

SenSIP Seminar Series

Human Thermal Exposure in Cities – Novel Sensing and Modeling to Build Heat Resilience

Presenter: Ariane Middel, Assistant Professor, AME & CIDSE, Arizona State University

November 6, 2020, 3:00 PM / Zoom <https://asu.zoom.us/j/97630576962>

Abstract

Heat is the leading cause of weather-related mortality in the U.S and poses a significant threat to public health. Future population exposure to extreme heat is expected to increase as rapid urbanization continues and heat waves are projected to last longer, become more intense and more frequent, challenging the resilience of urban systems. How people experience heat is driven by complex interactions between urban infrastructure (e.g., streets, buildings, trees) and micro- to global scale climates. This presentation will provide an overview of heat research at ASU's SHaDE lab that investigates thermal exposure at human-relevant scales. Dr. Middel introduces "MaRTy", a biometeorological instrument platform to sense how the urban environment is "felt" by a pedestrian. Observations from MaRTy will be employed to develop and validate a thermal comfort model that quantifies human heat exposure in cities based on an innovative Big Data approach using synthetic fisheye photos from Street View and Deep Learning. Dr. Middel's research highlights the importance of microclimate-responsive urban design for creating pedestrian-friendly outdoor spaces and building heat-resilient "climate smart" cities.

Biography:



Ariane Middel's research interests lie in the interdisciplinary field of urban climate with focus on climate-sensitive urban form, design, landscapes, and infrastructure in the face of extreme heat and climatic uncertainty. She advances the field of urban climate science through applied and solutions-oriented research employing quantitative and qualitative field observations, local and micro-scale climate modeling, and geovisualization to investigate sustainability challenges related to extreme heat, thermal comfort and exposure, Urban Heat Islands, and human-climate interactions in cities.

Her research focuses on developing sensors, models, and metrics to quantify urban heatscapes as they are experienced by pedestrians. She recently received an NSF CAREER award to develop a thermal exposure model based on an innovative big data approach using Street View data, deep learning, and novel environmental sensing techniques such as the biometeorological MaRTy cart.

Dr. Middel is an Assistant Professor with the School of Arts, Media and Engineering and the School of Computing, Informatics, and Decision Systems Engineering at Arizona State University. She received her PhD in computer science from University of Kaiserslautern, Germany and holds a MSc in engineering from University of Bonn, Germany. She currently serves a 3-year term (2019-2022) on the Executive Board of the International Association of Urban Climate (IAUC) and is a Board member of the American Meteorological Society (AMS) Built Environment (BUE).

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