Rohini Singh Gupta, E.I.T.

Postdoctoral Researcher | Cornell University

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Appointments

2024- Present **Postdoctoral Scholar,** Steinschneider Research Group, Cornell University
2017- 2024 **Ph.D Student,** Reed Research Group, Cornell University
2020-2021 **Visiting Scholar**, Environmental Intelligence for Global Change Group, Politecnico di Milano

Education

Cornell University — **Ithaca, NY**
Ph.D. Civil & Environmental Engineering — **July 2024**
GPA: 3.93/4.00

Cornell University — **Ithaca, NY**
M.S., Civil & Environmental Engineering — **Dec, 2019**
GPA: 3.95/4.00

University of Illinois at Urbana-Champaign — **Urbana-Champaign, IL**
Bachelor of Science in Civil and Environmental Engineering — **May, 2017**
GPA: 3.90/4.00

Publications

JOURNAL ARTICLES

[10] Gold, D.F., **Gupta, R. S.**, & Reed, P. M. (2024) Exploring the spatially compounding multi-sectoral drought vulnerabilities in Colorado's West Slope River Basins. *Earth's Future*

[9] Hirsch, Z.M., Zeff, H.B., **Gupta, R.S**., Vernon, C.R., Reed, P.M., Characklis, G.W. (2024) Two-way option contracts that facilitate adaptive water reallocation in the western United States. *Earth's Future*

[8] **Gupta R.S**., Vernon, C.R., Thurber T.B., Gold, D.F., Hirsch, Z.M., Hadjimichael, A., Reed, P.M. *statemodify*: a Python framework to facilitate accessible exploratory modeling for water systems planning and management in Colorado. *Journal of Open Source Software*

[7] **Gupta, R. S.**, Steinschneider, S., & Reed, P. M. (2023) Understanding the Contributions of Paleo-Informed Natural Variability and Climate Changes to Hydroclimate Extremes in the San Joaquin Region of California. *Earth's Future*

[6] Rodríguez-Flores J.M., **Gupta R.S.**, Zeff H.B., Reed P.M., Medellín-Azuara J (2023) Identifying robust adaptive irrigation operating policies to balance deeply uncertain economic food production and groundwater sustainability trade-offs. *J Environ Management.*

[5] **Gupta, R. S.**, Steinschneider, S., & Reed, P. M. (2022). A multi-objective paleo-informed reconstruction of western US weather regimes over the past 600 years. *Climate Dynamics*

[4] Reed, P. M., Hadjimichael, A., Moss, R. H., Brelsford, C., Burleyson, C. D., Cohen, S., ...**Gupta, R.S.,**… & Yoon, J. (2022). Multisector dynamics: Advancing the science of complex adaptive human‐Earth systems. *Earth's Future*

[3] Reed, P.M., Hadjimichael, A., Malek, K., Karimi, T., Vernon, C.R., Srikrishnan, V., **Gupta, R.S.**, Gold, D.F., Lee, B., Keller, K., Thurber, T.B, & Rice, J.S. (2022). Addressing Uncertainty in Multisector Dynamics Research [Book]. Zenodo. https://doi.org/10.5281/zenodo.6110623

[2] Logan, L. H., **Gupta, R. S.**, Ando, A., Suski, C., & Stillwell, A. S. (2021). Quantifying tradeoffs between electricity generation and fish populations via population habitat duration curves. *Ecological Modelling*

[1] **Gupta, R. S.**, Hamilton, A. L., Reed, P. M., & Characklis, G. W. (2020). Can modern multi-objective evolutionary algorithms discover high-dimensional financial risk portfolio tradeoffs for snow-dominated water-energy systems?. Advances in water resources, 145, 103718.

