

Atmospheric Science and Chemistry mEasurement NeTwork (ASCENT): Advanced, Ground-based Aerosol Measurement Network Across the United States

[Home](#) | [About](#) | [People](#) | [Measurement Sites](#) | [Instrumentation](#) | [Database](#) | [Education & Outreach](#) | [News & Events](#) | [Join Mailing List](#)

PI: Nga Lee (Sally) Ng, Georgia Institute of Technology

Steering Committee:

Nga Lee (Sally) Ng, Georgia Institute of Technology
Roya Bahreini, University of California, Riverside
Ann Dillner, University of California, Davis
Armistead Russell, Georgia Institute of Technology



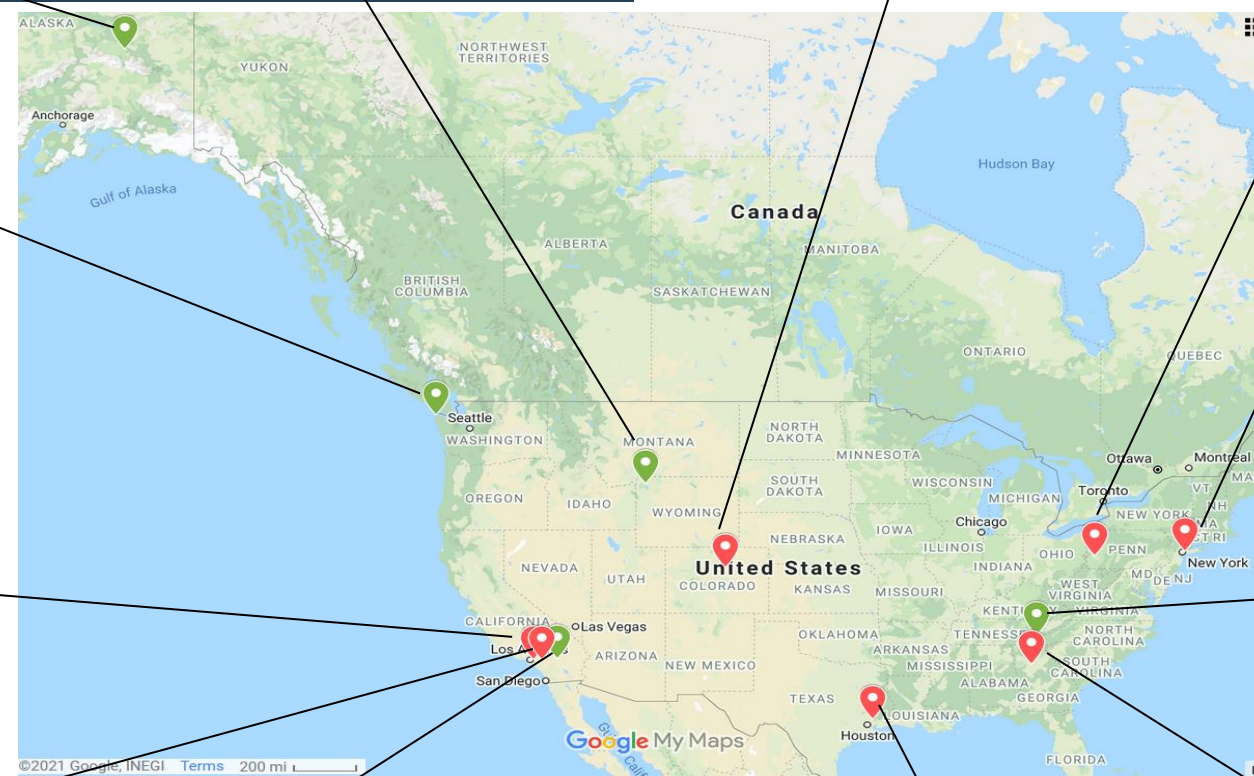
Site/Instrument Mentors: Richard Flagan (California Institute of Technology), James Flynn (University of Houston), Drew Gentner (Yale University), Robert Griffin (Roger Williams University), Lelia Hawkins (Harvey Mudd), Jose Jimenez (University of Colorado, Boulder), Jingqiu Mao (University of Alaska, Fairbanks), Shane Murphy (University of Wyoming), Albert Presto (Carnegie Mellon University), Allen Robinson (Carnegie Mellon University), John Seinfeld (California Institute of Technology), Jason Surratt (University of North Carolina, Chapel Hill), Joel Thornton (University of Washington)

