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James Doss-Gollin

Education

Present **Ph.D. Candidate**, *Department of Earth and Environmental Engineering*, Columbia University.
- NSF Graduate Research Fellow
- Columbia University Presidential Fellow

2016 **M.S.**, *Department of Earth and Environmental Engineering*, Columbia University.

2015 **B.S.**, *Mechanical Engineering* , Yale University, New Haven, CT.
- Senior project: "Adapting UVC-LEDs for Portable Water Purification"
- Graduated *Cum Laude*
- Distinction in major

Honors & Awards

2018 **Nickolas and Liliana Themelis Fellowship**, *Fu Foundation School of Engineering and Applied Science*, Columbia University.

2017-2020 **Graduate Research Fellowship**, *Climate and Large-Scale Atmospheric Dynamics*, National Science Foundation.

2015-2019 **Presidential Distinguished Fellowship**, *Fu Foundation School of Engineering and Applied Science*, Columbia University.

2015 **Distinction in Major**, *Department of Mechanical Engineering and Materials Science*, Yale University.

2015 **B.S. Cum Laude**, Yale University.

2014 **Larry Coben '79 Fellowship**, Yale University.

2013 **Vance-Carter Travel Award**, Yale University.

2012 **Thomas C. Barry Fellowship**, Yale University.

Research Experience

2015–Present **Graduate Research Fellow**, *Columbia Water Center*, Columbia University Department of Earth and Environmental Engineering, New York, NY.
Developed methods to understand the ways in which information and uncertainties about the future shape system design and investment in water systems and climate adaptation. Identified specific flood drivers in the Ohio River Basin and Lower Paraguay River Basin at daily and sub-seasonal time scales.

2014–2015 **Undergraduate Research Assistant**, *Lab of Jaehong Kim, Department of Chemical and Environmental Engineering*, Yale University, New Haven, CT.
Used CAD, 3D printing, and circuit design to prototype and measure UVC-LED technology for portable water treatment. Evaluated technical and economic viability of UV-C disinfection as a function of LED cost.

2014 **Visiting Student Researcher**, *Water and Climate Risks Lab*, Hydraulic and Environmental Engineering Department, Universidade Federal do Ceará, Fortaleza, Brazil.
Conducted bottom-up drought vulnerability assessment of rural drinking water systems in semi-arid northeastern Brazil. Used field data and rainfall data to demonstrate that federal investment in rainwater harvesting lessened but did not solve drought vulnerability.

2013 **Mechanical Design Intern**, *DEKA Research and Development*, Manchester, NH.
Used CAD and 3D printing to evaluate design changes for Slingshot water purification system.

2012 **Undergraduate Research Assistant**, *Lab of Jan Schroers, Department of Mechanical Engineering and Materials Science*, Yale University, New Haven, CT.
Prototyped and conducted measurements of novel bulk metallic glass alloys.

2012 **Summer Intern**, *Ikatú Agua Project*, Fundación Paraguaya, Asunción, Paraguay.
Assessed impact of credit for water system improvement in 19 rural communities. Carried out systematic review of program and presented recommendations to foundation leadership.

Publications and Presentations

Manuscripts Accepted, Under Review, and In Preparation

[1] Yash Amonkar, **James Doss-Gollin**, and Upmanu Lall. "Diagnosis, Simulation and Prediction of Inter-Annual and Longer Variations of Multi-Site, Annual Maximum Streamflow at a Regional Scale in the Ohio River Basin".

[2] **James Doss-Gollin**, David J Farnham, Michelle Ho, and Upmanu Lall. "Adaptation over Fatalism: Leveraging High-Impact Climate Disasters to Boost Societal Resilience". Editorial. Accepted to Journal of Water Resources Planning and Management.

[3] **James Doss-Gollin**, Upmanu Lall, and Timothy A Cohn. "Nonparametric Estimation of Autocorrelation Functions and Spectra Of Irregularly Sampled Data".

[4] **James Doss-Gollin**, Upmanu Lall, and Jonathan R Lamontagne. "Towards Adaptive Resilience: Managing Multiple Uncertainties with Real Options and Deep Reinforcement Learning".

Peer-Reviewed Journal Articles

[1] **James Doss-Gollin**, David J. Farnham, Scott Steinschneider, and Upmanu Lall. "Robust Adaptation to Multiscale Climate Variability". *Earth's Future* 7.7 (2019). DOI: 10.1029/2019EF001154.

[2] Viktor Rözer, Heidi Kreibich, Kai Schröter, Meike Müller, Nivedita Sairam, **James Doss-Gollin**, Upmanu Lall, and Bruno Merz. "Probabilistic Models Significantly Reduce Uncertainty in Hurricane Harvey Pluvial Flood Loss Estimates". *Earth's Future* 7.4 (2019). DOI: 10.1029/2018EF001074.