IN REVIEW OR REVISION

Gupta, R.S., Steinschneider, S., Reed., P.M. Exploring Vulnerabilities in the California Water System under the Late Renaissance Megadrought and Climate Change (In Review)

BOOKS, REPORTS, AND OTHER PUBLICATIONS

[2] Reed, P.M., Hadjimichael, A., Malek, K., Karimi, T., Vernon, C.R., Srikrishnan, V., **Gupta, R.S**., Gold, D.F**.**, Lee, B., Keller, K., Thurber, T.B., & Rice, J.S. (2022). Addressing Uncertainty in Multisector Dynamics Research [e-Book]. Zenodo. https://doi.org/10.5281/zenodo.6110623

[1] Reed, P. M., Hadjimichael, A., Moss, R. H., Monier, E., Alba, S., Brelsford, C., Dyreson, A., **Gupta, R.S.**, & et. al. (2022). MultiSector Dynamics: Scientific Challenges and a Research Vision for 2030, A Community of Practice Supported by the United States Department of Energy's Office of Science. *Zenodo*. http://doi.org/https://doi.org/10.5281/zenodo.5825890

Conference and Invited Presentations

INVITED TALKS

[2] **Gupta, R.S.**, Steinschneider, S., Reed, P.M. Partitioning how natural variability and climate change influence hydrologic response in five major California Central Valley watersheds. Earth and Atmospheric Science Department, Cornell University, February 2023

[1] **Gupta, R.S.**, Steinschneider, S., Reed, P.M. Partitioning how natural variability and climate change influence hydrologic response in five major California Central Valley watersheds. Lamont-Doherty Earth Observatory, October 2022

CONFERENCE PRESENTATIONS

[15] **Gupta, R.S.**, Steinschneider, S., Reed, P.M. Stress Testing California's Water System using an Exploratory Ensemble Analysis Conditioned on the Late Renaissance Megadrought and Climate Change. AGU, December 2024

[14] **Gupta, R.S.**, Steinschneider, S., Reed, P.M. Mapping Vulnerabilities of the California Food-Energy-Water System under Paleo-Informed Extreme Hydroclimate Conditions. AGU, December 2023

[13] **Gupta, R.S.**, Steinschneider, S., Reed, P.M. Partitioning How Natural Variability and Climate Change Influence Hydroclimate Response in Five Major Central Valley Watersheds. AGU, December 2022

[12] Hamilton, A. L., **Gupta, R. S.**, Reed, P. M., Zeff, H. B., & Characklis, G. W. Discovering robust infrastructure investment partnerships to meet California's water portfolio goals. AGU, December 2022

[11] **Gupta, R.S.**, Steinschneider, S., Reed, P.M. Process-rich scenario generation enhances exploratory decision support for deeply uncertain hydroclimatic extremes. DMDU, November 2022

[10] Hamilton, A. L., **Gupta, R. S.**, Reed, P. M., Zeff, H. B., & Characklis, G. W. Key challenges for defining and designing robust infrastructure investment partnerships in deeply uncertain many-actor water supply networks. DMDU, November 2022

[9] **Gupta, R.S.**, Steinschneider, S., Reed, P.M. Partitioning How Natural Variability and Climate Change Influence Hydroclimate Response in the Tuolumne River Basin. Frontiers in Hydrology, June 2022

[8] Hamilton, A. L., **Gupta, R. S.**, Zeff, H. B., Reed, P. M., & Characklis, G. W. Exploring the challenges facing California in achieving resilient water portfolios under climatic, economic, and regulatory uncertainty. Frontiers in Hydrology, June 2022

[7] Hamilton, A. L., **Gupta, R. S.**, Zeff, H. B., Characklis, G. W., & Reed, P. M. Designing effective, fair, and robust water infrastructure investment partnerships under deep uncertainty. Environmental & Water Resources Congress, ASCE, June 2022

[6] **Gupta, R.S.**, Steinschneider, S., Reed, P.M.. Partitioning how natural variability and climate change influence hydroclimate response in the Tuolumne River Basin. AGU, December 2022

[5] **Gupta, R.S.**, Steinschneider, S., Reed, P.M., Tree-ring based weather regime reconstructions over the past 600 years for climate scenario development in the Western United States. Environmental & Water Resources Congress, ASCE, June 2021

[4] **Gupta, R.S.**, Steinschneider, S., Reed, P.M., Tree-ring based weather regime reconstructions over the past 600 years for climate scenario development in the Western United States. Environmental & Water Resources Congress, AGU, December 2019

[3] **Gupta, R.S.**, Hamilton, A.L., Reed, P.M., Characklis, G.W., "Can modern multi-objective evolutionary algorithms address high-dimensional financial risk problems in coupled water and energy systems?" Environmental & Water Resources Congress, ASCE, 2019

