Rice University
Department of Civil and Environmental Engineering
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Houston, TX, 77005

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jdossgollin
James Doss-Gollin

James Doss-Gollin

research interests

Climate risk management and adaptation
Decision-making under uncertainty
Dynamics and spatiotemporal clustering of hydroclimate extremes
Probabilistic modeling and uncertainty quantification

appointments

Rice University
Assistant Professor, Department of Civil & Environmental Engineering, 2021–present.
Adjunct Professor, Department of Civil & Environmental Engineering, 2020.
The Pennsylvania State University
Postdoctoral Scholar, Earth & Environmental Systems Institute, 2020.
adviser: Klaus Keller

education

Columbia University
Ph.D, Earth & Environmental Engineering, 2020.
M.S., Earth & Environmental Engineering, 2016.
adviser: Upmanu Lall
Yale University
B.S., Mechanical Engineering, 2015.

awards

Nickolas and Liliana Themelis Fellowship, Fu Foundation School of Engineering and Applied Science, Columbia University, 2018.
Graduate Research Fellowship, Climate and Large-Scale Atmospheric Dynamics, National Science Foundation, 2017.
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.
Legacy Award, New Haven Promise, 2015.
Larry Coben '79 Fellowship, Yale University, 2014.
Vance-Carter Travel Award, Yale University, 2013.
Thomas C. Barry Travel Award, Yale University, 2012.

grants and contracts

co-PI, "Evaluating the Past and Future of Mississippi River Hydroclimatology to Constrain Risk via Integrated Climate Modeling, Observations, and Reconstructions". *NSF: Atmospheric & Geospace Sciences*, $441,342. 2022–2025.
PI, "Developing Future Rainfall Frequency Grids for the State of Texas". *Texas Water Development Board*, $42,500. 2022–2024.
PI, "EAGER: Participatory Design for Water Quality Monitoring of Highly Decentralized Water Infrastructure Systems". PI: Alicia Cooperman. *NSF: Strengthening America's Infrastructure*, $85,046 (total: $300,000). 2022–2023.
Lead PI, "Blending Observations of Extreme Precipitation across Space and Time to Improve Stormwater Management in Houston". *Rice University Sustainable Futures Fund*, $50,000. 2022–2023.
co-PI, "IFCE-Rice-SENAI Program on Artificial Intelligence for Urban Sustainability and Resilience to Natural Disasters in the Americas". *100,000 Strong in the Americas Innovation Fund*, $50,000. 2022–2023.

co-PI, "Synthesis of Texas Electricity Research from Rice University". *Energy Foundation*, $24,928. 2022–2023.

journal articles

Amonkar, Yash, **Doss-Gollin, James**, and Lall, Upmanu. 2023. "Compound Climate Risk: Diagnosing Clustered Regional Flooding at Inter-Annual and Longer Time Scales". In: *Hydrology* 10.3 (3), p. 67. DOI: 10.3390/hydrology10030067.

Doss-Gollin, James and Keller, Klaus. 2023. "A Subjective Bayesian Framework for Synthesizing Deep Uncertainties in Climate Risk Management". In: *Earth's Future* 11.1. DOI: 10.1029/2022EF003044.

Doss-Gollin, James, Farnham, David J., Lall, Upmanu, and Modi, Vijay. 2021. "How Unprecedented Was the February 2021 Texas Cold Snap?" In: *Environmental Research Letters*. DOI: 10.1088/1748-9326/ac0278.

Doss-Gollin, James, Farnham, David J., Ho, Michelle, and Lall, Upmanu. 2020. "Adaptation over Fatalism: Leveraging High-Impact Climate Disasters to Boost Societal Resilience". In: *Journal of Water Resources Planning and Management* 146.4. DOI: 10.1061/(asce)wr.1943-5452.0001190.

Doss-Gollin, James, Farnham, David J., Steinschneider, Scott, and Lall, Upmanu. 2019. "Robust Adaptation to Multiscale Climate Variability". In: *Earth's Future* 7.7, pp. 734–747. DOI: 10.1029/2019ef001154.