Database: Sean Raffuse, Veronica Scott, Rudi De Marco, Brian Trout (University of California, Davis); Eric Nienhouse (National Center for Atmospheric Research)

Collaboration Networks: NCore, IMPROVE, PAMS, SCAQMD, NEON, HNET, CASTNET, NATTS, AERONET, ACTRIS

ASCENT

- ASCENT: The Atmospheric Science and Chemistry mEasurement NeTwork
 - A network of 12+ sites to provide long term, detailed, aerosol observations across the US
 - “Sister” sites being added
 - Monitoring started in 2023
- Objectives
 - Establish a **new, long-term, ground-based aerosol measurement network** in the US for comprehensive and high time-resolution (minutes) characterization of aerosol chemical composition and physical properties
 - Co-located sites from other networks (e.g., NCORE, IMPROVE, PAMS, AERONET, NEON) to enhance data utility
 - Develop a standardized framework for advanced aerosol measurement **protocols**, create a **database** for data discovery and visualization, and long-term data preservation
 - Data to be provided for use by the scientific, health, policy and other stakeholder communities
 - **Enhance training** of students and current professionals engaged in atmospheric, climate, and air quality research
 - Class taught on linking TEMPO and ASCENT (and associated) data
 - Catalyze and support future development of an integrated and long-term atmospheric observation research infrastructure for aerosols, clouds, and trace gases in the US and to **strengthen collaborations with international atmospheric observation networks**
 - Already happening as additional, similar sties being established, capitalizing on ASCENT SOPs and experience

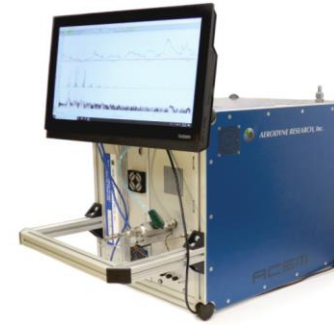


Site Selection

Site Number	Local Site Name	Current Network	Instrument Mentor	Comments
1	Delta Junction, AK	NEON, AERONET	Jingqiu Mao	Remote, arctic, background, boreal forest, intercontinental transport, EPSCoR
2	Cheeka Peak/ Makah	NCore, IMPROVE	Joel Thornton	Marine background/inflow, smoke at times, tribal site
3	Los Angeles-Pico Rivera	SCAQMD	John Seinfeld & Rick Flagan	Paired site 1: urban, anthropogenic, VCP, wildfires
4	Rubidoux	SCAQMD, NCore, PAMS	Roya Bahreini	Paired site 2: urban, anthropogenic, aged OA, wildfires
5	Joshua Tree	IMPROVE, CASTNET	Lelia Hawkins & Roya Bahreini	Paired site 3: aged OA, downwind of LA and Riverside
6	Yellowstone NP 2	IMPROVE, CASTNET	Shane Murphy	Background site with wildfires, EPSCoR
7	La Casa	NCore	Jose Jimenez	Urban, wintertime pollution, oil and gas, wildfires, agriculture
8	Houston-UH West Liberty	HNET	Robert Griffin & Jimmy Flynn	Urban, petrochemical industry, maritime shipping
9	Lawrenceville	NCore, IMPROVE, PAMS, NATTS	Albert Presto & Allen Robinson	Urban, oil and gas, fracking, heavy industry
10	Queens College 2	NCore, AERONET	Drew Gentner	Urban, coastal, VCP
11	South DeKalb	NCore, IMPROVE, PAMS, NATTS	Nga Lee Ng	Paired site 1: urban, biogenic
12	Great Smoky Mountains NP - Look Rock	Ncore, IMPROVE, CASTNET	Jason Surratt	Paired site 2: background, biogenic

