# DEEKSHA RASTOGI

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## EDUCATION

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|---|---|
| Aug' 2016 – Dec' 2019 | PhD, Energy Science and Engineering<br>Focus: Environmental and Climate Sciences<br>**The University of Tennessee, Knoxville, TN** |
| Aug' 2010 – Dec' 2012 | M.S., Atmospheric Sciences<br>**University of Illinois Urbana-Champaign, Urbana, IL** |
| Aug' 2006 – Jun' 2010 | B. Tech., Environmental Engineering<br>**Indian School of Mines, Dhanbad, Jharkhand, India** |

## WORK EXPERIENCE

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|---|---|
| Dec' 2019 – Present | Research Scientist,<br>Computational Urban Climate,<br>**Computational Urban Sciences Group**<br>**Computational Sciences and Engineering Division**<br>**Oak Ridge National Laboratory, Oak Ridge TN** |
| Aug' 2016 – Dec' 2019 | Graduate Research Assistant,<br>**The University of Tennessee, Knoxville, TN - Oak Ridge National Laboratory, Oak Ridge, TN** |
| Jun' 2019 – Aug' 2019 | Graduate Visitor, Advanced Study Program<br>**Climate & Global Dynamics/Research Applications, Laboratory, National Center for Atmospheric Research Boulder, CO** |
| Jan' 2013 – Jun' 2016<br>May 2012 – Aug' 2012 | Post Master's Research Associate,<br>Summer Intern,<br>**Oak Ridge Associated Universities/Oak Ridge National Laboratory, Oak Ridge, TN** |
| Aug' 2010 – Dec'2012 | Graduate Research Assistant,<br>**University of Illinois Urbana-Champaign, Urbana, IL** |

## Critical Expertise

- More than twelve years of experience working in the field of environmental science with a focus on atmospheric, climate and energy sciences.
- Unique expertise in investigating hydroclimate, weather/climate extremes, and infrastructure and human health responses to environmental and atmospheric processes.
- Advanced skills in the development and application of numerical modeling frameworks and scientific data analysis.

## Technical Skills

Numerical weather/climate modeling (WRF, RegCM), high performance computing, statistical data analysis, handling large datasets, Python, shell scripting, Fortran 90, SQL, NCO, NCAR command language (NCL),