Rözer, Viktor, Kreibich, Heidi, Schröter, Kai, Müller, Meike, Sairam, Nivedita, **Doss-Gollin, James**, Lall, Upmanu, and Merz, Bruno. 2019. "Probabilistic Models Significantly Reduce Uncertainty in Hurricane Harvey Pluvial Flood Loss Estimates". In: *Earth's Future* 7.4. DOI: 10.1029/2018ef001074.

Doss-Gollin, James, Muñoz, Ángel G, Mason, Simon J, and Pastén, Max. 2018. "Heavy Rainfall in Paraguay during the 2015-2016 Austral Summer: Causes and Sub-Seasonal-to-Seasonal Predictive Skill". In: *Journal of Climate* 31.17, pp. 6669–6685. DOI: 10.1175/jcli-d-17-0805.1.

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

Doss-Gollin, James, de Souza Filho, Francisco de Assis, and da Silva, Francisco Osny Enéas. 2015. "Analytic Modeling of Rainwater Harvesting in the Brazilian Semiarid Northeast". In: *Journal of the American Water Resources Association* 52.1, pp. 129–137. DOI: 10.1111/1752-1688.12376.

invited talks preprints & in review

"**Quantifying and characterizing uncertain climate hazards to enable adaptive resilience**", Atmospheric Sciences Seminar, *Texas A&M University*. College Station, TX, 2022-11-16.

"**Unprecedented impacts don't require unprecedented weather**", Post-Harvey Climate & Flood Impacts on the Built Environment, *Severe Storm Prediction, Education, & Evacuation from Disasters Center*. Houston, TX, 2022-04-29.

"**Revisiting our design criteria: What hazards should we design for in a changing climate?**", Hydrologic Sciences and Water Resources Engineering Seminar, *University of Colorado Boulder*. Remote Presentation, 2022-04-13.

"**Adapting Engineering Design Criteria to a Changing Climate: Insights from House Elevation** ", Technical Webinar, *ASCE Central New Jersey Branch*. Remote Presentation, 2022-04-12.

"**Panelist**", Extreme Weather: How To Report on a World That's Warmer, Colder, Wetter, Drier and Weirder, *31st Annual Conference of the Society of Environmental Journalists*. Houston, TX, 2022-04-02.

"**Extreme Impacts Don't Require Extreme Weather: Lessons from the February 2021 Texas Blackouts**", Outreach Event: Science is for Everyone, *American Meteorlogical Society*. Remote Presentation, 2022-01-25.

"**Extreme Impacts Don't Require Extreme Weather: Lessons from the February 2021 Texas Blackouts**", Compound Events Working Group, *Risk KAN (Knowledge Action Networks)*. Remote Presentation, 2021-12-09.

"**Panelist**", Tail events: Prediction, Planning, and Performance, *Harvard Electricity Policy Group*. Remote Presentation, 2021-09-28.

"**Towards Adaptive Resilience: Managing Flood Risks in a Changing World**", Technical Webinar, *ASCE Central New Jersey Branch*. Remote Presentation, 2021-04-28.

"**Prediction and Implications of Structured Climate Risk for Sequential Adaptation under Deep Uncertainty**", Center for Climate Risk Management CLIMA Seminar, *the Pennsylvania State University*. State College, PA, 2020-01-29.

"**Prediction and Implications of Structured Climate Risk for Sequential Adaptation under Deep Uncertainty**", Department of Civil and Environmental Engineering Seminar, *Rice University*. Houston, TX, 2020-01-27.

"**Prediction and Implications of Structured Climate Risk for Sequential Adaptation under Deep Uncertainty**", Complex Systems Simulation and Optimization Group, *National Renewable Energy Laboratory*. Golden, CO, 2020-01-07.

"**Drivers of Extreme Rainfall: Atmospheric Circulation Patterns and Regional Intense Rainfall in the Ohio River**", European Flood Awareness System Group, *European Centre for Medium Range Weather Forecasting*. Reading, England, 2016-09-02.

