DEEKSHA RASTOGI

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EDUCATION

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

WORK EXPERIENCE

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

Critical Expertise

- More than fourteen 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, AI applications for earth system modeling, Python, shell scripting, Fortran 90, NCO, NCAR command language (NCL)

LIST OF PUBLICATIONS

Journal Articles [30] (Google Scholar Profile) (cited >1150 times, h-index 17)

- **Rastogi, D**., Christian, J., Tuccillo, J., Christian, B., Kapadia, A. J., & Hanson, H. A. (2023). Exploring the spatial patterning of sociodemographic disparities in extreme heat exposure at multiple scales across the conterminous United States. GeoHealth, 7(10), e2023GH000864, https://doi.org/10.1029/2023GH000864
- **Rastogi, D**., Trok, J., Depsky, N., Monier, E., & Jones, A. (2023). Historical evaluation and future projections of compound heatwave and drought extremes over the conterminous United States in CMIP6. Environmental Research Letters, 19(1), 014039, https://doi.org/10.1088/1748-9326/ad0efe
- Jones, A. D., **Rastogi, D.**, Vahmani, P., Stansfield, A. M., Reed, K. A., Thurber, T., ... & Rice, J. S. (2023). Continental United States climate projections based on thermodynamic modification of historical weather. Scientific Data, 10(1), 664, https://doi.org/10.1038/s41597-023-02485-5
- Peluso A., **Rastogi, D.**, Klasky, H. B., Logan, J., Maguire, D., Grant, J., ... & Hanson, H. A. (2024). Environmental determinants of health: Measuring multiple physical environmental exposures at the United States census tract level. Health & Place, 89, 103303.
- **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), https://doi.org/10.1088/1748-9326/ac2fdf
- **Rastogi D.**, Touma, D., Evans, K. J., and Ashfaq, M. (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), https://doi.org/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, https://doi.org/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, https://doi.org/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), https://doi.org/10.1029/2022JD036659.
- Zarzycki, C. M., Zhang, T., Jones, A. D., **Rastogi, D.,** Vahmani, P., & Ullrich, P. A. (2024). Changes in four decades of near-CONUS tropical cyclones in an ensemble of 12 km thermodynamic global warming simulations. Geophysical Research Letters, 51(18), e2024GL110535.
- Brelsford, C., Jones, A., Pandey, B., Vahmani, P., Allen-Dumas, M., **Rastogi D.**, Sparks K., ... Zheng, Z., (2024) Cities are Concentrators of Complex, MultiSectoral Interactions within the human-Earth system. Earths Future. *Accepted*
- Srivastava, A.K., Ullrich, P. A., **Rastogi D.**, Vahmani P., Jones A., and Grotjahn R. (2023), Assessment of WRF dynamically downscaled precipitation on subdaily and daily timescales over CONUS, Geoscientific Model Development, 16, 3699–3722, https://doi.org/10.5194/gmd-16-3699-2023.
- Wang, Y., Mao, J., Brelsford, C.M., Ricciuto, D.M., Yuan, F., Shi, X., **Rastogi, D.**, Mayes, M.M., Kao, S.C., Warren, J.M. and Griffiths, N.A., 2024. Thermal, water, and land cover factors led to contrasting urban and rural vegetation resilience to extreme hot months. PNAS nexus, 3(4), p.pgae147, https://doi.org/10.1093/pnasnexus/pgae147
- Zhao, B., Kao, S. C., Zhao, G., Gangrade, S., **Rastogi, D**., Ashfaq, M., & Gao, H. (2023). Evaluating enhanced reservoir evaporation losses from CMIP6-based future projections in the contiguous United States. Earth's Future, 11(3), https://doi.org/10.1029/2022EF002961.
- Fan, M., Lu, D., **Rastogi, D.**, & Pierce, E. M. (2022). A Spatiotemporal-Aware Weighting Scheme for Improving Climate Model Ensemble Predictions. Journal of Machine Learning for Modeling and Computing, 3(4), https://doi.org/10.1615/JMachLearnModelComput.2022046715.
- 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., Xu, H., Kurte, K.R., and **Rastogi, D.** (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, https://doi.org/10.3389/frwa.2020.562304
- Gangrade, S., Kao, S.-C., Naz, B.S., **Rastogi, D.**, Ashfaq, M., Singh, N., and Preston, B.L. (2018), Sensitivity of probable maximum flood in a changing environment, Water Resources Research, 54(6), 3913-3936, https://doi.org/10.1029/2017WR021987.

