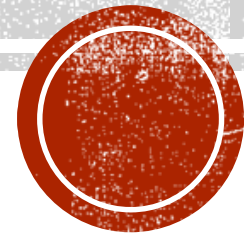


AIR POLLUTION, TRAFFIC AND EXERCISE

PARKS, POLLUTION AND OBESITY

RIMA HABRE, ScD

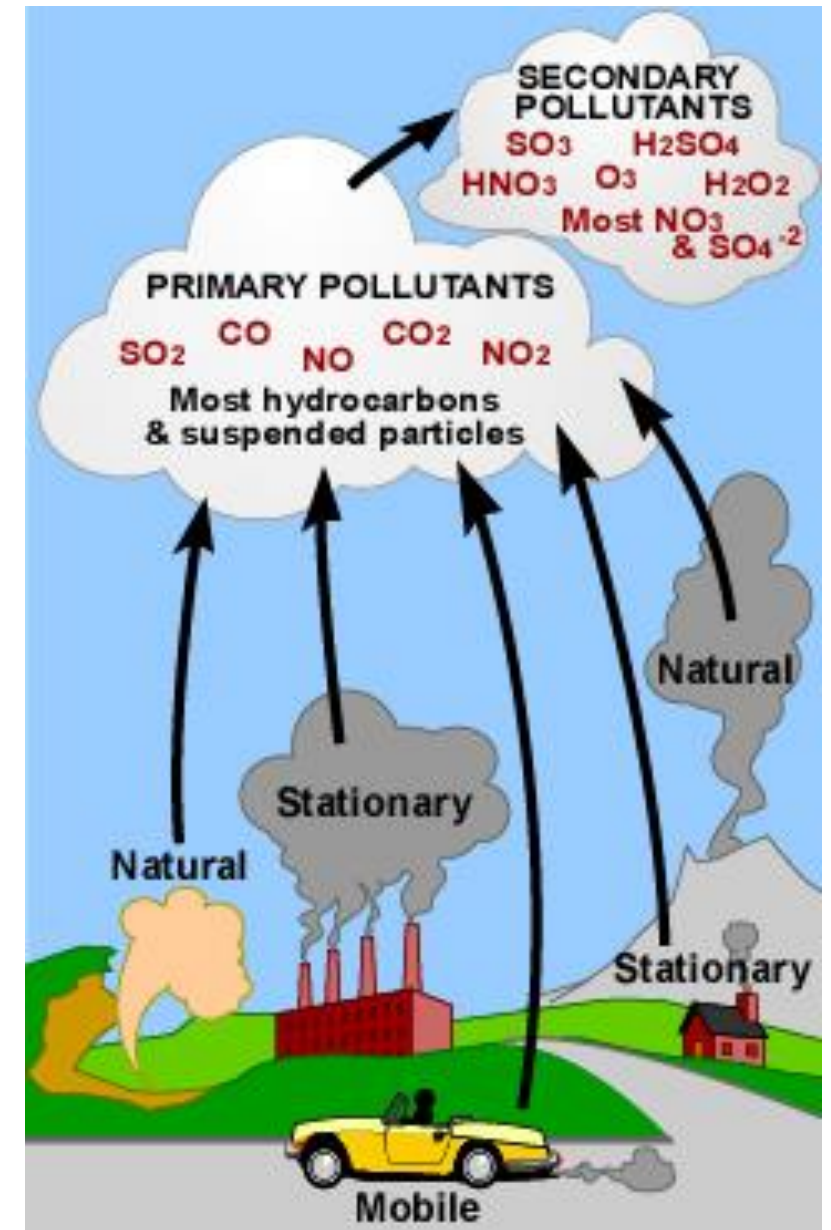
Assistant Professor of Clinical Preventive Medicine
Division of Environmental Health, USC Keck School of Medicine
habre@usc.edu