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

teaching

Columbia University
Environmental Data Analysis and Modeling. Teaching Assistant. Spring 2018.

Rice University
Climate Risk Management. Instructor. Spring 2023.
Environmental Data Science. Instructor. Spring 2022.
Fundamentals of Civil and Environmental Engineering. Instructor. Fall 2021.

primary advisor

Current Yuchen Lu, *Ph.D. in Civil and Environmental Engineering*, Rice University.

2022 Alyssa Graham, *M.S. in Civil and Environmental Engineering*, Rice University. Thesis: "Water Supply Vulnerability Testing and Robust Planning Analysis with Exploratory Modeling under Deep Uncertainty."

committee member

Current Chen Chen, *Ph.D. in Civil and Environmental Engineering*, Rice University.

Current True Furrh, *Ph.D. in Civil and Environmental Engineering*, Rice University.

Current Matthew Garcia, *Ph.D. in Civil and Environmental Engineering*, Rice University.

Current Kelsey Murphy, *Ph.D. in Earth, Environmental, and Planetary Sciences*, Rice University.

Current Xiangnan Zhou, *Ph.D. in Civil and Environmental Engineering*, Rice University.

2022 Raychel Bahnick, *M.S. in Civil and Environmental Engineering*, Rice University. Thesis: "Assessing Land Use Change and Subsidence Impact on Inland Flooding."

2022 Elizabeth Hoffmann, *M.S. in Civil and Environmental Engineering*, Rice University. Thesis: "Mapping Dynamic Watershed Response Under Increasing Development Using HEC-RAS 2D: A Case Study of the Big Creek Watershed in Fort Bend County."

2021 Toby Li, *M.S. in Civil and Environmental Engineering*, Rice University. Thesis: "Evaluating the Effects of Project Brays Mitigation Using Unsteady HEC-RAS Hydraulic Modeling: Application to Meyerland in Houston, TX."

2022 Chunshan Liu, *Ph.D. in Statistics*, Rice University. Thesis: "Bayesian Graphical Models for Multivariate Time Series."

media coverage

Texas could have foreseen 2021 cold-wave disaster, new study concludes, *Bob Henson*, **Texas Climate News**, 2022-05-21.

The False Comfort of Higher Seawalls, *Paola Rosa-Aquino*, **The New Republic**, 2019-10-29.

New Study Shows Promise for Long-Term Weather Forecasts in South America, *Elisabeth Gawthrop*, **State of the Planet**, 2018-08-06.

opinion

Opinion: The risks of climate change are great - so are the rewards of solving it, *Andrew Dessler, James Doss-Gollin, and Katherine Hayhoe*, **Houston Chronicle**, 2021-09-01.

sessions organized

Chair, *H44G – Water and Society: Interdisciplinary Perspectives on Hydroclimatic Forecasting for Water Resources Decision Making*, American Geophysical Union Fall Meeting, New Orleans, LA. 2021-12-16.

Primary Convenor, *NH53 – 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. 2019-12-23.

Student Organizer, *Earth and Environmental Engineering Student Research Symposium*, Columbia University, New York, NY. 2018-10-12.

Student Organizer, *Earth and Environmental Engineering Student Research Symposium*, Columbia University, New York, NY. 2017-10-27.

conference papers

Amonkar, Yash Vijay, **Doss-Gollin, James**, Farnham, David J., Modi, Vijay, and Lall, Upmanu. 2022. "Changing Climate, Peak Demand and Load Factors across the Contiguous United States". In: Fall Meeting 2022. AGU.

Dee, Sylvia, Dunne, Kieran, Munoz, Samuel E., Luo, Xinyue, Murphy, Kelsey, and **Doss-Gollin, James**. 2022. "Past, Present, and Future Hydroclimate across the Mississippi River Basin and Its Tributaries: Insights from Integrated Paleoclimate Data Analysis". In: Fall Meeting 2022. AGU.

