

ASCENT + Atlanta

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School of Earth and Atmospheric Sciences
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Georgia Institute of Technology

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**Georgia
Tech**

The Georgia Tech logo is located in the bottom right corner. It consists of the words "Georgia" and "Tech" stacked vertically in a bold, blue, sans-serif font. To the right of the text is a stylized yellow and white graphic of the Georgia Institute of Technology's tower.



ASCENT: Atmospheric Science and Chemistry mEasurement NeTwork



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

Steering Committee:

Nga Lee (Sally) Ng, Georgia Institute of Technology

Ann Dillner, University of California, Davis

Roya Bahreini, University of California, Riverside

Armistead Russell, Georgia Institute of Technology

Site/Instrument Mentors: 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)

Website Interface/Database: Jeff de La Beaujardiere, Eric Nienhouse (National Center for Atmospheric Research); Sean Raffuse and software engineering team (University of California, Davis)

Collaboration Networks: NCore, PAMS, IMPROVE, SCAQMD, NEON, HNET, ACTRIS

ASCENT

- A new long-term, ground-based, high time-resolution aerosol measurement network in the US
- 12 Sites
- 3-year grant (\$12M), supported by NSF Mid-scale Research Infrastructure Program
- Transfer operation and management to (an)other organization(s) after award period

ASCENT Site Map

<https://www.google.com/maps/d/u/0/edit?mid=1jzzBGQvFsX86gSbPluoAd1Dp6RPrDVkC&usp=sharing>

Leverage Existing Sites/Networks

NCORE: National Core Network

- PM_{2.5} mass and speciation;
O₃, CO, SO₂, NO, and NO_y

PAMS: Photochemical Assessment Monitoring Stations, VOCs

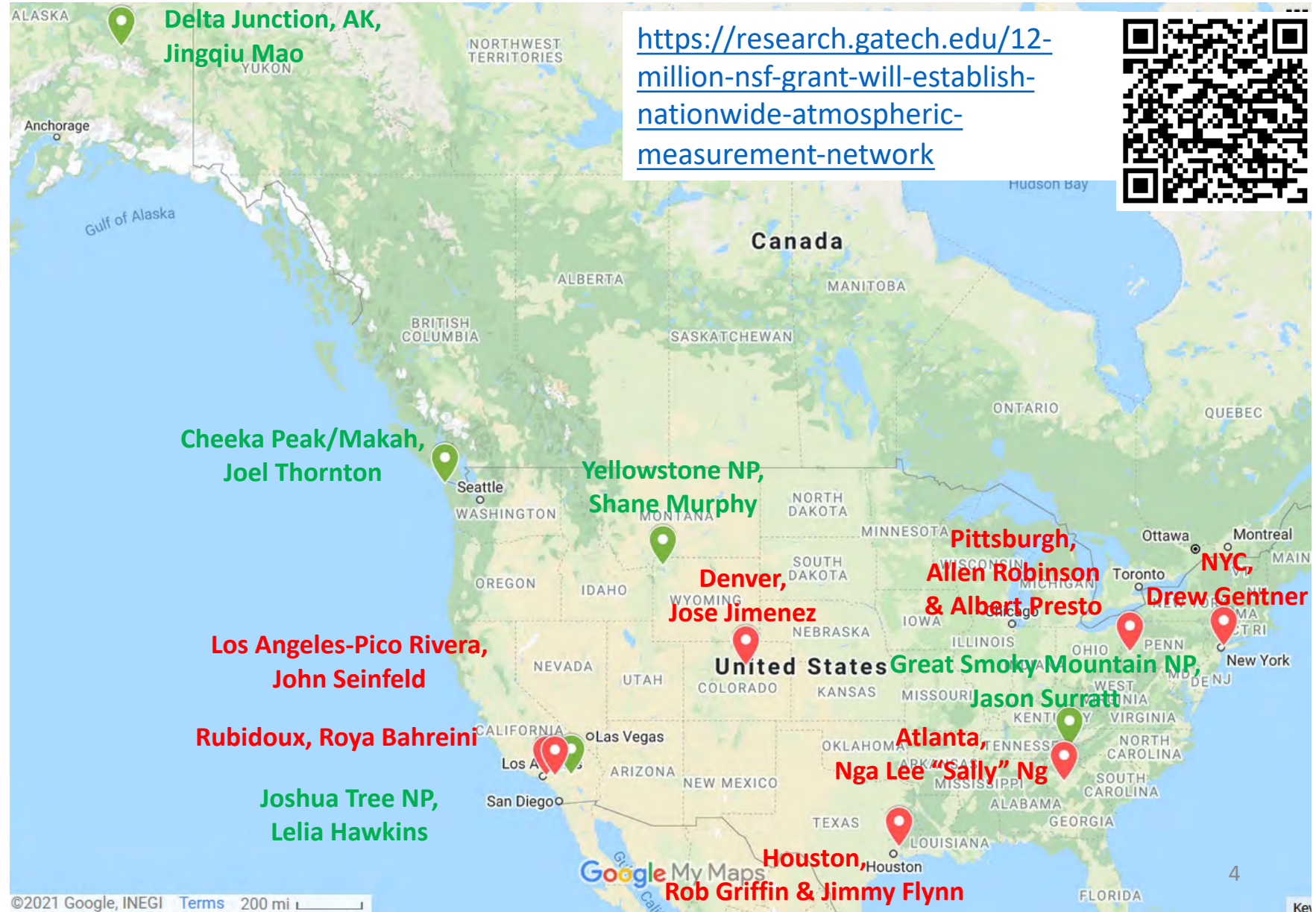
IMPROVE: Interagency Monitoring of PROtected Visual Environment network