Parks, Pollution and Obesity Conference, April 2017

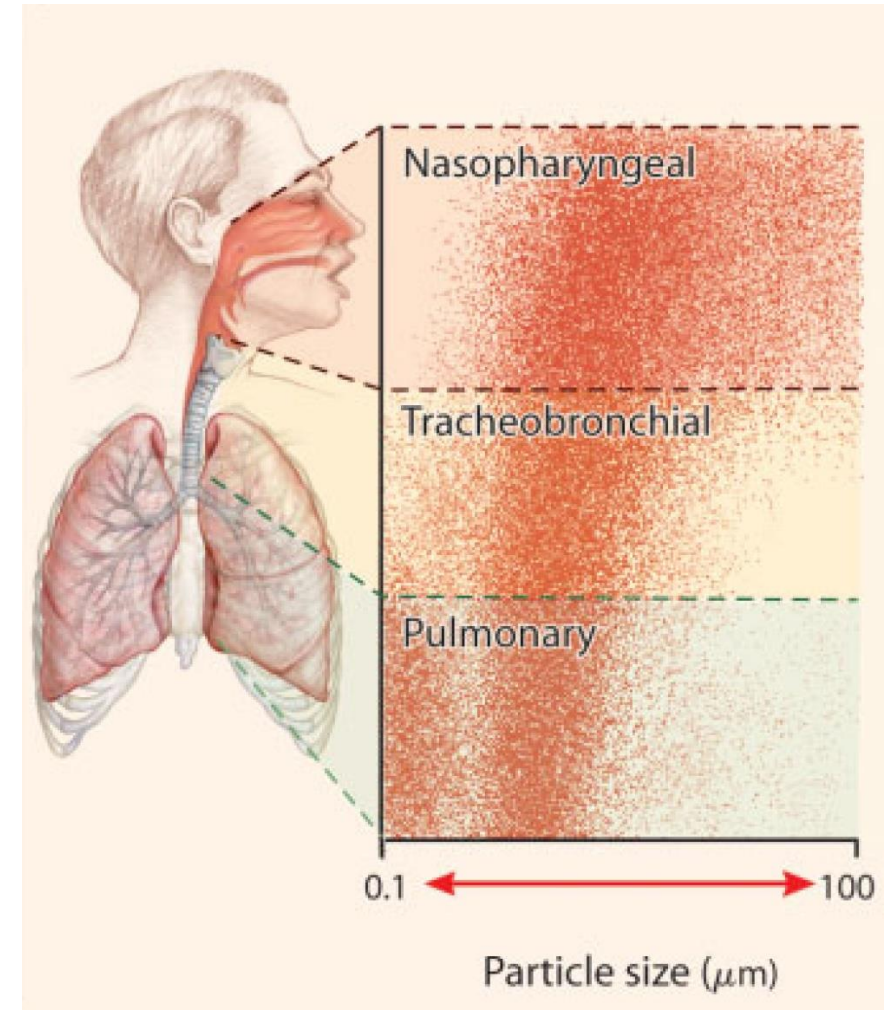
WHAT IS AIR POLLUTION?

- Anthropogenic vs natural sources
- Particulate and gaseous (aerosols)
- Primary vs secondary
 - The same pollutant can be both sometimes



WHAT IS AIR POLLUTION?

- **Particles**
 - Size (aerodynamic diameter, in micrometers)
 - Counts (particle number, in thousands)
 - Mass (eg, micrograms per meters cubed)
- **Gases**
 - Mixing ratio of the gas molecule to air (parts per million, parts per billion, etc..)