Doss-Gollin, James, Lamontagne, Jonathan, and Lall, Upmanu. 2022. "Near-Term Predictability Lowers Long-Term Adaptation Costs". In: Fall Meeting 2022. AGU.

Kazadi, Arnold N., **Doss-Gollin, James**, Sebastian, Antonia, and Silva, Arlei. 2022. "Flood Prediction with Graph Neural Networks". In: *Climate Change AI*. NeurIPS 2022 Workshop on Tackling Climate Change with Machine Learning. Climate Change AI.

Lu, Yuchen, Lee, Benjamin Seiyon, and **Doss-Gollin, James**. 2022. "Nonstationary GEV with Hierarchical Spatial Pooling: A Spatiotemporal Bayesian Framework for Nonstationary Extreme Precipitation Frequency Analysis in the Gulf Coast". In: Fall Meeting 2022. AGU.

Murphy, Kelsey, Dee, Sylvia, Munoz, Samuel E., Dunne, Kieran, O'Donnell, Michelle, and **Doss-Gollin, James**. 2022. "The Mississippi River's Hydrologic Response to Natural vs. Anthropogenic Forcing from the Last Millennium through the 21st Century". In: Fall Meeting 2022. AGU.

O'Donnell, Michelle, **Doss-Gollin, James**, Dee, Sylvia, and Munoz, Samuel E. 2022. "Validation of Community Earth System Model Hydrologic Variables Over the Mississippi River System To Understand Long Term Hydrometerologic Changes". In: Fall Meeting 2022. AGU.

Doss-Gollin, James, Farnham, David J., Lall, Upmanu, and Modi, Vijay. 2021. "How Unprecedented Was the February 2021 Texas Cold Snap?" In: AGU Fall Meeting 2021. AGU.

Doss-Gollin, James and Keller, Klaus. 2021. "What Scenario Should We Design for? Insights from Home Elevation for the Multiple PDF Problem". In: Fall Meeting 2021. AGU.

Geldner, Nathan, **Doss-Gollin, James**, Keller, Klaus, and Johnson, David R. 2021. "Characterization of the Equity-Efficiency Tradeoff in Targeted Residential Coastal Protection Projects". In: *2021 Annual Meeting of the Society for Risk Analysis*. Virtual.

Lall, Upmanu, Amonkar, Yash Vijay, Farnham, David J, Modi, Vijay, and **Doss-Gollin, James**. 2021. "The Risks of Energy Shortfalls Considering Temperature Extremes, Wind and Solar Energy for the Texas Energy Grid Using a Novel Space-Time Simulation Model". In: Fall Meeting 2021. New Orleans, LA: AGU.

Zhou, Xiangnan, Duenas-Osorio, Leonardo, Liu, Lu, Stadler, Lauren, **Doss-Gollin, James**, Getachew, Bezawit, and Li, Qilin. 2021. "Infrastructure System for Climate Change Adaption: A Case Study in the City of Lumberton, NC". In: Fall Meeting 2021. AGU.

Lall, Upmanu, Arumugam, Sankar, Cioffi, Francesco, Devineni, Naresh, **Doss-Gollin, James**, Kwon, Hyun-Han, and Rajagopalan, Balaji. 2020. "America's Water: Multiscale Forecasting and Innovation in Infrastructure Design & Management Instruments Is Critical for Climate Adaptation". In: Fall Meeting 2020. AGU.

Amonkar, Yash Vijay, **Doss-Gollin, James**, and Lall, Upmanu. 2019. "Preserving Long-Term Variability in Simulation of Multisite Streamflow Extremes". In: Fall Meeting 2019. AGU. DOI: 10.6084/m9.figshare.11444238.v1.

Doss-Gollin, James, Lall, Upmanu, and Lamontagne, Jonathan. 2019. "Towards Adaptive Resilience: Managing Uncertainties and Exploiting Predictability across Timescales". In: Fall Meeting 2019. AGU. DOI: 10.6084/m9.figshare.11397936.v1.