- Naz, B. S., Kao, S.-C., Ashfaq, M., Gao, H., **Rastogi, D.**, and Gangrade, S. (2018), Effects of climate change on streamflow extremes and implications for reservoir inflow in the United States, Journal of Hydrology, 556, 359-370, https://doi.org/10.1016/j.jhydrol.2017.11.027.
- Paull, S. H., Horton, D. E., Ashfaq, M., **Rastogi, D.**, Kramer, L. D., Diffenbaugh, N. S., and Kilpatrick, A. M. (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, https://doi.org/10.1098/rspb.2016.2078.
- Ashfaq, M., **Rastogi, D.**, Mei, R., Touma, D., and Leung, L.R. (2017), Sources of errors in the simulation of south Asian summer monsoon in the CMIP5 GCMs. Climate dynamics, 49(1-2), 193-223, https://doi.org/10.1007/s00382-016-3337-7.
- Ashfaq, M., **Rastogi, D.**, Mei, R., Kao, S.-C., Gangrade, S., Naz, B.S., and Touma, D. (2016), High-resolution ensemble projections of near-term regional climate over the continental United States, Journal of Geophysical Research: Atmospheres, 121(17), 9943-9963, https://doi.org/10.1002/2016JD025285.
- Pagán, B. R., Ashfaq, M., **Rastogi, D.**, Kendall, D. R., Kao, S.-C., Naz, B. S., Mei, R., and Pal,. J.S. (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, https://doi.org/10.1088/1748-9326/11/9/094026.
- Naz, B. S., Kao, S.-C., Ashfaq, M., **Rastogi, D.**, Mei, R., and Bowling, L.C., (2016), Regional hydrologic response to climate change in the conterminous United States using high-resolution hydroclimate simulations. Global and Planetary Change, 143, 100-117, https://doi.org/10.1016/j.gloplacha.2016.06.003.
- Mani, A., F. Tsai, T.-C., Kao, S.-C., Naz, B.S., Ashfaq M., and **Rastogi, D.** (2016), Conjunctive management of surface and groundwater resources under projected future climate change scenarios. Journal of Hydrology, 540, 397-411, https://doi.org/10.1016/j.jhydrol.2016.06.021.
- Mei, R., Ashfaq, M., **Rastogi, D.**, Leung, L. R., and Dominguez, F. (2015), Dominating controls for wetter South Asian summer monsoon in the twenty-first century. Journal of Climate, 28(8), 3400-3419, https://doi.org/10.1175/JCLI-D-14-00355.1.
- Singh, D., Horton, D. E., Tsiang, M., Haugen, M., Ashfaq, M., Mei, R., **Rastogi, D.**, Johnson, N.C., Charland, A., Rajaratnam, B., and Diffenbaugh, N.S. (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.

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

- Kao, S.-C., Ashfaq M., **Rastogi D.**, and Gangrade S. (2024), CMIP6-Based Multi-Model Hydroclimate Projection over the Conterminous US, Version 1.1, Oak Ridge National Laboratory, Oak Ridge, TN, https://doi.org/10.13139/OLCF/2311812.
- Chowdhury, S., F. Li, A. Stubbings, J. New, D. Rastogi, and S.-C. Kao (2024), Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation for every US County

in CONUS, Oak Ridge National Laboratory, Oak Ridge, TN, https://doi.org/10.5281/zenodo.10420668.

- 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. https://doi.org/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, https://doi.org/10.21951/SWA9505V3/1887469
- Bass, B., New, J., **Rastogi, D.**, Kao, S.-C. (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), https://doi.org/10.2172/1887712.
- 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), October 2021.
- Kao, S.-C., Ashfaq, M., Naz, B. S., Martinez, R., **Rastogi, D.**, Mei, R., Yetta, J., Samu, N. M., Sale, M. J. (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, https://doi.org/10.2172/1340431.
- Pagan, B. R., Pal, J.S., Gao, C., Reichenberger, J., Kendall, D.R., Ashfaq, M., **Rastogi, D.**, Kao, S.-C., Naz, B. S., Schubel, J. (2015), Long Beach Climate Resiliency Study: Impacts on Water Supply and Demand. United States: N. p., 2015, https://doi.org/10.2172/1502614.

