**OBSERVING HUMAN-SCALE URBAN AIR POLLUTION AND TEMPERATURE USING SENSOR-EMBEDDED LIGHT-RAIL PUBLIC TRANSPORTATION**

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Despite many positive attributes, the Phoenix region is unfortunately home to some of worst air quality and extreme temperatures in the nation. Exposure to extreme heat and air pollution contribute to a wide-range of health concerns (e.g., increased mortality and hospitalizations) for the region’s citizens—especially members of under-represented and underserved communities. Ongoing efforts to understand and mitigate these threats typically rely on a series of stationary temperature and air quality monitoring stations distributed throughout the county. However, air pollution and extreme heat are experienced at the human-scale, not the county-scale. Thus, in the absence of human-scale monitoring and analysis, we are left operating under relatively coarse assumptions and extrapolations about exposure, which in turn can complicate the consideration and implementation of mitigation efforts.

Given these needs and challenges, we propose installing low-cost, rapidly deployable environmental sensors on light-rail trains in order to form a mobile platform for high spatial and temporal resolution monitoring and evaluation of temperature and air quality throughout the Phoenix region. In particular, the sensors will measure factors such as air temperature, humidity, particulate matter, and ozone at frequent and regular intervals as the trains traverse the region on a daily basis. We will build upon existing relationships to collaborate with regional stakeholders such as the City of Phoenix, the City of Tempe, and Valley Metro. In particular, all data collected throughout the project will be made publically available via our lab website, and policy briefs summarizing key developments and findings will be developed.

The potential benefits of this project are manifold. First, it can help identify temporally and geographically distinct ‘trouble spots’ for heat and air quality exposure throughout the region. Gaining a better understanding of the specific times and locations of trouble spots can then contribute to more targeted (and presumably) more effective mitigation strategies. Second, the temperature and air quality monitoring conducted by this approach supplements the existing county-level monitoring stations, and can provide a new picture of exposure in under-represented/underserved communities that we do not currently have. Finally, this project can allow for the assessment of the pros and cons of using low-cost, rapidly deployable sensors as mechanisms for understanding local environmental conditions and hopefully serve as a springboard for larger scale deployment of such approaches across a multitude of vehicle types and locations.

Compared to alternative approaches for monitoring urban temperature and air quality, we believe our proposed project offers some distinct advantages. First, the measurements we will collect are more spatially and temporally refined than the existing stationary monitoring network. Second, our approach is likely to be cheaper, more consistent, and more environmentally friendly than other mobile sampling techniques such as cars or buses. Finally, in contrast to the propriety data collected by sensors in private vehicles, all data we collect will be free and publically available.

Ultimately, the data, results, and insights from this project can guide and catalyze follow-on efforts to scale up this approach throughout transportation systems and eventually result in a widespread human-scale environmental monitoring and mitigation network across all metropolitan areas.

