Air Pollution Monitoring for Communities (APM4C) Grants
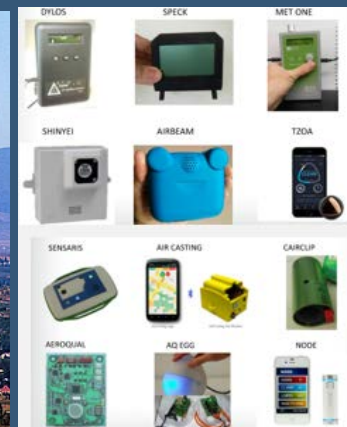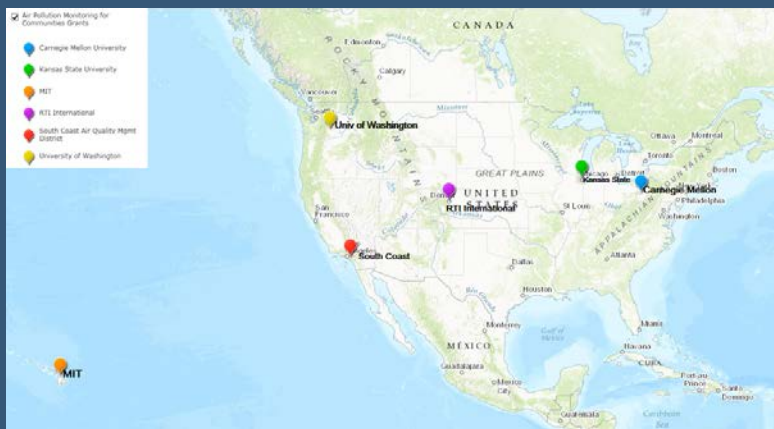
Rich Callan, MPH
Project Officer, NCER
11 July 2017

Office of Research and Development
National Center for Environment Research
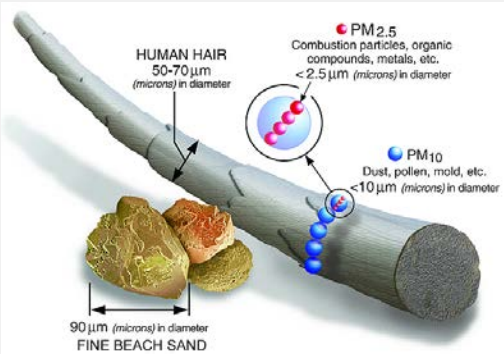
Disclosure/Disclaimer

I have no financial or other interests which could pose a conflict of interest.

Mention or inclusion of trade names or commercial products does not constitute endorsement or recommendation for use and are provided solely for informational purposes.
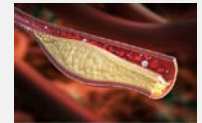
Air Pollution and Health Risks

MESA Air Study, The Lancet, August 13th, 2016

10-Year Study Links Faster Progression of Atherosclerosis to Air Pollution

https://www.epa.gov/air-research/multi-ethnic-study-atherosclerosis-mesa-air-study

Request for Applications (RFA)

U.S. Environmental Protection Agency

Office of Research and Development

National Center for Environmental Research

Science to Achieve Results (STAR) Program

Air Pollution Monitoring for Communities

This is the initial announcement of this funding opportunity.

Funding Opportunity Number: EPA-G2014-STAR-K1

Catalog of Federal Domestic Assistance (CFDA) Number: 66.509

Solicitation Opening Date: June 9, 2014
Solicitation Closing Date: October, 7, 2014, 11:59:59 pm Eastern Time

Technical Contact: Sherri Hunt (hunt.sherri@epa.gov); phone: 703-347-8042
Eligibility Contact: Ron Josephson (josephson.ron@epa.gov); phone: 703-308-0442
Electronic Submissions: Todd Peterson (peterson.todd@epa.gov); phone: 703-308-7224

https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.rfatext/rfa_id/587

New Sensor Technology

Typical Regulatory Monitors

Examples of "Low-Cost" (<$2500) PM and Gas Sensors

Thanks to Ron Williams, EPA

RFA: Research Areas of Interest

Address two or more:

1. **Sensors:** How to **measure air pollution levels** at the individual and community level?