Roy and Milton, 2004



CITIZEN SCIENCE

- Directly engages everyone in the process of scientific discovery
- Data collection by enthusiasts, engaged stakeholders not just scientists
- Learning, participation, involvement in community and policy-making process

Putting new ways to measure air quality into the hands of the public. www.epa.gov/air-sensor-toolbox



Aircasting.org



individual, community and government change



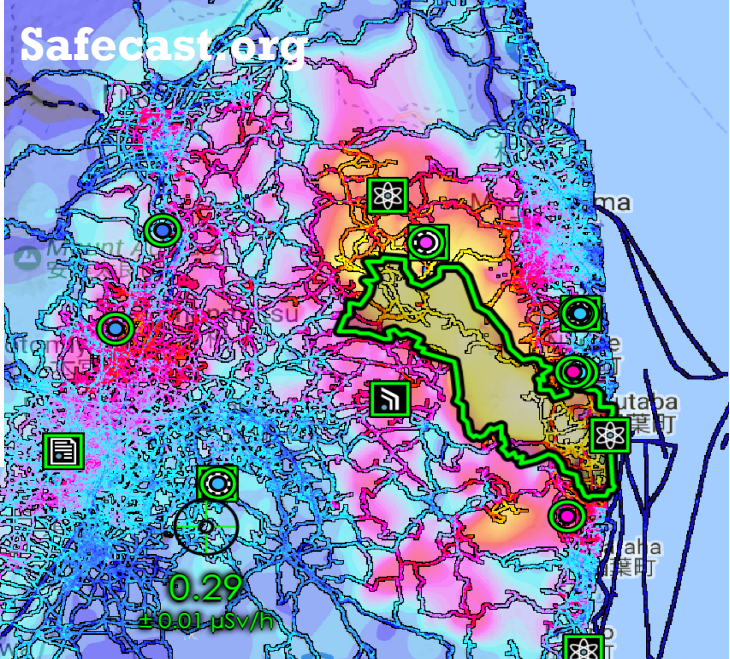
LOW-COST SENSORS, SMARTPHONE APPS, OPEN SOURCE DIY, CROWDSOURCING PLATFORMS



Build your own
bGeigie Nano



KIT AVAILABLE NOW



RADIATION

Safecast maintains the largest open dataset of background radiation measurements ever collected. Over 50 million readings to date and growing daily.



AIR QUALITY

Safecast is currently building out a network of sensors to monitor PM1.0, PM2.5, Carbon Monoxide, Nitrogen Dioxide, Ozone and Methane.



OPEN DATA

All data collected by Safecast is released under a CC0 public domain designation. Anyone is free to use it for free with no licensing restrictions.

COMPARISON TO REFERENCE MONITORS





- Formal evaluations of low-cost, air pollution sensors against reference methods
- In the field and in the lab
- PM (particulate matter) and gas sensors
- Look for an R-squared (R^2) value as close to 1 as possible

The logo for AQ-SPEC features the text 'AQ-SPEC' in a large, bold, blue sans-serif font. The background is a light blue gradient with a network of white lines and nodes, resembling a circuit board or data network. The text is centered and has a slight glow effect.