## LIST OF PUBLICATIONS

*Journal Articles [20]* ( *Google Scholar Profile*) *(cited >750 times)*

- **Rastogi, D.,** Kao, S. C., & Ashfaq, M. (2022). How may the choice of downscaling techniques and meteorological reference observations affect future hydroclimate projections? *Earth's Future*, 8(10), https://doi.org/10.1029/2022EF002734
- **Rastogi, D.,** Lehner, F., Kuruganti, T., Evans, K. J., Kurte, K. R., & Sanyal, J. (2021). The role of humidity in determining future electricity demand in the southeastern United States. *Environmental Research Letters*,16(11), doi: 10.1088/1748-9326/ac2fdf
- **Rastogi D.,** D. Touma, K. J. Evans, and M. Ashfaq (2020), Shift towards intense and widespread precipitation events over the United States by mid 21st century. *Geophysical Research Letters*, *47*, e2020GL089899, https://doi.org/10.1029/2020GL089899.
- **Rastogi, D.**, Lehner, F., & Ashfaq, M. Revisiting Recent United States Heatwaves in a Warmer and More Humid Climate (2020). *Geophysical Research Letters*, 47, e2019GL086736, https://doi.org/10.1029/2019GL086736
- **Rastogi, D.,** J.S. Holladay, K. J. Evans, K., B.L. Preston, and M. Ashfaq (2019), Shift in seasonal climate patterns likely to impact residential energy consumption. *Environmental Research Letters, 14(7),* doi: 10.1088/1748-9326/ab22d2.
- **Rastogi, D.**, M. Ashfaq, L. R. Leung, S. Ghosh, A. Saha, K. Hodges, and K. J. Evans (2018), Characteristics of Bay of Bengal Monsoon Depressions in the 21st Century. *Geophysical Research Letters*, *45*(13), 6637-6645, doi:10.1029/2018GL078756.
- **Rastogi, D.**, S.-C. Kao, M. Ashfaq, R. Mei, E.D. Kabela, S. Gangrade, B. S. Naz, B. L. Preston, N. Singh, and V.G. Anantharaj (2017), Effects of climate change on probable maximum precipitation: A sensitivity study over the Alabama-Coosa-Tallapoosa River Basin. *Journal of Geophysical Research: Atmospheres*, *122*(9), 4808-4828, doi: /10.1002/2016JD026001.
- Ashfaq, M., **Rastogi, D.,** Kitson, J., Abid, M. A., & Kao, S. C. (2022). Evaluation of CMIP6 GCMs over the CONUS for downscaling studies. Journal of Geophysical Research: Atmospheres, 127(21), e2022JD036659.
- Lai, L., Kumar, S., **Rastogi, D.,** & Ashfaq, M. (2022). Temporal variabilities of soil carbon dioxide fluxes from cornfield impacted by temperature and precipitation changes through high-frequent measurement and DAYCENT modelling. *The Journal of Agricultural Science*, https://doi.org/10.1017/S0021859622000132
- Allen-Dumas M. R., H. Xu, K.R. Kurte, and **D. Rastogi** (2020), Towards urban water security: broadening the use of machine learning methods for mitigating urban water hazards. Frontiers in Water: Water and Hydrocomplexity,2,75.
- Gangrade, S., S.-C. Kao, B.S. Naz., **D. Rastogi**, M. Ashfaq, N. Singh, and B.L. Preston (2018), Sensitivity of probable maximum flood in a changing environment, *Water Resources Research, 54*(6), 3913-3936, doi:10.1029/2017WR021987.

- Naz, B. S., S.-C. Kao, M. Ashfaq., H. Gao, **D. Rastogi**, and S. Gangrade (2018), Effects of climate change on streamflow extremes and implications for reservoir inflow in the United States, *Journal of Hydrology*, *556,* 359-370, doi: 10.1016/j.jhydrol.2017.11.027.
- Paull, S. H., D. E. Horton, M. Ashfaq, **D. Rastogi,** L. D. Kramer, N. S. Diffenbaugh, and A. M. Kilpatrick (2017), Drought and immunity determine the intensity of West Nile virus epidemics and climate change impacts. *Proceedings of the Royal Society B: Biological Sciences*, *284*(1848), 20162078, doi:10.1098/rspb.2016.2078.
- Ashfaq, M., **D. Rastogi**, R. Mei, D. Touma, and L. R. Leung (2017), Sources of errors in the simulation of south Asian summer monsoon in the CMIP5 GCMs. *Climate dynamics*, *49*(1-2), 193-223, doi: 10.1007/s00382-016-3337-7.
- Ashfaq, M., **D. Rastogi**, R. Mei, S.-C. Kao, S. Gangrade, B.S. Naz, and D. Touma (2016), High-resolution ensemble projections of near-term regional climate over the continental United States, *Journal of Geophysical Research: Atmospheres*, *121*(17), 9943-9963, doi:10.1002/2016JD025285.
- Pagán, B. R., M. Ashfaq, **D. Rastogi,** D. R. Kendall, S.-C. Kao, B. S. Naz, R. Mei, and J.S. Pal. (2016), Extreme hydrological changes in the southwestern US drive reductions in water supply to Southern California by mid century. *Environmental Research Letters*, *11*(9), 094026, doi:10.1088/1748-9326/11/9/094026.
- Naz, B. S., S.-C. Kao, M. Ashfaq, **D. Rastogi,** R. Mei, and L.C. Bowling, (2016), Regional hydrologic response to climate change in the conterminous United States using high-resolution hydroclimate simulations. *Global and Planetary Change*, *143*, 100-117, doi:10.1016/j.gloplacha.2016.06.003.
- Mani, A., F. T.-C. Tsai, S.-C. Kao, B.S. Naz, M. Ashfaq, and **D. Rastogi** (2016), Conjunctive management of surface and groundwater resources under projected future climate change scenarios. *Journal of Hydrology*, *540*, 397-411, doi:10.1016/j.jhydrol.2016.06.021.
- Mei, R., M. Ashfaq, **D. Rastogi,** L. R. Leung, and F. Dominguez (2015), Dominating controls for wetter South Asian summer monsoon in the twenty-first century. *Journal of Climate*, *28*(8), 3400-3419, doi:10.1175/JCLI-D-14-00355.1.
- Singh, D., D. E. Horton, M. Tsiang, M. Haugen, M. Ashfaq, R. Mei, R., **D. Rastogi,** N.C. Johnson, A. Charland, B. Rajaratnam, and N.S. Diffenbaugh (2014), Severe precipitation in Northern India in June 2013: Causes, historical context, and changes in probability. *Bulletin of the American Meteorological Society*, *95*(9), S58.