[2] **Gupta, R.S.**, Logan, L.H., Stillwell, A.S., "Thermal Pollution Impacts on Aquatic Ecosystems: A Case Study of Power Generation and Ohio River Fish Species." Environmental & Water Resources Congress, ASCE, 2016

[1] Logan, L.H., **Gupta, R.S.**, Stillwell, A.S., "Quantifying Economic Tradeoffs between Thermoelectric Power Generation and Aquatic Ecosystem Stability," (1) Presented at Environmental & Water Resources Congress, Planning and Management Track, ASCE, 2016 (2) Ohio River Basin Consortium for Research and Education Annual Symposium, 2016, **2nd Place Award: Oral Presentation**

Research Experience

DOE - IM3 – Cornell University **Aug 2021-Present**

Developing flexible, open-source, integrated modeling capabilities that capture the structure, dynamic behavior, and emergent properties of the multiscale interactions within and between human and natural systems.

- Developing synthetic streamflow generation techniques to create hydroclimate ensembles for the West Slope of Colorado (Hidden Markov Modeling, Bayesian Hidden Markov Modeling)
- Creating accessible open-source software to enable exploratory modeling of regional water systems

NSF-GRFP– Cornell University **Dec 2019-May 2023**

- Developed a multi-objective framework to reconstruct regional weather regimes in California using tree-ring reconstructed products.
- Produced 600-year traces of synthetic weather and streamflow (baseline and climate change scenarios) for 12 basins in California using methods of embedding tree ring data into synthetic generation.
- Currently, forcing a California Food Energy Water Systems (CALFEWS) model with the ensembles to assess the robustness of stakeholders to different climate futures.

NSF-INFEWS – Cornell University **Aug 2017-Dec 2019**

Investigated how evolutionary algorithms can be used to discover optimal financial risk management strategies for hydropower utilities in California.

Teaching Experience

2019 **Decision Analysis (CEE 5980)**, Teaching Assistant *Cornell University*

Mentoring

2017-2023 **Undergraduate Research Mentor**

- Audrey Noziere (Aug 2021-May 2023)
- Alex Eagan (Aug 2021-Dec 2022)
- Imani Finkley (Aug-Dec 2021)
- Andrew Dircks (Jan 2020-Aug 2021)

2019-2021 **Civil and Environmental Engineering PhD Mentoring Program**, Mentor

Professional Service

LEADERSHIP

2020 – present **MultiSector Dynamics Community of Practice Facilitation Team**, Member
2016-2017 **Tau Beta Pi**, Vice President (University of Illinois)
2013-2017 **Engineers Without Borders**, Travel Team Member (University of Illinois)

JOURNAL PEER REVIEW

Journal of Water Resources Planning and Management, Journal of Hydrologic Engineering, Geophysical Research Letters, Water Resources Research, Advances in Water Resources, Water Management, Journal of Infrastructure Preservation and Resilience

CONFERENCE SESSIONS

Convener, Enhancing Water Management: Streamflow Reconstruction and Addressing Uncertainty in Human-Water Systems, American Geophysical Union (2023)

PROFESSIONAL MEMBERSHIP

2017 – present **American Society of Civil Engineers, Ithaca Chapter**, Member
2017 – present **American Geophysical Union**, Member

Skills

Certification: Civil Engineer In Training, Issued: June 2017
Computing: R; Python; MATLAB; Linux; C/C++; HPC with SLURM; Microsoft Excel; Adobe Illustrator

Fellowships

National Science Foundation Graduate Research Fellowship- Awarded: Spring 2019

Awards

John E. Perry Teaching Assistant Prize (Cornell University, Spring 2019)

Bernard Meyers Graduate Fellowship (Cornell University, Summer 2018)

Ira O. Baker Prize-The Ira O. Baker Prize is the top prize awarded to two undergraduate CEE seniors at the University of Illinois. These prizes have been given to the top-ranking senior students in civil engineering every spring since 1924. The faculty of the department selects the winners. Selection is based on the student's activities in organizations and on personal characteristics that include initiative, reliability, and potential. (University of Illinois at Urbana-Champaign, May 2017)