2. **Interactions:** How to **maximize value of sensors for communities** and how to share information effectively?

3. **Data Quality:** How to interpret **data quality** from sensors? How well do sensors perform **over time?**

4. **Spatiotemporal Patterns:** Can we **map patterns of air pollutants over space and time** using sensor networks?

Substantial engagement with community groups was encouraged.

EPA/ORD Research Programs

http://www.epa.gov/research

Air Pollution Monitoring for Communities Grants

Background

The U.S. Environmental Protection Agency is providing funding to six institutions that will advance air monitoring technology while helping communities address unique air quality challenges. The research teams will work 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.
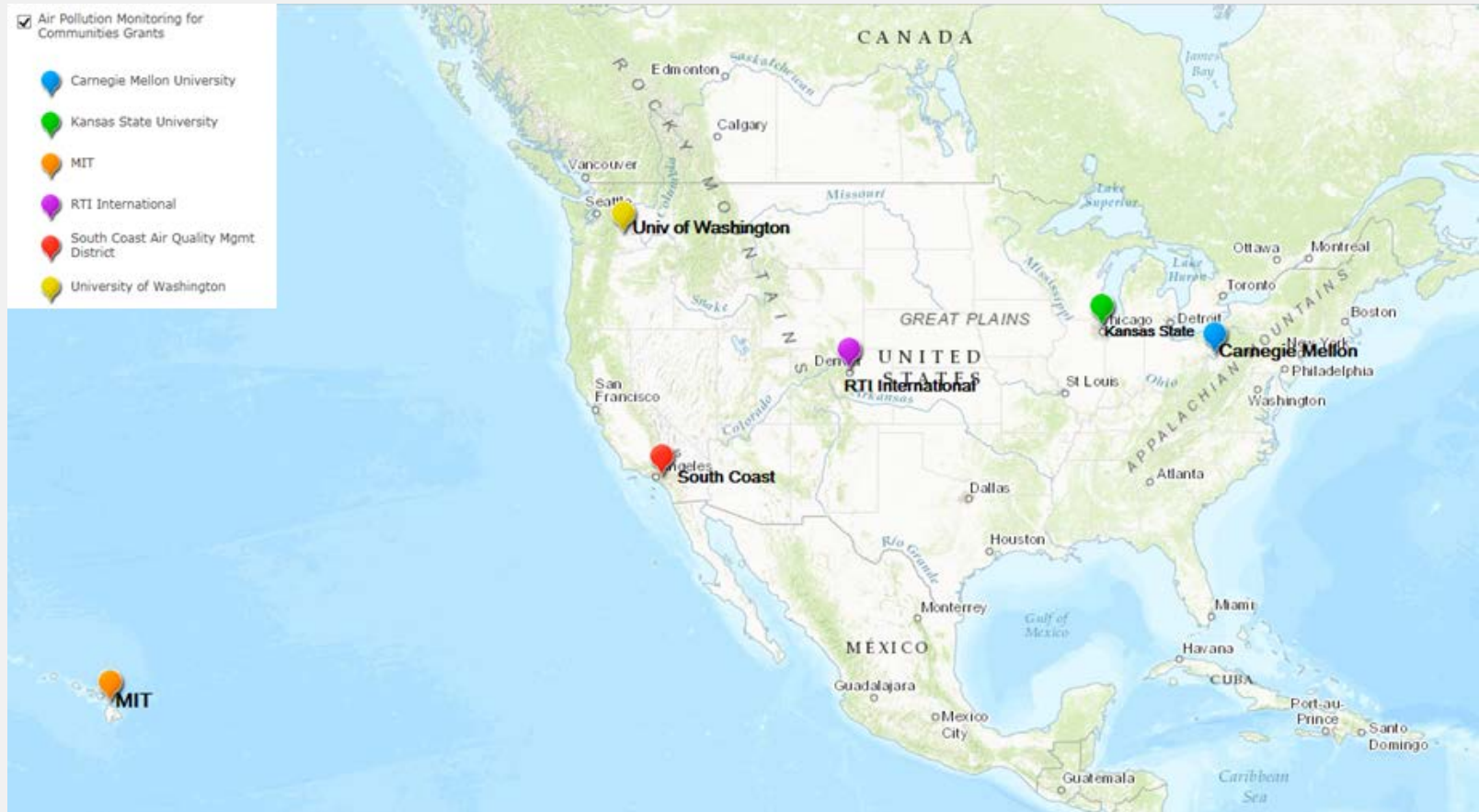
Six grants were awarded.