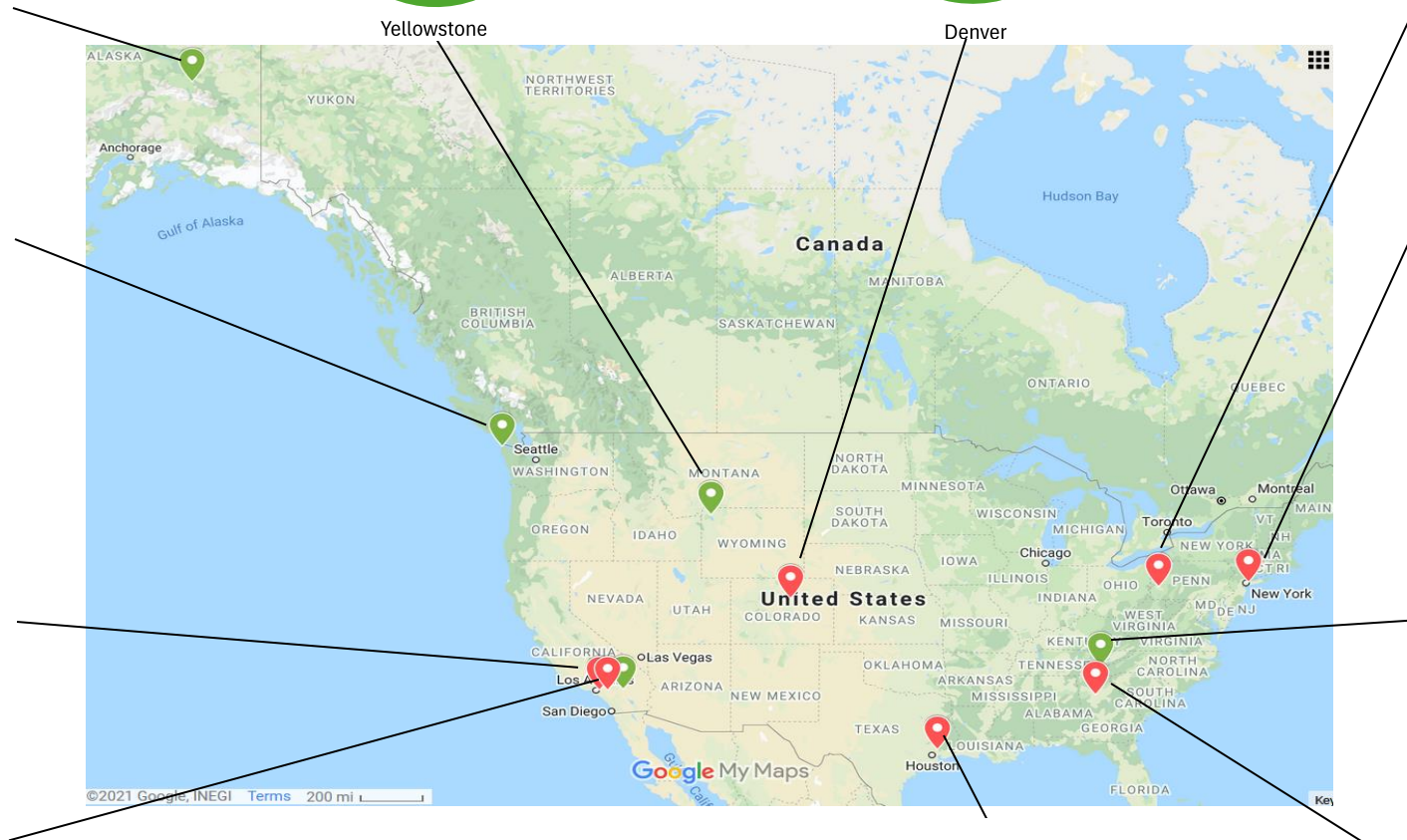
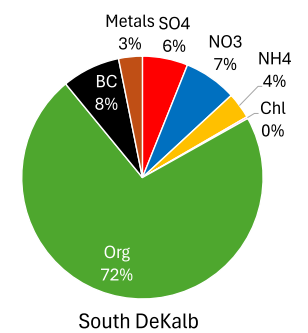
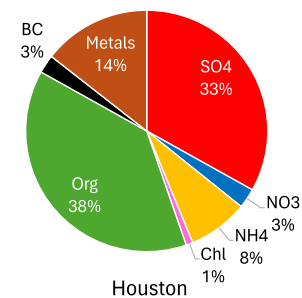
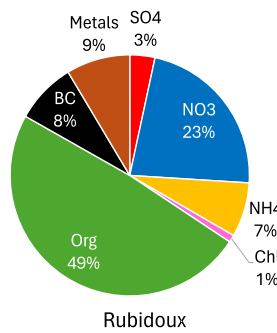
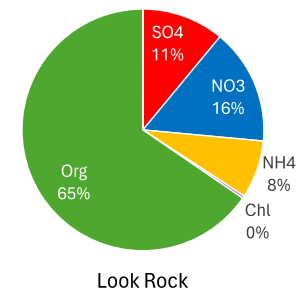
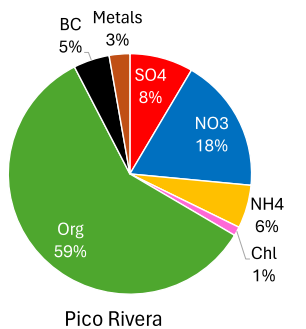
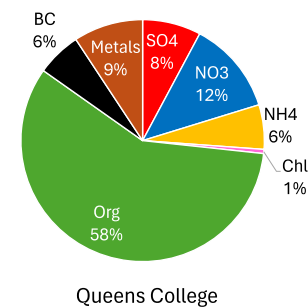
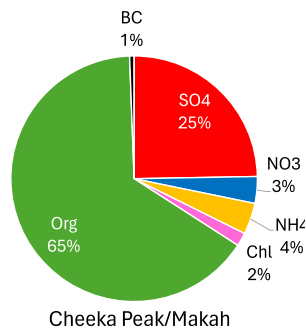
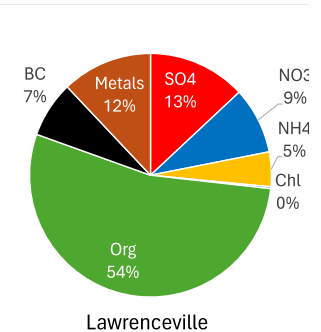
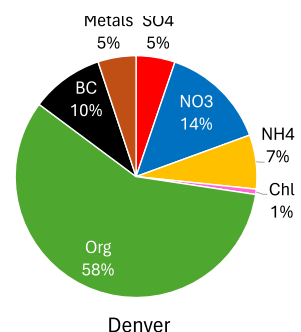
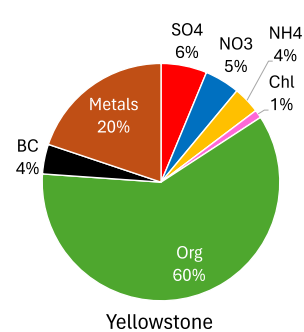
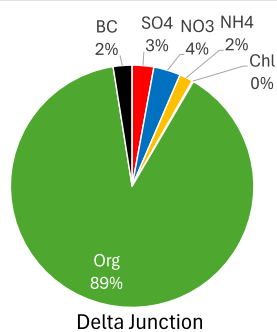
High Time-Resolution Aerosol Instrumentation

