



COLLOQUIUM SERIES

UrbanPop: A Spatial Microsimulation Framework for Exploring Demographic Influences on Human Dynamics

Speaker: Joe Tuccillo, PhD, Geospatial Science and Human Security Division, Oak Ridge National Laboratory

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Abstract: Human dynamics models, which address how people live, move, and interact, are critical to promote effective and equitable public service delivery, develop policy interventions, and provide responses to natural and technological hazards at the neighborhood and community scales. The UrbanPop spatial microsimulation framework developed at Oak Ridge National Laboratory (ORNL) supports human dynamics modeling by generating high-fidelity representations of individual demographics during

the nighttime and daytime using synthetic populations derived from public-use American Community Survey (ACS) data.

In this talk, Dr. Tuccillo will provide a survey of research highlights from various applications of UrbanPop, including estimating social vulnerability, understanding healthcare access among underserved populations during the COVID-19 pandemic, and assessing environmental justice issues related to urban extreme heat events. Additionally, Dr. Tuccillo will discuss efforts to develop Likeness, a new Python software stack for UrbanPop designed to increase the framework's reproducibility for a variety of research aims, as well as expand modeling capabilities to real-world transportation networks and building occupancy characteristics.