Lead Institutions:
- Kansas State University
- MIT
- South Coast Air Quality Management District
- University of Washington
- Research Triangle Institute
- Carnegie Mellon University

<< STAR GRANTS AND STAR CENTERS >>						
1	☐	R836182 Grant	Shared Air/Shared Action (SA^2): Community Empowerment through Low-cost Air Pollution Monitoring	Griswold, Wendy; Erdal, Serap; Erickson, Larry E.; Johnson, Cheryl; Maghirang, Ronaldo; Merritt, Gail; Renas, Margaret; Salazar, Peggy; Urbaszewski, Brian; Wasserman, Kim	**Kansas State University**, Alliance for a Greener South Loop, Delta Institute, Little Village Environmental Justice Organization, People for Community Recovery, Respiratory Health Association, Southeast Environmental Task Force, University of Illinois at Chicago, University of Memphis	May 2016 - April 2019	KS
2	☐	R836183 Grant	The Hawai'i Island Volcanic Smog Sensor Network (HI-Vog): Tracking air quality and community engagement near a major emissions hotspot	Kroll, Jesse H.; Heald, Colette L.	**Massachusetts Institute of Technology**, The Kohala Center	May 2016 - April 2019	MA
3	☐	R836184 Grant	Engage, Educate, and Empower California Communities on the Use and Applications of "Low-cost" Air Monitoring Sensors	Polidori, Andrea; Dye, Timothy S; Fine, Philip M.; Tisopulos, Laki; Zhu, Yifang	**South Coast Air Quality Management District**, Sonoma Technology Inc.(STI), University of California - Los Angeles	May 2016 - April 2019	CA
4	☐	R836185 Grant	Putting Next Generation Sensors and Scientists in Practice to Reduce Wood Smoke in a Highly Impacted, Multicultural Rural Setting (NextGenSS)	Karr, Catharine J.; Austin, Elena; Black, Jessica; Larson, Timothy V.; Riley, Erin; Seto, Edmund; Simpson, Christopher; Yost, Michael	**University of Washington**, Heritage University	August 2016 - July 2019	WA
5	☐	R836187 Grant	Monitoring the Air in Our Community: Engaging Citizens in Research	Cho, Seung-Hyun; Cicutto, Lisa; Crews, Krysten; Hawthorne, Wendy	**Research Triangle Institute**, Groundwork Denver, National Jewish Health	May 2016 - April 2019	NC
6	☐	R836286 Grant	Democratization of Measurement and Modeling Tools for Community Action on Air Quality, and Improved Spatial Resolution of Air Pollutant Concentrations	Ramachandran, Subramanian; Pandis, Spyros N.; Presto, Albert	**Carnegie Mellon University**	May 2016 - April 2019	PA

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

Community Locations

Carnegie Mellon Univ.	Kansas State	MIT	RTI International	SCAQMD	University of Washington
Pittsburgh, Pennsylvania	South Chicago, Illinois	Hawai'i Island	Globeville, Elyria Swansea, Colorado	6 California Communities	Yakima Valley, Washington State

Putting Next Generation Sensors & Scientists in practice to reduce wood smoke in a highly impacted, multi-cultural rural setting (NextGenSS)

Catherine Karr, PI

Collaboration with
Jessica Black, Heritage University

DEPARTMENT OF
ENVIRONMENTAL AND
OCCUPATIONAL
HEALTH SCIENCES
UNIVERSITY *of* WASHINGTON
School of Public Health

The Center for Native Health & Culture
@ Heritage University

The Hawai'i Island volcanic smog sensor network (HI-Vog): Tracking air quality and community engagement near a major emissions hotspot

Jesse Kroll
MIT

Colette Heald
MIT

Jesse H. Kroll (PI), Colette L. Heald (co-PI), Kathleen M. Vandiver, Nancy Redfeather, Elizabeth Cole

Engage, educate, and empower California communities on the use and applications of "low-cost" air monitoring sensors