[3] **James Doss-Gollin**, Ángel G Muñoz, Simon J Mason, and Max Pastén. "Heavy Rainfall in Paraguay during the 2015-2016 Austral Summer: Causes and Sub-Seasonal-to-Seasonal Predictive Skill". *Journal of Climate* 31.17 (2018). DOI: 10.1175/JCLI-D-17-0805.1.

[4] David J Farnham, **James Doss-Gollin**, and Upmanu Lall. "Regional Extreme Precipitation Events: Robust Inference From Credibly Simulated GCM Variables". *Water Resources Research* 54.6 (2018). DOI: 10.1002/2017wr021318.

[5] **James Doss-Gollin**, Francisco de Assis de Souza Filho, and Francisco Osny Enéas da Silva. "Analytic Modeling of Rainwater Harvesting in the Brazilian Semiarid Northeast". *Journal of the American Water Resources Association* 52.1 (2015). DOI: 10.1111/1752-1688.12376.

Conference Papers and Presentations

[1] **James Doss-Gollin**, David J Farnham, Scott Steinschneider, and Upmanu Lall. "Robust Adaptation to Cyclical Climate Risk". *American Geophsyical Union Fall Meeting*. Washington, DC, 2018. DOI: 10.13140/RG.2.2.28447.20649.

[2] **James Doss-Gollin**, David J Farnham, and Upmanu Lall. "Designing and Operating Infrastructure for Nonstationary Flood Risk Management". *American Geophsyical Union Fall Meeting*. New Orleans, LA, 2017. DOI: 10.13140/RG.2.2.16110.46403.

[3] **James Doss-Gollin**, Ángel G Muñoz, Simon J Mason, and Max Pastén. "Causes and Model Skill of the Persistent Intense Rainfall and Flooding in Paraguay during the Austral Summer 2015-2016". *American Geophsyical Union Fall Meeting*. New Orleans, LA, 2017. DOI: 10.13140/RG.2.2.20146.30406.

[4] Davide Faranda, Gabriele Messori, **James Doss-Gollin**, David J Farnham, Upmanu Lall, and Pascal Yiou. "Dynamics and Thermodynamics of Weather Extremes: A Dynamical Systems Approach". *American Geophsyical Union Fall Meeting*. New Orleans, LA, 2017.

[5] Viktor Rözer, Heidi Kreibich, Kai Schröter, **James Doss-Gollin**, Upmanu Lall, and Bruno Merz. "BN-FLEMOps Pluvial - A Probabilistic Multi-Variable Loss Estimation Model for Pluvial Floods". *American Geophsyical Union Fall Meeting*. New Orleans, LA, 2017.

[6] **James Doss-Gollin**, David J Farnham, and Upmanu Lall. "Global-Local Interactions Modulate Tropical Moisture Exports to the Ohio River Basin". *American Geophsyical Union Fall Meeting*. San Francisco, CA, 2016. DOI: 10.13140/RG.2.2.36009.19044.

[7] David J Farnham, **James Doss-Gollin**, and Upmanu Lall. "Space-Time Characteristics and Statistical Predictability of Extreme Daily Precipitation Events in the Ohio River Basin". *American Geophsyical Union Fall Meeting*. San Francisco, CA, 2016.

[8] Caitlin M Spence, Casey Brown, and **James Doss-Gollin**. "Exploiting Synoptic-Scale Climate Processes to Develop Nonstationary, Probabilistic Flood Hazard Projections". *American Geophysical Union Fall Meeting*. San Francisco, CA. 2016.

[9] David J Farnham, Upmanu Lall, Hyun-Han Kwon, and **James Doss-Gollin**. "Moisture Transport and Extreme Precipitation in Mid-Latitudes". *American Geophsyical Union Fall Meeting*. San Francisco, CA, 2015.

[10] Luiz Martins Araújo Júnior, Francisco de Assis de Souza Filho, Cleiton da Silva Silveira, Tyhago Aragão Dias, and **James Doss-Gollin**. "Análise Dos Eventos de Seca No Nordeste Setentrional Brasileiro Com Base No Índice de Precipitação Normalizada". *XII Simpósio de Recursos Hídricos Do Nordeste*. Natal, Rio Grande do Norte, Brasil: Associação Brasileira de Recursos Hídricos (ABRH), 2014. DOI: 10.13140/RG.2.1.4610.7685.

[11] **James Doss-Gollin**, Francisco de Assis de Souza Filho, and Francisco Osny Enéas da Silva. "Considerações Sobre a Sustentabilidade Hídrica de Cisternas Para Captação de Chuva No Semiárido Brasileiro". *XII Simpósio de Recursos Hídricos Do Nordeste*. Natal, Rio Grande do Norte, Brasil: Associação Brasileira de Recursos Hídricos (ABRH), 2014. DOI: 10.13140/RG.2.1.4086.4807.