Doss-Gollin, James, Farnham, David J, Steinschneider, Scott, and Lall, Upmanu. 2018. "Robust Adaptation to Cyclical Climate Risk". In: Fall Meeting 2018. AGU. DOI: 10.13140/rg.2.2.28447.20649.

Doss-Gollin, James, Farnham, David J, and Lall, Upmanu. 2017. "Designing and Operating Infrastructure for Nonstationary Flood Risk Management". In: 2017 Fall Meeting. AGU. DOI: 10.13140/rg.2.2.16110.46403.

Doss-Gollin, James, Muñoz, Ángel G, Mason, Simon J, and Pastén, Max. 2017. "Causes and Model Skill of the Persistent Intense Rainfall and Flooding in Paraguay during the Austral Summer 2015-2016". In: 2017 Fall Meeting. AGU. DOI: 10.13140/rg.2.2.20146.30406.

Faranda, Davide, Messori, Gabriele, **Doss-Gollin, James**, Farnham, David J, Lall, Upmanu, and Yiou, Pascal. 2017. "Dynamics and Thermodynamics of Weather Extremes: A Dynamical Systems Approach". In: 2017 Fall Meeting. AGU.

Rözer, Viktor, Kreibich, Heidi, Schröter, Kai, **Doss-Gollin, James**, Lall, Upmanu, and Merz, Bruno. 2017. "BN-FLEMOps Pluvial - A Probabilistic Multi-Variable Loss Estimation Model for Pluvial Floods". In: 2017 Fall Meeting. AGU.

Doss-Gollin, James, Farnham, David J, and Lall, Upmanu. 2016. "Global-Local Interactions Modulate Tropical Moisture Exports to the Ohio River Basin". In: 2016 Fall Meeting. AGU. DOI: 10.13140/rg.2.2.36009.19044.

Farnham, David J, **Doss-Gollin, James**, and Lall, Upmanu. 2016. "Space-Time Characteristics and Statistical Predictability of Extreme Daily Precipitation Events in the Ohio River Basin". In: 2016 Fall Meeting. AGU.

Spence, Caitlin M, Brown, Casey, and **Doss-Gollin, James**. 2016. "Exploiting Synoptic-Scale Climate Processes to Develop Nonstationary, Probabilistic Flood Hazard Projections". In: 2016 Fall Meeting. AGU.

Farnham, David J, Lall, Upmanu, Kwon, Hyun-Han, and **Doss-Gollin, James**. 2015. "Moisture Transport and Extreme Precipitation in Mid-Latitudes". In: 2015 Fall Meeting. AGU.

Araújo Júnior, Luiz Martins, de Souza Filho, Francisco de Assis, da Silva Silveira, Cleiton, Aragão Dias, Tyhago, and **Doss-Gollin, James**. 2014. "Análise dos eventos de seca no Nordeste Setentrional Brasileiro com base no índice de precipitação normalizada". In: *XII Simpósio de Recursos Hídricos Do Nordeste*. Natal, Rio Grande do Norte, Brasil: Associação Brasileira de Recursos Hídricos (ABRH). DOI: 10.13140/rg.2.1.4610.7685.

Doss-Gollin, James, de Souza Filho, Francisco de Assis, and da Silva, Francisco Osny Enéas. 2014. "Considerações sobre a sustentabilidade hídrica de cisternas para captação de chuva no Semiárido Brasileiro". In: *XII Simpósio de Recursos Hídricos Do Nordeste*. Natal, Rio Grande do Norte, Brasil: Associação Brasileira de Recursos Hídricos (ABRH). DOI: 10.13140/rg.2.1.4086.4807.

workshop presentations

"**Valuing Flexibility and Soft Instruments for Sequential Decision Problems**", 2020 Annual Meeting of the Society for Decision Making under Deep Uncertainty, *Society for Decision Making under Deep Uncertainty*. . Remote Presentation. Nov. 2020.

"**Adaptive Resilience through Real Options and Deep Reinforecement Learning**", Doctoral Consortium on Computational Sustainability, *Carnegie Mellon University*. Pittsburgh, PA. Oral Presentation. Oct. 2019.