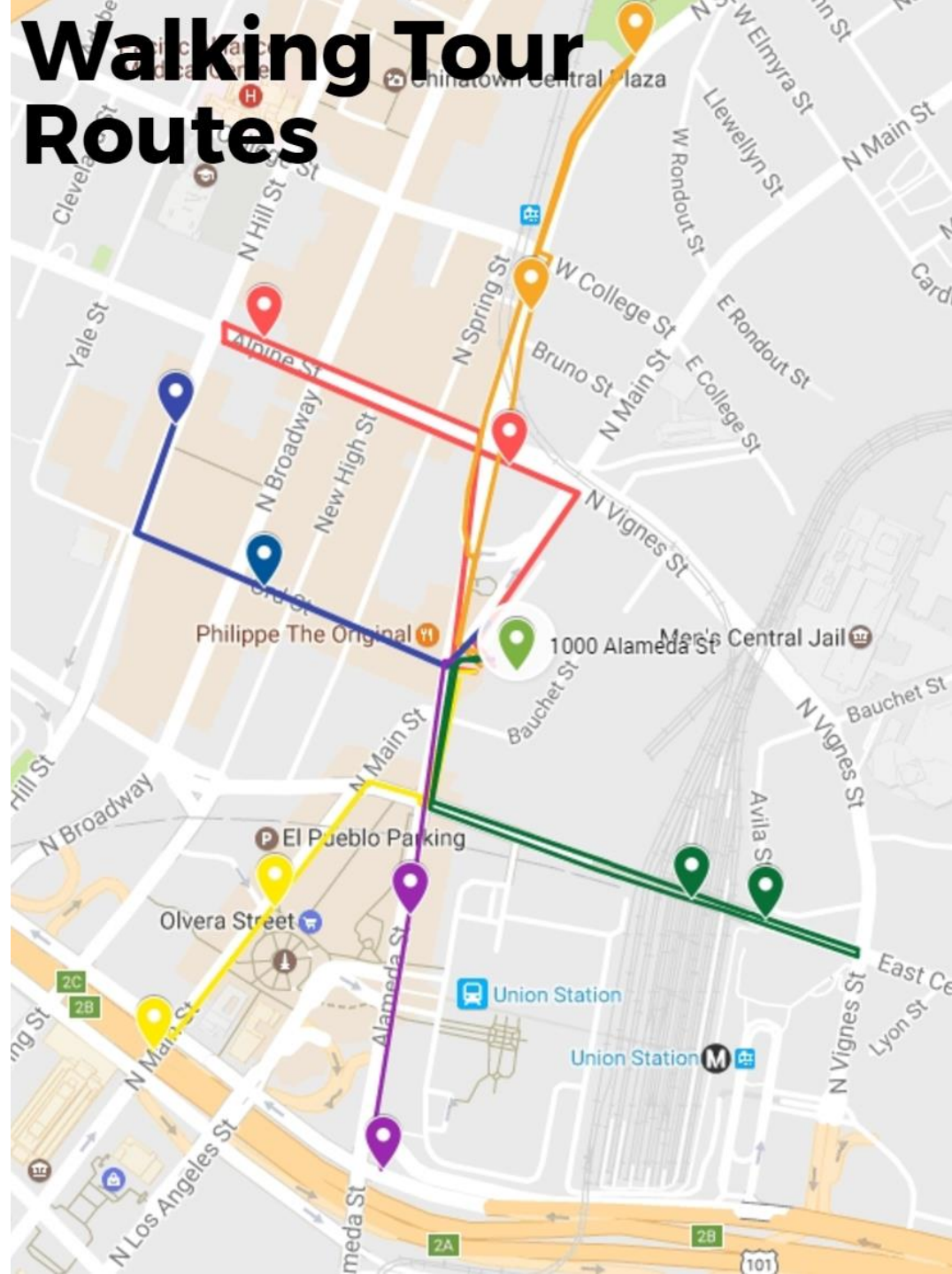
AQ-SPEC

Air Quality Sensor Performance Evaluation Center

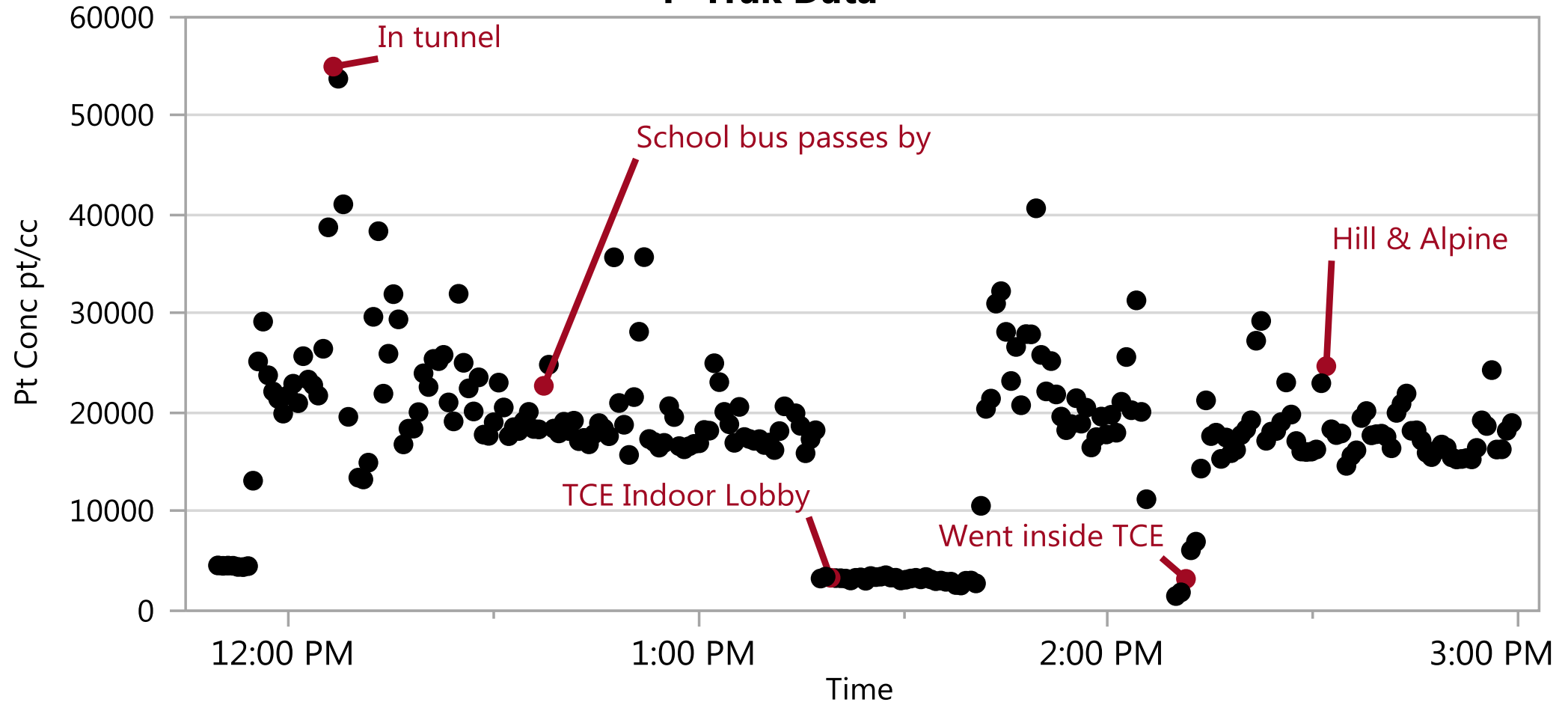
PM Sensors

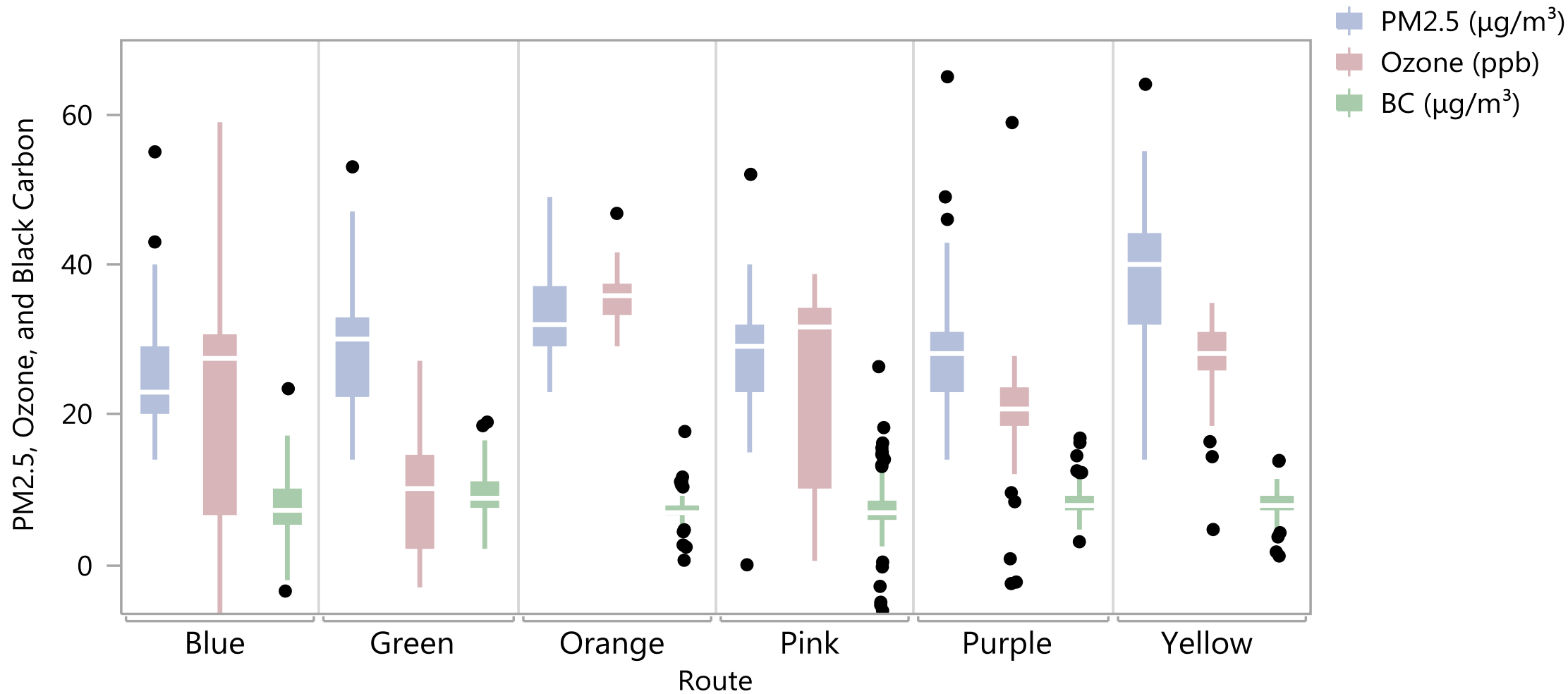
Sensor Image	Manufacturer (Model)	Type	Pollutant(s)	Approx. Cost (USD)	*Field R ²	*Lab R ²	Summary Report
	HabitatMap (AirBeam)	Optical	PM _{2.5}	~\$200	R ² ~ 0.65 to 0.70	R ² ~ 0.87	PDF (1,144 KB)
	PurpleAir (PA-I)	Optical	PM _{1.0} , PM _{2.5} & PM ₁₀	~\$150	PM _{1.0} : R ² ~ 0.93 to 0.95 PM _{2.5} : R ² ~ 0.77 to 0.92 PM ₁₀ : R ² ~ 0.32 to 0.44	PM _{1.0} : R ² ~ 0.95 PM _{2.5} : R ² ~ 0.99 PM ₁₀ : R ² ~ 0.97	PDF (1,072 KB)
	PurpleAir (PA-II)	Optical	PM _{1.0} , PM _{2.5} & PM ₁₀	~\$200	PM _{1.0} : R ² ~ 0.96 to 0.98 PM _{2.5} : R ² ~ 0.93 to 0.97 PM ₁₀ : R ² ~ 0.66 to 0.70		
	AethLabs (microAeth)	Optical	BC (Black Carbon)	~\$6,500	R ² ~ 0.79 to 0.94		