Encyclopedia Chapter

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

SELECTED PRESENTATIONS

- **Rastogi, D.,** Kao, S. C., & Ashfaq, M. Evaluating Widespread and Persistent Temperature Extremes: Implications for the United States Electric Grid Infrastructure, American Geophysical Fall Meeting 2023, 11-15 December 2023, San Francisco, CA
- **Rastogi D.,** Modeling Climate Extremes for Impact Assessment, the International Building Performance Simulation Association (IBPSA), USA, March 30, 2023 **(Invited Webinar)**

- **Rastogi D.,** Lehner F., Kuruganti T., Evans K. J., Kurte K. and Sanyal J., Evaluating future changes in electricity demand over the southeastern United States using a set of high-resolution climate projections, American Geophysical Fall Meeting 2022, 12-16 December 2022, Chicago, IL **(Invited)**
- 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 21st century. American Geophysical Fall Meeting 2019, 9-13 December 2018, San Francisco, CA.

RESEARCH PROJECTS

- Enable Storm Typing-Based Precipitation Frequency Analysis in a Changing Climate. Sponsor: Water Power Technologies Office (WPTO), U.S. DOE, Oct'2024-Present (PI)
- Widespread and Persistent Climate Extremes: Identification and Impact Assessment. Laboratory Directed Research and Development (LDRD) Program, Oak Ridge National Laboratory. Role: Principal Investigator, March' 2023-Present (PI)
- Power Planning for Alignment of Climate and Energy Systems (PACES) funded by U.S. Department of Energy (DOE), Office of Electricity, Grid Modernization Initiative, Oct' 2023-Present
- Terrestrial Ecosystem Science Scientific Focus Area, funded by DOE-Biological and Environmental Research (BER), Office of Science, Oct'2023-Present
- Future Extreme Weather funded by U.S. DOE, Building Technology Office, Oct'2022-Present
- US DOE-Tennessee Valley Authority Climate R&D Collaboration, Oct'2022-Present
- Ecosystem Resilience to Thermal Extremes: Urbanization Impacts. LDRD Program, Oak Ridge National Laboratory. Role: Contributor, Oct' 2021-Sept' 2023
- Veterans Affairs (VA) Veterans Care Improvement via Computation and Outcomes-driven Research (VICTOR) Environmental Determinants of Health (EDH). Apr' 2021- Mar' 2023

- Georgetown University Center for Clinical and Translational Science-Environmental Determinants of Health, funded by National Institute of Health. Jan'2021-Mar' 2023
- Identifying Ecosystems Vulnerable to Climate Change: LDRD 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 (WPTO), U.S. DOE, Aug'2020-Present
- Integrated Multi-Sector Multi-Scale Modeling (IM3) funded by U.S. DOE-BER, Office of Science, Dec'2019-Sep'2023.
- Multiscale Methods for Accurate, Efficient, and Scale-Aware Models of the Earth funded by Advanced Scientific Computing Research (ASCR) program within the U.S. DOE, Office of Science, Dec'2019-Nov'2020.
- Energy Exascale Earth System Model (E3SM), U.S. DOE, 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: LDRD Program, Oak Ridge National Laboratory. Mar' 2014 – June' 2016.
- Effects of Climate Change on Federal Hydropower – The Second 9505 Assessment. Sponsor: WPTO, U.S. DOE. Oct' 2013 – Jun' 2016.
- A Hierarchical Regional Modeling Framework for Decadal-Scale Hydro-climatic Predictions and Impact Assessments, funded by LDRD Program, Jan' 2013 – Sep' 2013.
- Development of Frameworks for Robust Regional Climate Modeling, funded by U.S. DOE-BER, Jan' 2013 – Sep' 2013.

AWARDS AND RECOGNITIONS

- Invited to talk to the Health and Environment Class at Wofford College. (October, 2021)
- 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 – December 2019)
- Graduate Research Fellowship, Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign, Urbana IL. (2010-2012)
- Higher Education Research Experiences (HERE) summer program, Oak Ridge National Laboratory, Oak Ridge, TN (2012)

PROFESSIONAL SERVICES & TRAININGS

- Served as Session chair/convener:
  - American Geophysical Fall Meeting 2023, 11-15 December 2023, San Francisco, CA
  - American Geophysical Fall Meeting 2022, 12-16 December 2022, Chicago, IL.
  - 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.

- Served in the leadership team of the Multi-Sector Dynamics working group on urban systems and organized the urban systems seminar series.
- Peer Reviews (*Conducted >70 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