Talks and Workshop Presentations

2019-10-18 **Adaptive Resilience Through Real Options and Deep Reinforcement Learning**, *Doctoral Consortium on Computational Sustainability*, Carnegie Mellon University, Pittsburgh, PA, talk.

2019-04-13 **Evaluating staged investments in critical infrastructure for climate adaptation**, *Interdisciplinary Ph.D. Workshop in Sustainable Development 2019*, Columbia University, New York, NY, talk.

2018-11-08 **Robust Adaptation to Multi-Scale Climate Variability**, *The Nexus of Climate Data, Insurance, and Adaptive Capacity*, Asheville, NC, poster.

2017-09-10 **Extreme Rainfall in Paraguay During the 2015-16 Austral Summer**, *North East Graduate Student Water Symposium*, Amherst, MA, talk.

2017-05-31 **Regional Intense Precipitation: Inferences From GCM Atmospheric Circulation Fields**, *Modeling Research in the Cloud*, NCAR, Boulder, Colorado, poster.

2017-04-21 **Statistical-Dynamical Analysis of Climate Projections for Flood Infrastructure Design**, *Interdisciplinary Ph.D. Workshop in Sustainable Development 2017*, Columbia University, New York, NY, talk.

2016-12-07 **Physical Mechanisms and Subseasonal-To-Seasonal Predictability of Persistent Intense Rainfall and Paraguay River Flooding During the Austral Summer 2015/2016**, *Workshop on Subseasonal to Seasonal Predictability of Extreme Weather and Climate*, Columbia University, New York, NY, poster.

2016-08-26 **Understanding the Physical Drivers of Extreme Rainfall for Flood Prediction**, *Oxford Water Network*, Oxford University, talk.

Teaching Experience

2019 **Python and Data Science Tutor**, *Oliver Wyman*.
Led multiple weeklong courses to teach fundamentals of Python and data science to over 100 consultants at multinational company.

2018 **Teaching Assistant**, *Environmental Data Modeling & Analysis*, Columbia University.
- Wrote and graded problem sets for 40 masters-level students
- Held regular office hours and gave two lectures: "Introduction to R and RStudio", and "Introduction to Bayesian Methods"

2017 **Guest Lecturer**, *Water Systems Analysis*, Columbia University.
Gave lecture "Using Climate Information for Water Systems Analysis"

Community Service and Outreach

2017-Present **Peer Reviewer**.
- Journal of Applied Meteorology and Climatology
- Journal of Hydrology
- Natural Hazards and Earth System Sciences
- Oxford Journal of Development Studies
- Water Security

Conferences and Workshops

2019-12-13 **Primary Convener**, *H51A Emerging Needs and Approaches for Climate Services: Understanding and Developing Innovative Approaches to User-Oriented Climate Services*, American Geophysical Union Fall Meeting, San Francisco, CA.

2017–2019 **Organizer**, *Earth and Environmental Engineering Student Research Symposium*, Columbia University, New York, NY.

Professional Memberships

2018–Present Society for Decision Making under Deep Uncertainty (DMDU)

2018–Present American Society of Civil Engineers (ASCE)

2015–Present American Geophysical Union (AGU)

2016–Present American Meteorological Society (AMS)

Outreach and Volunteering

2016–2017 **Volunteer**, *Youth Career Connect*, New York, NY.
Mentored New York high school juniors and seniors interested in STEM careers.

2015 **Summer Intern**, *Education Policy Initiative*, New Haven Housing Authority/Elm City Communities, New Haven, CT.
Developed summer curriculum and researched policy interventions to support literacy and youth engagement and reduce multi-generational poverty.

2012–2015 **Founder and President**, *New Haven REACH*, New Haven, CT.
Founded and led a program to support New Haven high school seniors applying to college. Recruited, trained, and coordinated over 50 volunteer mentors from Yale.

2011–2015 **President**, *Engineers Without Borders*, Yale Student Chapter.
As member (2011-2012, 2015), design lead (2013) and president (2014) led student team in design and construction of water supply system for rural community of 1500 in Northwestern Cameroon.

Skills

Computer

`lang` Python (and PyData ecosystem), R (and Tidyverse), bash, Matlab, C++

`ML` stan, PyMC3, tensorflow, keras, openAI gym

`doc` Markdown, pandoc, RMarkdown, LaTeX, jupyter, jekyll, pelican

`SWE` Docker, git, conda, make, pytest

Language

English Native speaker

Spanish Full professional proficiency

Portuguese Professional working proficiency

French Elementary proficiency

Italian Elementary proficiency

Guaraní Basic