Department of Civil and Environmental Engineering
UNIVERSITY OF WISCONSIN–MADISON

Postdoctoral Research Associate in dynamical and statistical modeling of convective storm hazards

About the lab: The Hydroclimate Extremes Research (HER) Group, headed by Dr. Daniel Wright, is part of the Civil and Environmental Engineering Department (CEE) and the Center for Climatic Research at the University of Wisconsin-Madison (UW-Madison). We work in a number of research areas, including measurement, modeling, and analysis of extreme rainfall; understanding the roles of rainfall and land surface processes to produce floods; interfacing with meteorologists and climate scientists to translate projected changes in extreme precipitation from climate models into projections of future risks; and developing practical tools for improved probabilistic rainfall and flood hazard and risk estimation. We also do extensive outreach to water and infrastructure practitioners—including engineers, insurers, and planners—to build awareness and capacity around climate change impacts on rainstorms, floods, and related infrastructure.

About this position: The HER Group has two interrelated projects on dynamical and statistical simulation and downscaling of extreme rainfall and other convective hazards. The position would likely be funded by both projects.

- **Project #1—Stochastic Downscaling and Uncertainty Quantification of Convective Hazards:** Dr. Wright is Site PI in the new Center for Interdisciplinary Research on Convective Storms. We anticipate funding for stochastic modeling and downscaling of convective hazards including hail, wind, and rainfall, using our open-source STREAM and StormLab codebases and a combination of outputs from high-resolution convection permitting regional climate models and GCM large ensembles such as CESM2 LENS and CESM HR. The goal is to generate high-resolution hazard scenarios to support insurance applications.
- **Project #2—Dynamic Modeling of Extreme Convective Rainfall:** The HER Group has funding to support NOAA to implement recommendations made in the National Academies report Modernizing Probable Maximum Precipitation. The project will involve ensemble simulations of convective rainfall events such as Kerr County, TX (July 2025) and Milwaukee, WI (August 2025) using the Weather Research and Forecasting (WRF) regional atmospheric model. Key objectives are 1) to determine whether WRF is capable of reproducing observed precipitation rates using ensemble approaches, and 2) to examine the relative importance of large-scale storm environments and small-scale perturbations in the development of mesoscale systems that produce these extreme precipitation.

Necessary skills and prerequisites: We are seeking applicants at the postdoctoral level, but exceptional applicants seeking a PhD will be considered. A PhD in atmospheric science, hydrology, or a related discipline is required for a postdoctoral position. Strong writing and oral communication skills are required, as is an ability to work collaboratively. Experience programming and analyzing data in Python, R, or similar language is required. Experience with WRF simulations, statistical and/or dynamical downscaling, and high-performance computing is highly preferred. Comfort and experience in statistical and stochastic concepts is valuable. Since funding will likely come from multiple sources, time management skills and ability to deliver results on multiple projects is essential.

Interested persons should contact Dr. Wright at danielb.wright@wisc.edu with questions and to express interest. Applicants of all genders, sexes, ethnicities, religions, etc. that meet the skills and prerequisites are encouraged to apply. Applicants for a postdoctoral position should include a brief cover letter or

research statement, CV, contact information for three references, and a writing sample such as a prior publication or report.

University of Wisconsin-Madison is an equal opportunity/affirmative action employer, and all qualified applicants will receive consideration for employment without regard to age, race, color, religion, sex, sexual orientation, gender identity or expression, national origin, disability status, protected veteran status, or any other characteristic protected by law. For more information, see here.