.**, Lall, U., "Global-Local Interactions Modulate Tropical Moisture Exports to the Ohio River Basin". In: *AGU Fall Meeting*. San Francisco, CA, 2016.
- [11] **Farnham, D. J.**, Doss-Gollin, J., Lall, U., "Seasonal climate signals and synoptic circulation patterns associated with regional daily intense precipitation in the Ohio River Basin". In: *Workshop on Sub-Seasonal to Seasonal Predictability of Extreme Weather and Climate*. Columbia University, 2016.
- [12] **Farnham, D. J.**, Doss-Gollin, J., Lall, U., "Space-time characteristics and statistical predictability of extreme sub-weekly precipitation events in the Ohio River Basin". In: *AGU Fall Meeting*. San Francisco, CA, 2016.
- [13] Habib, E., Tarboton, D., Deshotel, M., **Farnham, D. J.**, "Development of Student-centered Modules to Support Active Learning in Hydrology". In: *ASCE Annual Conference & Exposition*. New Orleans, LA, 2016.
- [14] Larson, L. R., Cooper, C. B., Krafte, K., Gibson, R., **Farnham, D. J.**, Hsueh, D., Culligan, P., Wade McGillis, "Characterizing citizen scientists based on project engagement: Data generators, data users, and "onlooker effects."" In: *Southeastern Recreation Research Conference*. Asheville, NC, 2016.
- [15] **Farnham, D. J.**, Habib, E., Lall, U., "HydroViz: A Web-based Climate Teleconnection Module for Undergraduate and Graduate Water Engineering Students". In: *AGU Fall Meeting*. San Francisco, CA, 2015.
- [16] **Farnham, D. J.**, Lall, U., Kwon, H.-H., Doss-Gollin, J., "Moisture Transport and Extreme Precipitation in Mid-latitudes". In: *AGU Fall Meeting*. San Francisco, CA, 2015.
- [17] Habib, E., Bodin, M., Taboton, D., Merck, M., **Farnham, D. J.**, "Stimulating Active Learning in Hydrology Using Research-Driven, Web-based Learning Modules". In: *ASCE Annual Conference & Exposition*. Seattle, WA, 2015.
- [18] Hsueh, D. Y., **Farnham, D. J.**, Gibson, R. A., McGillis, W. R., Zheng, Y., Buchanan, R., Eddowes, D., Zain, N., Loiselle, S., Butkiewicz, L., "NYC URBAN WATER QUALITY: MONITORING THE FLOW OF CSOS WITH CITIZEN SCIENTISTS". In: *Aquatic Sciences Meeting*. Granada, Spain, 2015.
- [19] Hsueh, D., **Farnham, D. J.**, Gibson, R., McGillis, W. R., Culligan, P. J., Cooper, C., Larson, L., Mailloux, B. J., Buchanan, R., Borus, N., Zain, N., Eddowes, D., Butkiewicz, L., Loiselle, S. A., "Advancing the Potential of Citizen Science for Urban Water Quality Monitoring: Exploring Research Design and Methodology in New York City". In: *AGU Fall Meeting*. San Francisco, CA, 2015.
- [20] **Farnham, D. J.**, Atkinson, J. F., "Flow visualization study: Understanding water circulation in Lake Ontario through physical modeling". In: *The 22nd Annual Great Lakes Research Consortium Student-Faculty Conference*. Oswego, NY, 2012.

Invited Presentations

- [1] *Bronx Sewershed Water Quality and Citizen Science (with W. McGillis and D. Hsueh)*. Interdisciplinary Workshop on Urban Green Infrastructure: Reports on Monitoring, Modeling, Performance & Design Work. Columbia University, New York, NY, USA, 2015.
- [2] *Extreme Rainfall Mechanisms, Prediction, and Simulation at Chonbuk National University in Summer 2015*. NSF EAPSI closing ceremony presentation series at the National Research Foundation of Korea. Seoul, South Korea, 2015.
- [3] *NYC Urban Water Quality: Monitoring the Flow of CSOs with Citizen Scientists (with R. Gibson and D. Hsueh)*. Citizens Advisory Committee, New York-New Jersey Harbor & Estuary Program meeting. New York, NY, USA, 2015.
- [4] *Water Quality Monitoring: 2013 Citizens' Water Quality Testing Program*. New York City Department of Environmental Protect and New York City Department of Health. New York, NY, USA, 2014.

- [5] *Understanding Climate Risks in an Urban Environment (with M. Haraguchi)*. NSF IGERT, Solving Urbanization Challenges by Design summer workshop series. Columbia University, New York, NY, USA, 2013.
- [6] *Urban Water Cycle Responses to Climate*. NSF IGERT, Solving Urbanization Challenges by Design Brown Bag seminar series. Columbia University, New York, NY, USA, 2013.

Invited Panel Participation

- [1] *2016 Planet Forward Sustainable Cities Summit: Rethinking Water: Solutions for a 21st Century Infrastructure*. George Washington University, Washington DC, USA, 2016.
- [2] *Earth Institute Sustainable Development Seminar Series: The Monster El Niño Of 2015-16: What Was Expected? And, What Was Done?* Columbia University, New York, NY, USA, 2016.

Select Honors and Awards

- 2015 **National Science Foundation/National Research Foundation of Korea EAPSI Fellowship**, National Science Foundation
- 2015 **Graduate Research Fellowship Program Honorable Mention**, National Science Foundation
- 2012–Present **Integrated Graduate Education and Research Traineeship**, National Science Foundation
- 2012 **Best Poster Presentation**, 22nd Annual Great Lakes Research Consortium
- 2012 **Garmen Scholarship, Robert P. Apmann Memorial Award, and Undergraduate Research Award**, SUNY-Buffalo

Recent Community Involvement

- 2017–Present **Volunteer**, *We Run As One Summer Youth Basketball and cultural exchange*, New York, NY
Event set-up, take-down, and score keeping
- 2014–Present **Volunteer**, *Student Sponsor Partners*, New York, NY
High school student mentor
- 2014, 2016, 2017 **Volunteer**, *International Research Institute for Climate and Society*, New York, NY
Facilitator at Lamont Doherty Earth Observatory open house
- 2013–2014 **Volunteer**, *Citizen's Water Quality Testing Program*, New York, NY
Water quality sampling site coordinator

Select Computer Skills

- Languages Proficient in **R**; Experience with Matlab, Python, C++
- Software Proficient in Markdown, \LaTeX , Microsoft Word/Powerpoint/Excel

Media Appearances

- December 12, 2018 **Work highlighted and quoted in Ines Kagubare's: "Study tracks climate variation's impact on green power"**, E&E News
<https://www.eenews.net/climatewire/2018/12/12/stories/1060109407>
- December 11, 2018 **Work highlighted and quoted in Sarah Fecht's: "How climate impacts solar and wind power supply"**, Phys.org
<https://www.eenews.net/climatewire/2018/12/12/stories/1060109407>
- September 20, 2017 **Quoted in Renee Cho's: "What the U.S. Military is Doing About Climate Change"**, Earth Institute
<https://phys.org/news/2018-12-climate-impacts-solar-power.html>
- April 28, 2016 **Quoted in Mike Hower's: "Sustainable Cities Summit tackles the challenges of urban sustainability"**, Planet Forward
<https://www.planetforward.org/2016/04/28/sustainable-cities-summit-tackles-the-challenges-of-urban-sustainability>
- April 27, 2016 **Quoted in Mike Hower's: "The 5 toughest challenges tomorrow's cities face"**, GreenBiz
<https://www.greenbiz.com/article/5-toughest-challenges-tomorrows-cities-face>

