



**NCAR**  
OPERATED BY UCAR

Research Applications  
Laboratory

## RAL SEMINAR SERIES

# Current Plans and Future Heat Extremes:

**Modeling Nature-Based Solution Impacts on  
Urban Eco-hydrometeorology in Milwaukee, WI**

**AARON ALEXANDER**

Postdoctoral Researcher  
University of Wisconsin-Madison



**Wednesday, February 4, 2026**

2-3 PM (MT) FL2-1022 or Virtual | [Watch Live](#)

Urbanization significantly alters surface water and energy cycles by increasing runoff, reducing evapotranspiration, and intensifying heat storage, creating a combined risk of flooding and extreme heat. Climate change further amplifies these impacts in cities through feedbacks between urban heat islands and precipitation processes. In response, many cities are adopting resiliency plans centered on nature-based solutions or green infrastructure that more closely mimic natural watershed processes. These strategies can reduce runoff and potentially mitigate urban heat by increasing tree canopy, shading impervious surfaces, and enhancing evaporative cooling. However, the hydrologic and thermal benefits of these interventions remain poorly quantified at spatial and temporal scales relevant to urban decision-making.

In this talk, we assess the city-scale impacts of widespread adoption of nature-based solutions on seasonal hydrologic and energy balances, rainfall, and extreme heat. We use Noah-MP for Heterogeneous Urban Environments (HUE), a land surface model that resolves fine-scale urban hydrologic processes and spatial heterogeneity. We present results from event-based simulations and multi-year regional climate simulations centered on Milwaukee, Wisconsin, and introduce preliminary findings from an ongoing project examining future extremes using an extremes-preserving pseudo-global warming methodology applied to the 2012 Milwaukee heatwave. [Event Website](#)