## Journal Articles in *Review/Submitted [3]*

- Srivastava, A.K., P. A. Ullrich, **D. Rastogi,** P. Vahmani, A. Jones, and R. Grotjahn, Assessment of WRF dynamically downscaled precipitation on subdaily and daily timescales over CONUS, *Geoscientific Model Development*
- Zhao B., S.C. Kao, G. Zhao, S. Gangrade, **D. Rastogi**, M. Ashfaq and H. Gao, Evaluating Enhanced Reservoir Evaporation Losses from CMIP6-Based Future Projections in the Contiguous United States. *Earth's Future, Submitted*.
- Fan, P., Lu, **D., Rastogi**, D. & Pierce E.M., A Spatiotemporal-Aware Climate Model Ensembling Method for Improving Precipitation Predictability, *Journal of Advances in Modeling Earth Systems, Submitted.*

## *Conference Paper*

- Fan, P., Lu, D., & **Rastogi, D.** Multimodel Ensemble Predictions of Precipitation using Bayesian Neural Networks (2022). *The International Conference on Learning Representations (ICLR). (Peer Reviewed)*

## *Datasets*

- Jones, A., **Rastogi, D.,** Vahmani P., Stansfield A., Reed K, Thurber, T., Ullrich, P., Rice, J.S., (2022), IM3/HyperFACETS Thermodynamic Global Warming (TGW) Simulation Datasets. United States: N. p., Web. doi:10.57931/1885756.
- Kao, S. C., Ashfaq, M., **Rastogi, D.,** Gangrade, S. (2022) CMIP6-based Multi-model Hydroclimate Projection over the Conterminous US. HydroSource. Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA. DOI: https://doi.org/10.21951/SWA9505V3/1887469
- Bass, B., J. New, **D. Rastogi**, S.-C. Kao (2022) Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation (1.0). Zenodo. https://doi.org/10.5281/zenodo.6939750

## *Technical Reports*

- Kao, S. C., Ashfaq, M., **Rastogi, D.,** Gangrade, S., Uria Martinez, R., Fernandez, A., ... & Zhao, G. (2022). The Third Assessment of the Effects of Climate Change on Federal Hydropower (No. ORNL/TM-2021/2278). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States).
- Christian B., Klasky H., Sparks K., Peluso A., Tuccillo J., **Rastogi D.,** Branstetter M.,Whitehead M., Hamaker A., Watson R. VA EDH Data Curation Documentation FY22-Q2, Rev. 2 (No. ORNL/SPR-2022/2391). Oak Ridge National Lab., Oak Ridge, TN. March 2022
- Christian, B., Klasky, H., Sparks, K., Peluso, A., **Rastogi, D**., Tuccillo, J., Yoon, H.J. and Watson, R., 2022. CTSA MHRI Datasets (No. ORNL/SPR-2022/2400). Oak Ridge National Lab, Oak Ridge, TN. March 2022
- Brelsford, C., Jones, A., Allen-Dumas, M., Bukovsky, M., Dronova, I., Hong, T., Iwaniec, D., Markolf, S., Newcomer, M., Nico, P., **Rastogi, D.,** Reid, S., Sparks, K., Tucillo, J., Zheng, Z. (2021). Needs to Inform Pathways to More Resilient Communities in a Changing Climate (MSD Working Group Workshop Report). https://multisectordynamics.org/working-groups/urban/workshop-report-multi-sectoral-urban-interactions/ October 2021.
- Kao, S.-C., M. Ashfaq, B. S. Naz, R. Martinez, **D. Rastogi**, R. Mei, J. Yetta, N. M. Samu, M. J. Sale (2016), The Second Assessment of the Effects of Climate Change on Federal Hydropower, ORNL Technical Report, Oak Ridge National Laboratory, Oak Ridge, TN, United States: N. p., 2016. Web. doi:10.2172/1340431
- Pagan, B. R., J.S. Pal, C. Gao, J. Reichenberger, D.R. Kendall, M. Ashfaq, **D. Rastogi**, S.-C. Kao, B. S. Naz, J. Schubel (2015), *Long Beach Climate Resiliency Study: Impacts on Water Supply and Demand*. United States: N. p., 2015. Web. doi:10.2172/1502614.