Investigators: Andrea Polidori (Contact PI), Philip M. Fine (PI), Laki Tisopulos (PI), Yifang Zhu (Co-PI), and Timothy S. Dye (Co-PI)
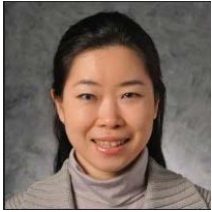
Institutions: South Coast Air Quality Management District (SCAQMD); University of California Los Angeles (UCLA); Sonoma Technology Inc. (STI)

Funding: U.S. EPA STAR Grant #RD83618401

6 Communities in California

AQ-SPEC
Air Quality Sensor Performance Evaluation Center
http://www.aqmd.gov/aq-spec
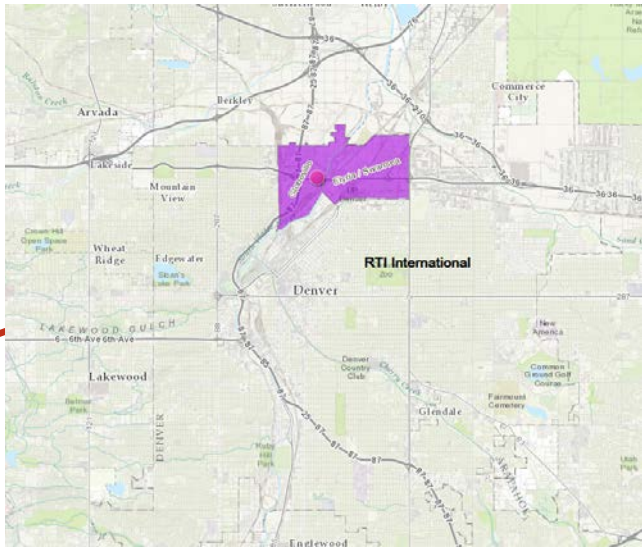
Seung-Hyun Cho
RTI International
(PI)

Lisa Cicutto
National Jewish
Health
(co-PI)

Monitoring the Air in Our Community: Engaging Citizens in Research

Seung-Hyun Cho, RTI International
Lisa Cicutto, National Jewish Health

Partner Community:
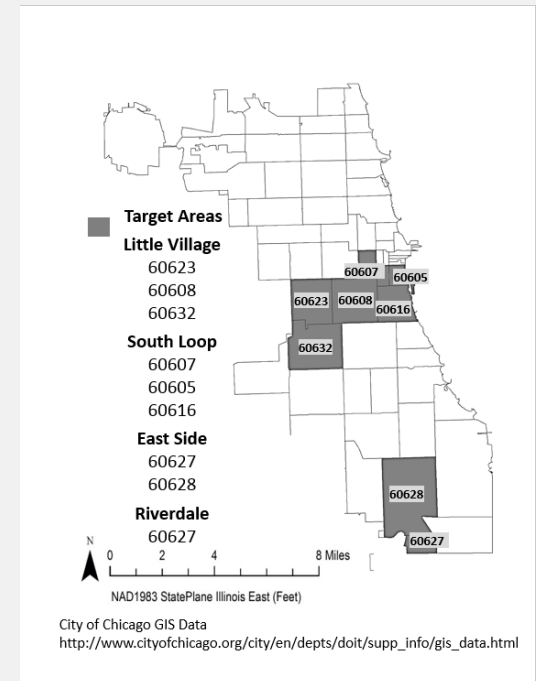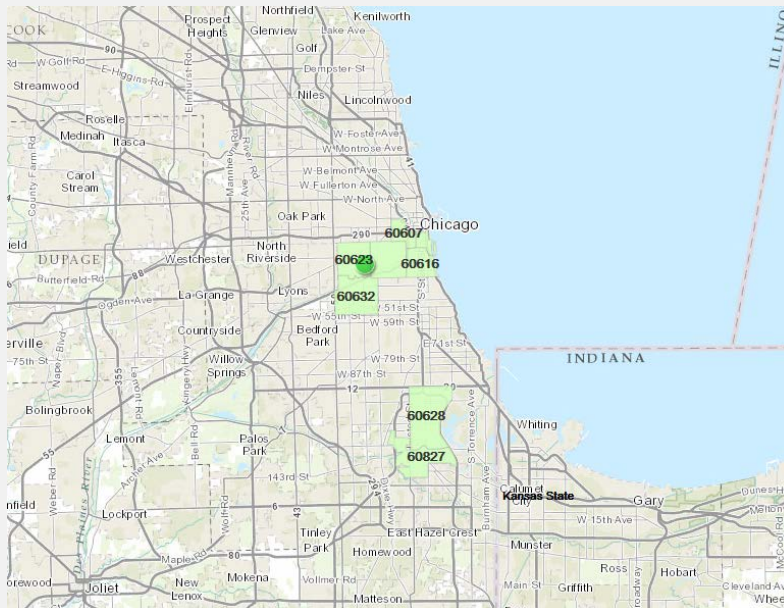Globeville, Elyria Swansea
(GES), Colorado