Instrument	Model and Manufacturer	Measurements
Aerosol Chemical Speciation Monitor (ACSM), PM _{2.5}	ToF-ACSM, Aerodyne Research	Organics, sulfate, nitrate, ammonium, chloride
Xact, PM _{2.5}	625i, Cooper Environmental	Trace metals: Sb, As, Ba, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mn, Ni, Se, Ag, Sn, Ti, Tl, V, Zn, more available
Aethalometer, PM _{2.5}	AE33, Magee Scientific	Wavelength-dependent absorption; black and brown carbon
Scanning Mobility Particle Sizer (SMPS), PM ₁	3938W89, TSI	Particle number size distribution, number concentration



Low-cost Sensors

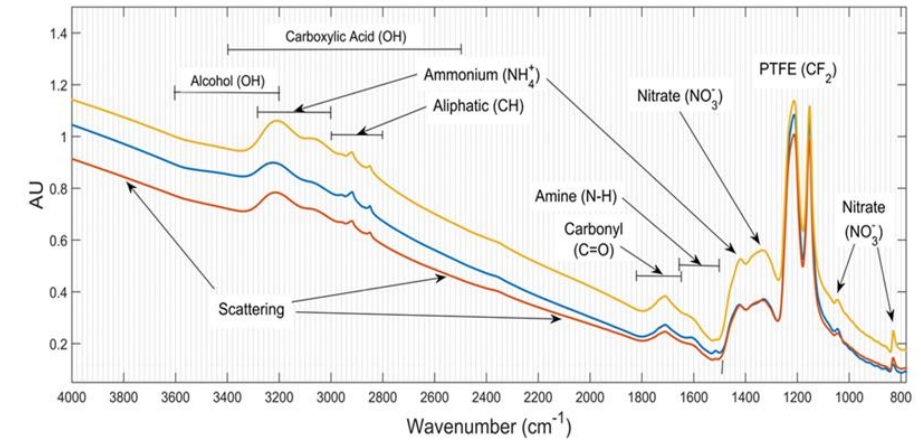
(PurpleAir, QuantAQ MODULAIR-PM) @ all ASCENT sites and MODUAIR at selected sites