## *Encyclopedia Chapter*

- Roy, S. B. and **D. Rastogi** (2014), Land--Atmosphere Interactions. In Encyclopedia of Natural Resources: Water and Air. Taylor and Francis: New York, Published online: 21 Oct 2014; 1040-1043, doi: 10.1201/9780203757611

## SELECTED PRESENTATIONS

- A. Peluso, **Rastogi D**., Klasky H., Christian B., Hanson H., Environmental Determinants of Health: Measuring Multiple Physical Environmental Exposures at United States County Level, Meeting of the NH Commission to Study Environmentally Triggered Chronic Illness, September 2022 **(Invited)**
- S. Gangrade, **Rastogi D.,** S.-C. Kao, M. Ashfaq, Evaluation of CMIP6 based Multi-Model Ensemble Hydroclimate Projections and their Associated Uncertainties over the Conterminous United States*, 2022 World Environmental & Water Resources Congress,* June 5-8, 2022, Atlanta, GA
- Eldardiry H., N. Sun, H. Yan, P. Reed, A. Jones, **D. Rastogi,** Propagation of Meteorological Forcing Uncertainty into Community Land Model Simulations: Evaluation of Hydrologic Signatures over the Conterminous United States, American Meteorological Society Annual Meeting 2022, January 23-27, 2022, Houston, TX
- **Rastogi D**., S.-C. Kao, M. Ashfaq, How may the choice of downscaling techniques and meteorological reference observations affect future hydroclimate projections? American Geophysical Fall Meeting 2021, 13-17 December 2021, New Orleans, LA
- **Rastogi D.,** D. Touma, K. J. Evans, and M. Ashfaq, European Geophysical Union Meeting, April 2021, Investigating Future Changes in the Spatial Characteristics of Precipitation Extremes over the United States (April 29, 2021) (**Invited**)
- **Rastogi D**., S.-C. Kao, M. Ashfaq, Downscaling and Intercomparison of CMIP6 Models over the Conterminous United States. Secure Water Act Section 9505 Assessment Workshop, February 23-25, 2021
- **Rastogi D.**, D. Touma, M. Ashfaq (2019), Shift towards intense and widespread precipitation events over the United States by mid 21$^{st}$ century. American Geophysical Fall Meeting 2019, 9-13 December 2018, San Francisco, CA.

