

Applied Geospatial Data-Science Initiative for Urban Climate Change Studies (AGDI-UCCS)

- **Principal Investigator:** Ranjani W. Kulawardhana (Alabama A&M University)
- **Co-Investigators:** Wubishet Tadesse (Alabama A&M University); Melissa R. Dumas, Jiafu Mao (Oak Ridge National Laboratory); Duli Chand, Samson Hagos (Pacific Northwest National Laboratory)

A predictive understanding of the complex and interrelated urban processes, specifically their effects on heat build-up and local climate within rapidly growing cities at variable spatial scales and during specific heat events, is critical to achieve urban climate change resilience. This project aims to establish the Applied Geospatial Data-Science Initiative for Urban Climate Change Studies (AGDI-UCCS). The overarching goal of AGDI-UCCS is to enhance collaborative research, education, experiential training, and professional development opportunities for students and emerging researchers from historically underrepresented minority communities. AGDI-UCCS research will focus on developing geospatial modeling applications by integrating remotely sensed data and products to achieve a predictive understanding of urban climate change impacts, specifically the dynamic processes of rapidly developing urban landscapes of midsize cities and their suburban landscapes of the midsouth. Through proposed AGDI-UCCS activities, the project aims to expand and strengthen Alabama A&M University's (AAMU) collaborations with two national laboratories: Pacific Northwest National Laboratory and Oak Ridge National Laboratory. The funded project addresses its science objectives in multiple ways.

1. Research findings [e.g., development of the geospatial modeling framework, urban heat islands (UHI) simulations at variable scales, quantification and spatial modeling of UHI] will contribute to improving predictive capabilities of world research forecasting—urban canopy modeling. This improvement will advance scientific understanding of urban-climate interactions and their impacts on incidences of heat waves, heat stress, and energy demands in rapidly growing cities to help identify potential adaptation and mitigation strategies toward achieving urban climate change resilience.
2. Financial support will help alleviate AAMU's existing barriers for expanding the principal investigator's current research, teaching, and student training capabilities.
3. Collaborations with DOE's national laboratories will develop a two-way engagement with DOE-funded research to facilitate the exchange of data, products, research, and technical expertise.
4. Experiential learning opportunities will help students from traditionally underrepresented communities develop research, technological skills (e.g., spatial modeling), and professional skills to enter DOE and science, technology, engineering, and math (STEM) careers, leading to enhanced diversity in the future STEM workforce.