In response to the California Climate Adaptation Strategy — Priorities and Actions on "*Reduce health impacts of wildfire smoke*" and "*Improve wildfire smoke guidance for schools, children, and other vulnerable populations*", this project will develop a low-cost AI-based sensor network to address a major challenge faced by disadvantaged communities in Merced, Fresno, and Tulare County: limited access to smoke hazard forecasts. The proposed work builds on our team's recent innovation in Artificial Intelligence of Things (AIoT) and collaboration with AirGradient, an open-source air quality sensor manufacturer. In particular, the low-power long-range communication (LoRa) capability of sensors overcomes barriers to working with underserved communities that lack infrastructure. In addition, our deep learning algorithm enables high-resolution prediction of fire smoke pollution with limited sensor data. In partnership with the Central California Asthma Collaborative (CCAC), SocioEnvironmental and Education Network (SEEN), and the UCM Science & Conservation Field Station (SCICON), we will deploy sensor nodes to public sectors and private residences in underserved areas classified by the Climate and Economic Justice Screening Tool. The Specific Aims of this proposal address three CA climate priorities:

Specific Aim 1: Build an AI-based low-power sensor network for wildfire air pollution and climate forcing prediction (Priority 2 Goal A Action 1, Priority 5 Goal B Action 2).

Specific Aim 2: Mitigate smoke hazards for underserved communities through partnership with CCAC (Priority 2 Goal A Action 1).

Specific Aim 3: Support interdisciplinary education on climate resilience through partnerships with SEEN and SCICON (Priority 6 Goal B Action 5).

The major outcome will be a fine-grained exposure map for a broad array of wildfire pollutants that impact public health and exacerbate climate warming. The exposure map will be integrated into CCAC's SJVAir database, website, and mobile App to help frontline and vulnerable communities develop data-informed response strategies during extreme climate events. New knowledge synthesized from the sensing system will be translated to climate resilience education resources for K-12 and college students through outreach activities organized by SEEN and SCICON. The project team comprises four PIs (75% early-career, 50% female) across SNS, SOE, and SSHA, with expertise spanning computer sciences, electrical engineering, climate science, and public health. The project team seeks to support students from diverse backgrounds through interdisciplinary collaboration and convergence training. Our community partners, CCAC and SEEN, have been deeply engaged in efforts to promote environmental justice for >10 years.