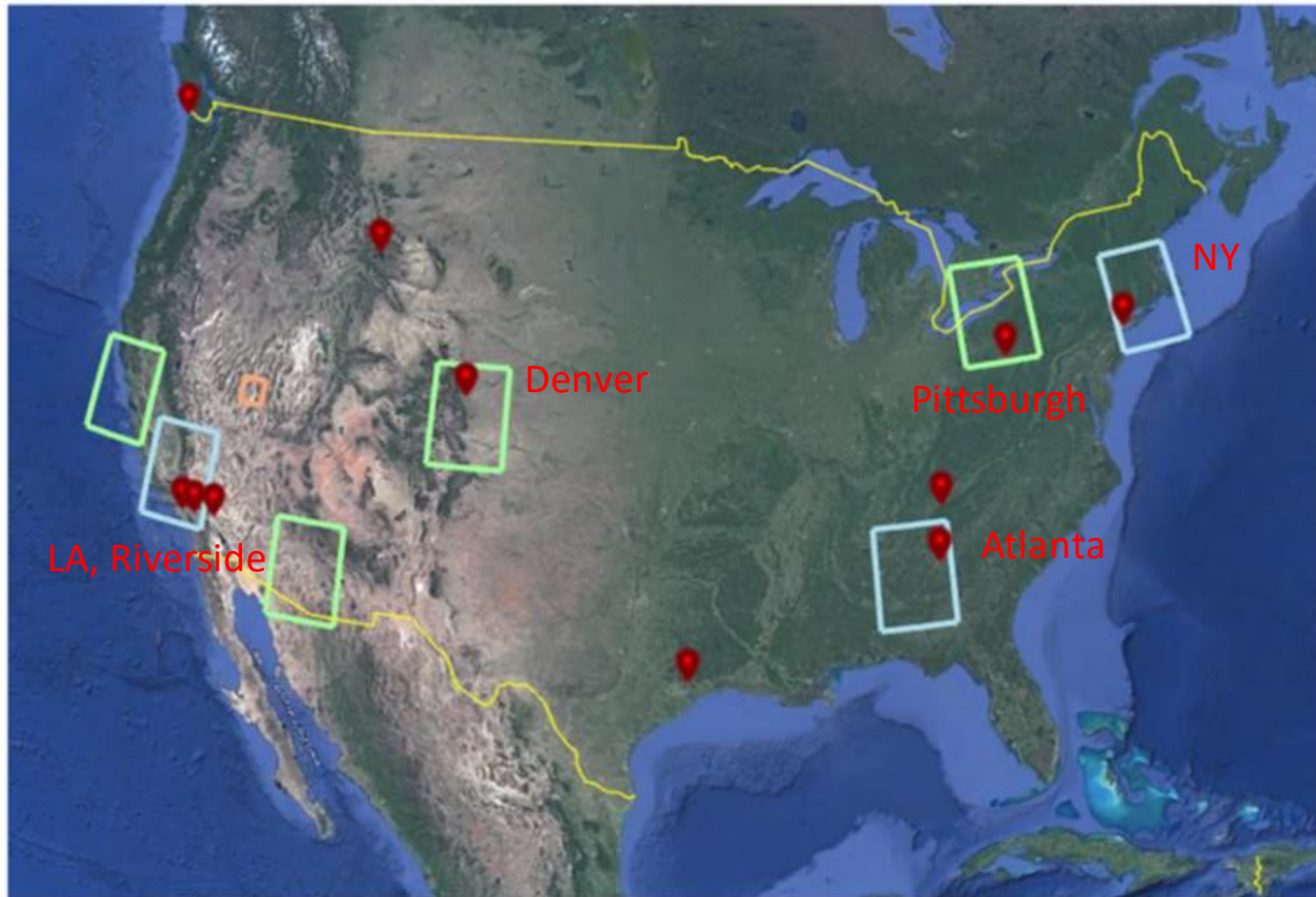
Preliminary Data

Value-Added Products

- Two added-value components underway:
 - Analyze organic functional groups in parallel by FT-IR and ACSM
 - Develop parameterizations of ACSM data to increase the chemical resolution of organic aerosols from the ACSM
 - (Near) real time source apportionment
 - Likely PMF or NNMF-driven



Comparison of ASCENT Data with Existing Networks



- Compare ASCENT high time-resolution measurements with PM_{2.5} filters (Chemical Speciation Network, CSN)
- Organics, black carbon, nitrate, sulfate, ammonium, soil (2.2Al + 2.49Si + 1.63Ca + 2.42Fe + 1.94Ti)

Thank you!