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

PI: Wendy Griswold, Univ. of Memphis and Kansas State University

Community Partners Include:
Alliance for a Greener South Loop, Delta Institute, Little Village Environmental Justice Organization, People for Community Recovery, Respiratory Health Association, Southeast Environmental Task Force, University of Illinois-Chicago (UIC)

Target Areas

Little Village
60623
60608
60632

South Loop
60607
60605
60616

East Side
60627
60628

Riverdale
60627

NAD1983 StatePlane Illinois East (Feet)

City of Chicago GIS Data
http://www.cityofchicago.org/city/en/depts/doit/supp_info/gis_data.html

Democratization of Measurement and Modeling Tools for Community Action on Air Quality

R Subramanian (PI), Julie Downs (co-PI), Albert Presto, Spyros Pandis, Carnegie Mellon University

Partners: Jamin Bogi (Group Against Smog and Pollution, GASP), Myron Arnowitt (Clean Water Fund), Thurman Brendlinger (Clean Air Council)
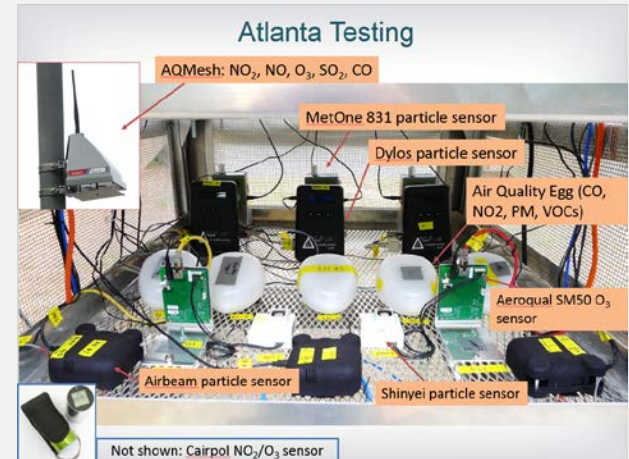
R Subramanian

Julie Downs

Carnegie Mellon University

CAPS
Center for Atmospheric Particle Studies

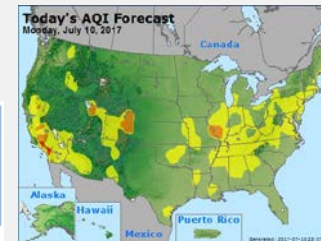# Air pollution sensors: Involvement and collaboration across EPA

- Sensor evaluations
- Field study applications
- Development of custom sensor systems
- Air Sensor Toolbox
- Data management and visualization (RETIGO)
- Data messaging (incl. airnow.gov, Village Green)
- Citizen Science and community engagement
- EPA-funded research grants
- Smart City Air Challenge

EPA offices and Regions include:
Office of Research and Development, Office of Air and Radiation,
all 10 EPA Regions, Office of Environmental Information

Atlanta Testing

AQMesh: NO$_2$, NO, O$_3$, SO$_2$, CO
MetOne 831 particle sensor
Dylos particle sensor
Air Quality Egg (CO, NO2, PM, VOCs)
Aeroqual SM50 O$_3$ sensor
Airbeam particle sensor
Shinyei particle sensor
Not shown: Cairpol NO$_2$/O$_3$ sensor