Walking Tour Routes

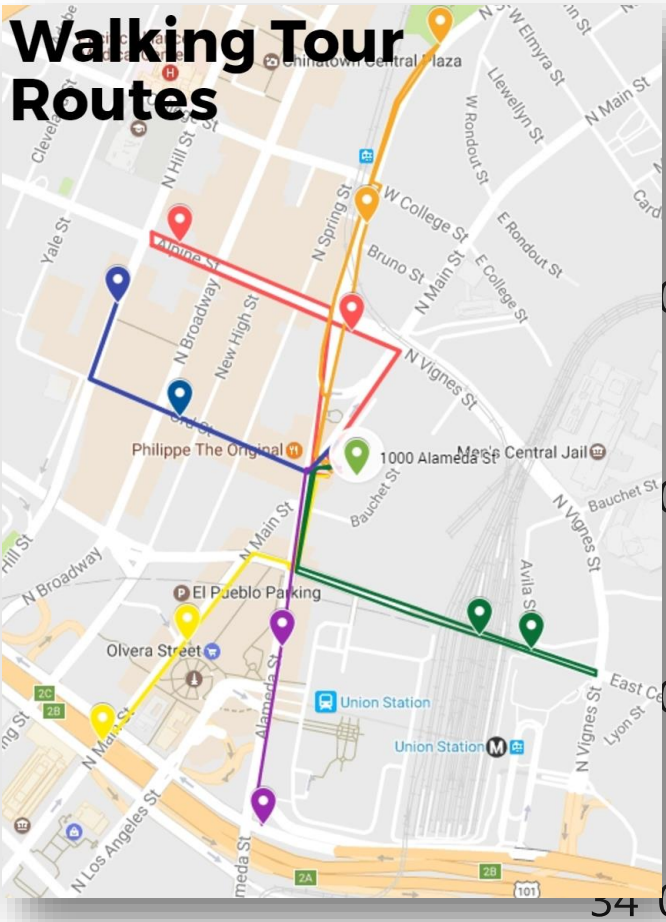


P-Trak Data

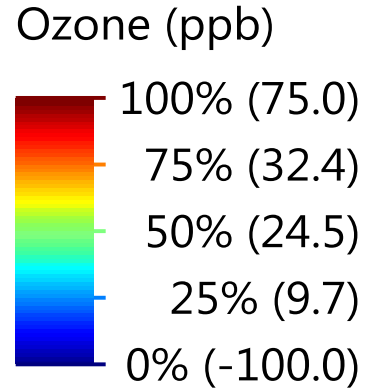




Walking Tour Routes

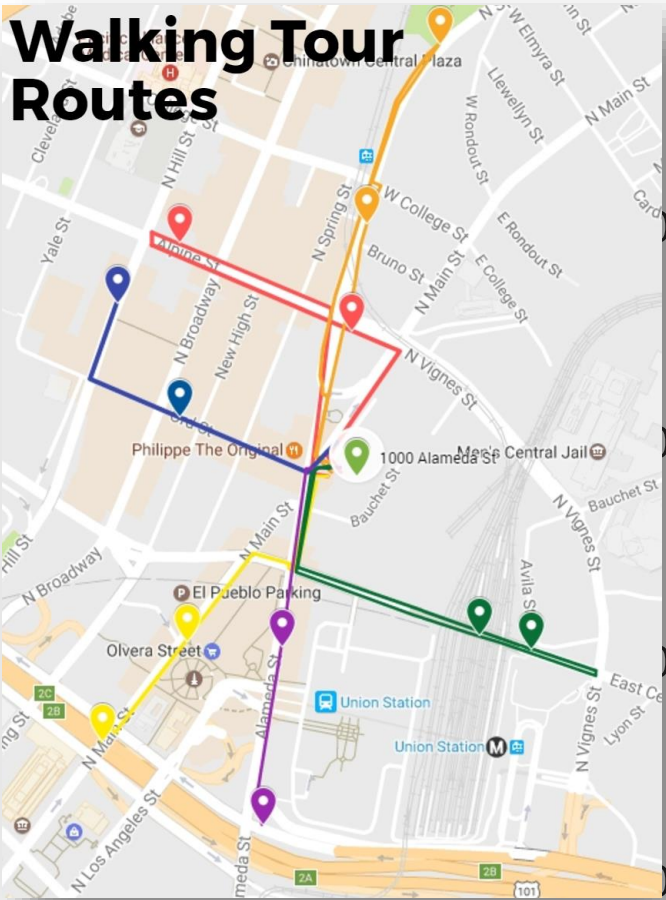


04' N
04' N
04' N
04' N
03' N
34°03' N



118°15' W 118°14' W 118°14' W 118°14' W 118°14' W

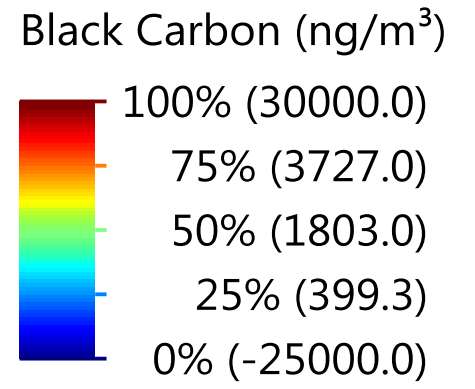
Walking Tour Routes

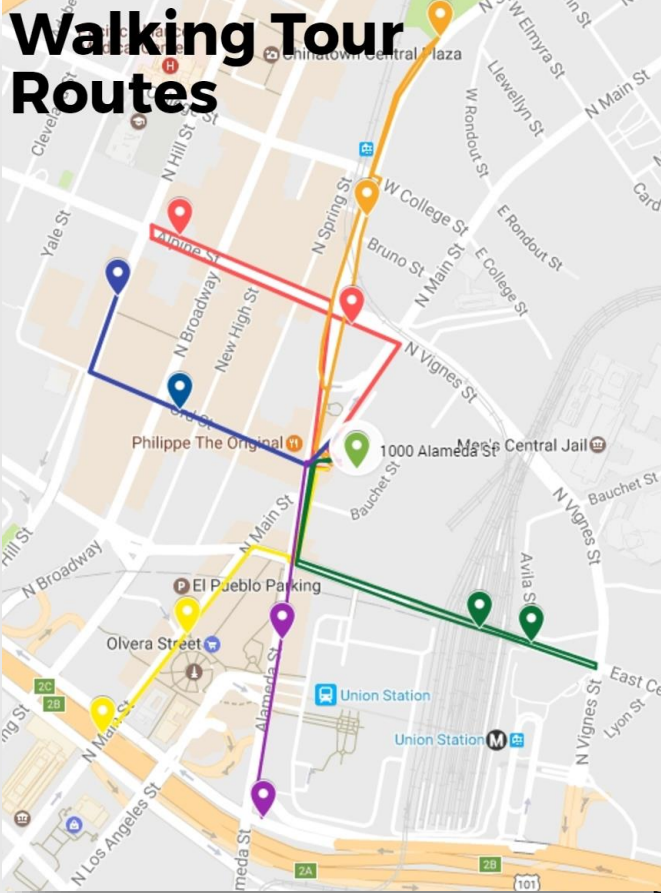


4' N
4' N
4' N
3' N
34°03' N



118°15' W 118°14' W 118°14' W 118°14' W





34°04' N
 34°04' N
 34°04' N
 34°03' N
 34°03' N



118°15' W 118°14' W 118°14' W 118°14' W

RESOURCES

- EPA Citizen Science page: <https://www.epa.gov/citizen-science>
- EPA Air Sensors Toolbox for Citizen Science: <https://www.epa.gov/air-sensor-toolbox>
- Build your own particle sensor, EPA workshop: https://www3.epa.gov/airnow/teachers/gh_pmsensorkit_handoutandinstructions.pdf
- AQ spec program: <http://www.aqmd.gov/aq-spec/evaluations/summary>
- Habitat Map: <http://habitatmap.org/>
- Safecast: <http://blog.safecast.org/>

USC Environmental Health Centers

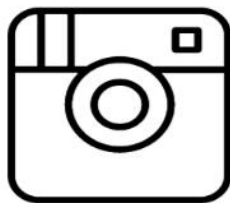


Southern California
Children's Environmental Health Center

Keck School of
Medicine of **USC**



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ehc.usc.edu



scehsc@usc.edu

USCEHC