"**Evaluating Staged Investments in Critical Infrastructure for Climate Adaptation**", Interdisciplinary Ph.D. Workshop in Sustainable Development, *Columbia University*. New York, NY. Oral Presentation. Apr. 2019.

"**Robust Adaptation to Multi-Scale Climate Variability**", The Nexus of Climate Data, Insurance, and Adaptive Capacity, . Asheville, NC. Poster Presentation. Nov. 2018.

"**Extreme Rainfall in Paraguay during the 2015-16 Austral Summer: Causes and Predictive Skill**", North East Graduate Student Water Symposium, *University of Massachusetts Amherst*. Amherst, MA. Oral Presentation. Sept. 2017.

"**Regional Intense Precipitation: Inferences From GCM Atmospheric Circulation Fields**", Modeling Research in the Cloud, *National Center for Atmospheric Research*. Boulder, CO. Poster Presentation. May 2017.

"**Statistical-Dynamical Analysis of Climate Projections for Flood Infrastructure Design**", Interdisciplinary Ph.D. Workshop in Sustainable Development 2017, *Columbia University*. New York, NY. Oral Presentation. Apr. 2017.

"**Causes and Model Skill of the Persistent Intense Rainfall and Flooding in Paraguay during the Austral Summer 2015-2016**", Workshop on Subseasonal to Seasonal Predictability of Extreme Weather and Climate, *Columbia University*. New York, NY. Poster Presentation. Dec. 2016.

peer review

AGU Advances
Climatic Change
Earth's Future
Energy Technology
Environmental Research Letters
Geophysical Research Letters
Hydrology and Earth System Sciences
Joule
Journal of Applied Meteorology and Climatology
Journal of Hydrology
Journal of Water Resources Management and Planning
Oxford Journal of Development Studies
Water Resources Research
Water Security
Weather, Climate, and Society

grant review

National Science Foundation

additional experience

Founder (2012), President (2012-2015), and Faculty Adviser (2022–Present), New Haven REACH, New Haven, CT. 2012–Present.
As Faculty Adviser, I mentor the current leadership of the organization I created at Yale University. New Haven REACH links Yale students with juniors and seniors in under-resourced public schools in New Haven to provide free mentorship on college applications, particularly the personal statement..

Social and Behavioral Research - Basic/Refresher, CITI program. 2022–2025. Record #46214890.

Social and Behavioral Responsible Conduct of Research, CITI program. 2022. Record #46214894.

Panel Fellow, NSF CMMI's Game Changer Academies for Advancing Research Innovation. 2021.

Visiting Graduate Researcher, Lamontagne Research Group, Department of Civil and Environmental Engineering, Tufts University, Medford, MA. 2019–2020.

Graduate Research Fellow, Columbia Water Center, Department of Earth and Environmental Engineering, Columbia University, New York, NY. 2015–2020.

Summer School Participant, Fluid Dynamics of Sustainability and the Environment, Cam-

bridge University, Cambridge, England. 2016.

Education Policy Intern, Elm City Communities / New Haven Housing Authority, New Haven, CT. 2015.

President (2014), Design Lead (2013), Member (2012, 2015), Engineers Without Borders, Yale Student Chapter, New Haven, CT. 2012–2015.

Undergraduate Research Assistant, Lab of Jaehong Kim, Department of Chemical and Environmental Engineering, Yale University, New Haven, CT. 2014–2015.

Visiting Undergraduate Researcher, Water and Climate Risk Lab, Department of Hydraulic and Environmental Engineering, Universidade Federal do Ceará, Fortaleza, Brazil. 2014.

Mechanical Design Intern, Slingshot Team, DEKA Research & Development, Manchester, NH. 2013.

Undergraduate Research Assistant, Lab of Jan Schroers, Department of Mechanical Engineering and Materials Science, Yale University, New Haven, CT. 2012.

Ikatú Agua Intern, Fundación Paraguaya, Asunción, Paraguay. 2012.