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INNOVATIVE RESEARCH FOR A SUSTAINABLE FUTURE

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AIR POLLUTION MONITORING FOR COMMUNITIES

Background

The U.S. Environmental Protection Agency (EPA), through its Science to Achieve Results (STAR) grants program, is providing funding to six institutions that will advance air monitoring technology while helping communities address unique air quality challenges. The research teams are working in collaboration with other organizations and local communities to engage and inform the public about local air quality.

Air sensor technology has advanced rapidly in recent years, providing less expensive, more portable air pollution sensors that can be used by the public to learn about local air quality.

The goals of the studies are to address the following questions about the technology and their use by the public:

- How accurate and reliable are the sensors used by the public?
- What is the quality of the data the sensors produce?
- How can sensors be used by communities and individuals to monitor air pollution exposure?
- How can the information help communities and individuals understand and reduce harmful air pollution exposures?

Researchers conducting the diverse portfolio of studies are working with communities across the U.S. to address local challenges.



The grants are funding the following research projects:

Carnegie Mellon University

Award: \$749,780

Project Title: *Democratization of Measurement and Modeling Tools for Community Action on Air Quality and Improved Spatial Resolution of Air Pollutant Concentrations*

Project Location: Pittsburgh, Pennsylvania

This project is focused on improving air quality and human health in Pittsburgh, particularly in Environmental Justice communities. Multiple real-time, affordable, multi-pollutant (RAMP) air monitors and high-resolution air quality modeling will provide localized information, instead of generalizing pollutant levels for all of Pittsburgh. Carnegie Mellon University researchers are partnering with several local community groups to investigate the accuracy and reliability of existing

sensors and their potential effectiveness in helping communities understand local levels of air pollutants and how to respond.

Kansas State University

Award: \$750,000

Project Title: *Shared Air/Shared Action (SA²): Community Empowerment through Low-cost Air Pollution Monitoring*

Project Location: Chicago, Illinois

This research project involves multiple universities and four local community organizations working to improve air quality for citizens of South Chicago. Researchers are investigating whether people become more engaged with their environment if they are provided with relevant scientific and technical tools, including low-cost portable sensors and appropriate technical assistance. Collaboration between academic researchers and the communities in planning and conducting the study is key to this

project, with plans to evaluate how community-led research with sensors can help improve community understanding of pollution concentrations. This project features development of sustainable, community-specific strategies to monitor pollutants and analyze and communicate results and to see if communities can leverage their resources to create coordinated action plans to reduce exposure and mitigate health risks.

Massachusetts Institute of Technology

Award: \$750,000

Project Title: *The Hawai'i Island Volcanic Smog Sensor Network (HI-Vog): Tracking Air Quality and Community Engagement near a Major Emissions Hotspot*

Project Location: Hawai'i Island

Air quality on the island of Hawai'i can be poor due to high emissions of sulfur dioxide (SO₂) from Kilauea Volcano. The resulting "volcanic smog" ("vog"), a mixture of SO₂ and fine particulate matter (PM), can have negative impacts on human health as well as agriculture, and is a major local concern. Because community members' exposure to vog cannot be easily estimated, the region can be a unique test case for the use and assessment of distributed air quality (AQ) networks based on portable low-cost sensors. This project includes the development and deployment of a state-of-the-art community-based AQ sensor network across Hawai'i Island to measure air quality and vog exposures. Researchers will assess the utility of AQ sensor networks as community resources and as tools for atmospheric chemistry research. Researchers are working with the Kohala Center, a community-based institute, and the Hawai'i Island School Garden Network.

Research Triangle Institute

Award: \$749,837

Project Title: *Monitoring the Air in Our Community: Engaging Citizens in Research*

Project Location: Globeville, Elyria Swansea (GES), Colorado

This research team is investigating whether communities can successfully use low-cost sensors to understand the air quality in their neighborhood, as well as their personal exposure to pollutants. Researchers plan to identify what types of air pollution data would best fulfill community needs and preferences. They will then assess how well community members are able to understand the data and whether they modify their behavior to reduce their exposure to potentially harmful pollutants.

South Coast Air Quality Management District

Award: \$749,820

Project Title: *Engage, Educate, and Empower California Communities on the Use and Applications of "Low-cost" Air Monitoring Sensors*

Project Locations: Northern, Central and Southern California

The overall objective of this research project is to provide California communities with the knowledge necessary to appropriately select, use, and maintain low-cost air pollution sensors and to correctly interpret sensor data. Researchers plan to develop new methodologies to educate and engage communities on the use and applications of the sensors. Additionally, they are conducting testing to characterize the performance of the sensors and identify candidates for field deployment. The group plans to deploy the selected sensors in local communities, interpret the collected data and communicate the lessons learned to the public through a series of outreach activities.

University of Washington

Award: \$746,021

Project Title: *Putting Next Generation Sensors and Scientists in Practice to Reduce Wood Smoke in a Highly Impacted, Multicultural Rural Setting*

Project Location: Washington State

This research team plans to deploy next-generation, low-cost particulate matter air sensors in student-directed studies pertaining to wood smoke impacts in the Yakima Valley, a rural community. The researchers and students will evaluate the quality of sensor measurements and identify effective platforms for data dissemination and communication to the community through multigenerational and multi-cultural outreach. Researchers are partnering with faculty at Heritage University, whose students represent the community's population of predominately Yakama Nation and Latino immigrant families. This project builds on the EnvironMentors program, which pairs undergraduates with high school students. Students are being trained to formulate and test hypotheses on wood smoke exposure and plan to compare sensor data to validated air pollution measurements.

Information about the awards:

<https://www.epa.gov/air-research/air-pollution-monitoring-communities-grants>

Information about EPA Air Research:

www.epa.gov/air-research

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October 2017