Thanks to Ron Williams, EPA

Today's AQI Forecast
Example of RETIGO results: mobile air quality data on a map

Village Green Project, Kansas City (multiple locations)
https://www.epa.gov/air-research/village-green-project
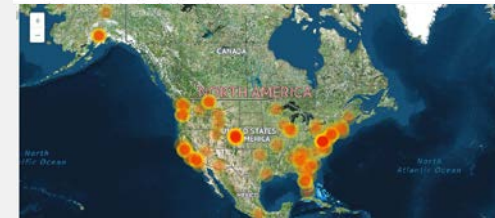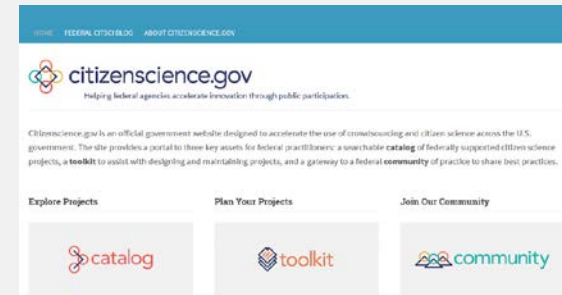
Thanks to Gayle Hagler and Ron Williams, EPA

Resources

Air Sensor Toolbox for Citizen Scientists, Researchers and Developers

Putting new ways to measure air quality into the hands of the public.

Air Sensor
Measure · Learn · Share

Citizen Science Toolbox

This website provides information for citizen scientists and others on how to select and use low-cost, port... understand results from monitoring activities. The information can help the public learn more about air q...

https://www.epa.gov/air-sensor-toolbox

citizenscience.gov

Explore Projects
catalog

Plan Your Projects
toolkit

Join Our Community
community

https://www.citizenscience.gov/

International Society of Exposure Science
Science for Better Environmental Health

International Society of Exposure Science
27th Annual Meeting
October 15-19, 2017
Sheraton Imperial Hotel & Convention Center
Research Triangle Park, North Carolina, USA

Air Pollution Monitoring for Communities
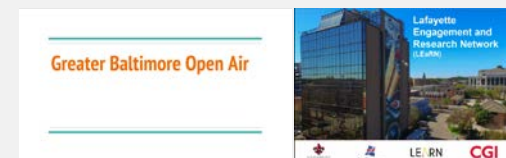Grantee Symposium
Tuesday, October 17th
3:30 p.m. – 5:00 p.m.

http://www.intlexposurescience.org/ISES2017

EPA's Smart City Air Challenge Webinar Series

EPA is conducting a series of webinars to help communities design effective air quality projects.
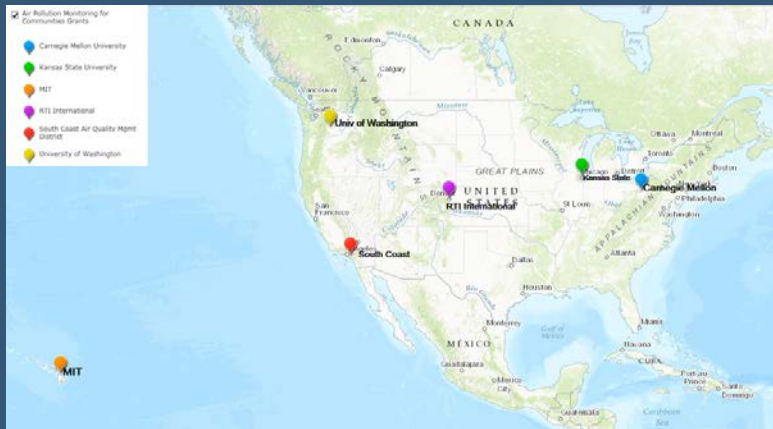Awards to two communities: Baltimore, Maryland and Lafayette, Louisiana, with four honorable mentions.
Next webinar: Tuesday July 18th, 2017, 12:00 noon Eastern Time

https://developer.epa.gov/smart-city-air-challenge-webinar-series/

Greater Baltimore Open Air

Lafayette Engagement and Research Network (LEARN)

Thank You

Air Pollution Monitoring for Communities grants website
https://www.epa.gov/air-research/air-pollution-monitoring-communities-grants

Rich Callan
callan.richard@epa.gov