## RESEARCH PROJECTS

- US Department of Energy-Tennessee Valley Authority Climate R&D Collaboration, Oct'2022-Present
- Ecosystem Resilience to Thermal Extremes: Urbanization Impacts. Laboratory Directed Research and Development Program, Oak Ridge National Laboratory. Role: Contributor, Oct' 2021-Present
- Veterans Affairs (VA) Veterans Care Improvement via Computation and Outcomes-driven Research (VICTOR) Environmental Determinants of Health (EDH). Apr' 2021-Present
- Georgetown University Center for Clinical and Translational Science-Environmental Determinants of Health, funded by National Institute of Health. Jan'2021-Present
- Identifying Ecosystems Vulnerable to Climate Change: Laboratory Directed Research and Development Program, Oak Ridge National Laboratory. Role: Co-Investigator, Oct'2020-Sept' 2022
- Effects of Climate Change on Federal Hydropower – The Third 9505 Assessment. Sponsor: Water Power Technologies Office, U.S. Department of Energy, Aug'2020-Present
- Integrated Multi-Sector Multi-Scale Modeling (IM3) funded by Biological and Environmental Research program within U.S. Department of Energy, Office of Science, Dec'2019-Present.
- Multiscale Methods for Accurate, Efficient, and Scale-Aware Models of the Earth funded by Advanced Scientific Computing Research (ASCR) program within the U.S. Department of Energy, Office of Science, Dec'2019-Nov'2020.

- Energy Exascale Earth System Model (E3SM), U.S. Department of Energy, Office of Science, Office of Biological and Environmental Research, Aug' 2016 – Dec' 2019.
- Towards the Development of an Integrated Energy-Water Risk Assessment Tool for Probable Maximum Precipitation and Flood. Sponsor: Laboratory Directed Research and Development Program, Oak Ridge National Laboratory. Mar' 2014 – June' 2016.
- Effects of Climate Change on Federal Hydropower – The Second 9505 Assessment. Sponsor: Water Power Technologies Office, U.S. Department of Energy. Oct' 2013 – Jun' 2016.
- A Hierarchical Regional Modeling Framework for Decadal-Scale Hydro-climatic Predictions and Impact Assessments, funded by Laboratory Directed Research and Development (LDRD) Program, Jan' 2013 – Sep' 2013.
- Development of Frameworks for Robust Regional Climate Modeling, funded by U.S. Department of Energy Biological and Environmental Research (DOE-BER), Jan' 2013 – Sep' 2013.

## AWARDS AND RECOGNITIONS

- Invited to talk to the Health and Environment Class at Wofford College
- Invited to talk in U.S. Green Building Council (USGBC), *Better Buildings, Better Lives: Big South, Response & Resilience panel*. (December 9, 2020)
- Invited to talk in Urban Land Institute – *Panel on Extreme Heat in Urban Environments*.(July 15, 2020)
- Appointed as an ***Editor*** of *Journal of Water and Climate Change*. (June 2020 - April 2022)
- Invited to serve as ***Guest Editor*** for a *special issue of Sustainability* Journal on "The Impact of Climate Change on Urban Water Infrastructure". (July 2020)
- Graduate Student Researcher Award in the Science and Technology Category, UT-Battellle Awards. (2019)
- Graduate Student Fellowship, Advanced Study Program, National Center for Atmospheric Research, Boulder, CO. (2019)
- Bredesen Center Fellowship, The University of Tennessee, Knoxville, TN. (August 2016 – Present)
  Graduate Research Fellowship, Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign, Urbana IL. (2010-2012)

## PROFESSIONAL SERVICES & TRAININGS

- Served as Session chair/convener:
  - Urban Science workshop, "Extreme Heat" breakout session, 21-23 July, 2021.
  - American Geophysical Fall Meeting 2021, 13-17 December 2021, New Orleans, LA.
  - American Geophysical Fall Meeting 2020, 1-17 December 2020 (Virtual).
  - American Geophysical Fall Meeting 2019, 9-13 December 2019, San Francisco, CA.
  - American Geophysical Fall Meeting 2018, 10-14 December 2018, Washington D.C.
- Peer Reviews (*Conducted >50 peer reviews for 20 Journals*):
  *Nature Climate Change, Nature Communications, Joule, Journal of Geophysical Research-Atmospheres, Earth's Future, Journal of Climate, Climate Dynamics, Water Resources Research, Journal of the American Water Resources Association, International Journal of Climatology, Journal of Cleaner Production, Journal of Hydrometeorology, Journal of Hydrology: Regional Studies, Journal of Hydrology, Journal of Water and Climate Change, Climate Risk Management, Climate Change, Water, Catena, MethodsX*