- PM_{2.5} mass; gas-phase
measurements

SCAQMD: South Coast Air Quality Management District

NEON: National Ecological Observatory Network

HNET: Houston Network of Environmental Towers



Site Selection

Site Number	Local Site Name	Current Network	Instrument Mentor	Comments
1	Delta Junction, AK	NEON	Jingqiu Mao	Remote, arctic, background, boreal forest, intercontinental transport, EPSCoR
2	Cheeka Peak/ Makah	IMPROVE	Joel Thornton	Marine background/inflow, smoke at times, tribal site
3	Los Angeles-Pico Rivera	AQMD	John Seinfeld	Paired site 1: urban, anthropogenic, VCP, wildfires
4	Rubidoux	NCORE, PAMS	Roya Bahreini	Paired site 2: urban, anthropogenic, aged OA, wildfires
5	Joshua Tree	IMPROVE	Lelia Hawkins & Roya Bahreini	Paired site 3: aged OA, downwind of LA and Riverside
6	Yellowstone NP 2	IMPROVE	Shane Murphy	Background site with wildfires, EPSCoR
7	La Casa	NCORE, PAMS	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, PAMS	Allen Robinson & Albert Presto	Urban, oil and gas, fracking, heavy industry
10	Queens College 2	NCORE, PAMS	Drew Gentner	Urban, coastal, VCP
11	South DeKalb	NCORE, PAMS	Nga Lee Ng	Paired site 1: urban, biogenic
12	Great Smoky Mountains NP - Look Rock	IMPROVE	Jason Surratt	Paired site 2: background, biogenic

Instrumentation and Value-added Products

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

Value-added products:

- FTIR / ACSM functional group analysis and parametrization
- (Near) real time source apportionment

Data Infrastructure

- Collaboration with NCAR: Data Stewardship Coordinator, Software Applications and Gateway Engineering (SAGE) team
- Collaboration with software engineering team at UC Davis Air Quality Research Center
- Four data levels
 - (0) raw data
 - (1) calibrated and quality assured data (minimum level of quality control)
 - (2) full quality-controlled data
 - (3) value-added data products
- Data export tool
- Database and web interface

Research Capabilities

- Infrastructure, Energy, and Land Use Change
- Climate Change and Feedbacks
- Public Health and Equity
- Satellite Validation
- Field campaign sites, mobile platforms, test beds to develop and evaluate the next generation of low-cost sensors, etc.

ASCENT Meeting at AAAR

Time: Thursday October 6, 2022; 12pm-1pm

Venue: Room 306 A/B/C

- This meeting is intended as a wider forum to discuss future collaborative studies that leverage the ASCENT infrastructure to advance research in atmospheric science, climate, and air quality
- All ideas and regions of study are welcome
- If you would like to present a slide with a specific research idea at the meeting, please contact the ASCENT Steering Committee by **September 30, 2022**

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ASCENT Website (beta version)

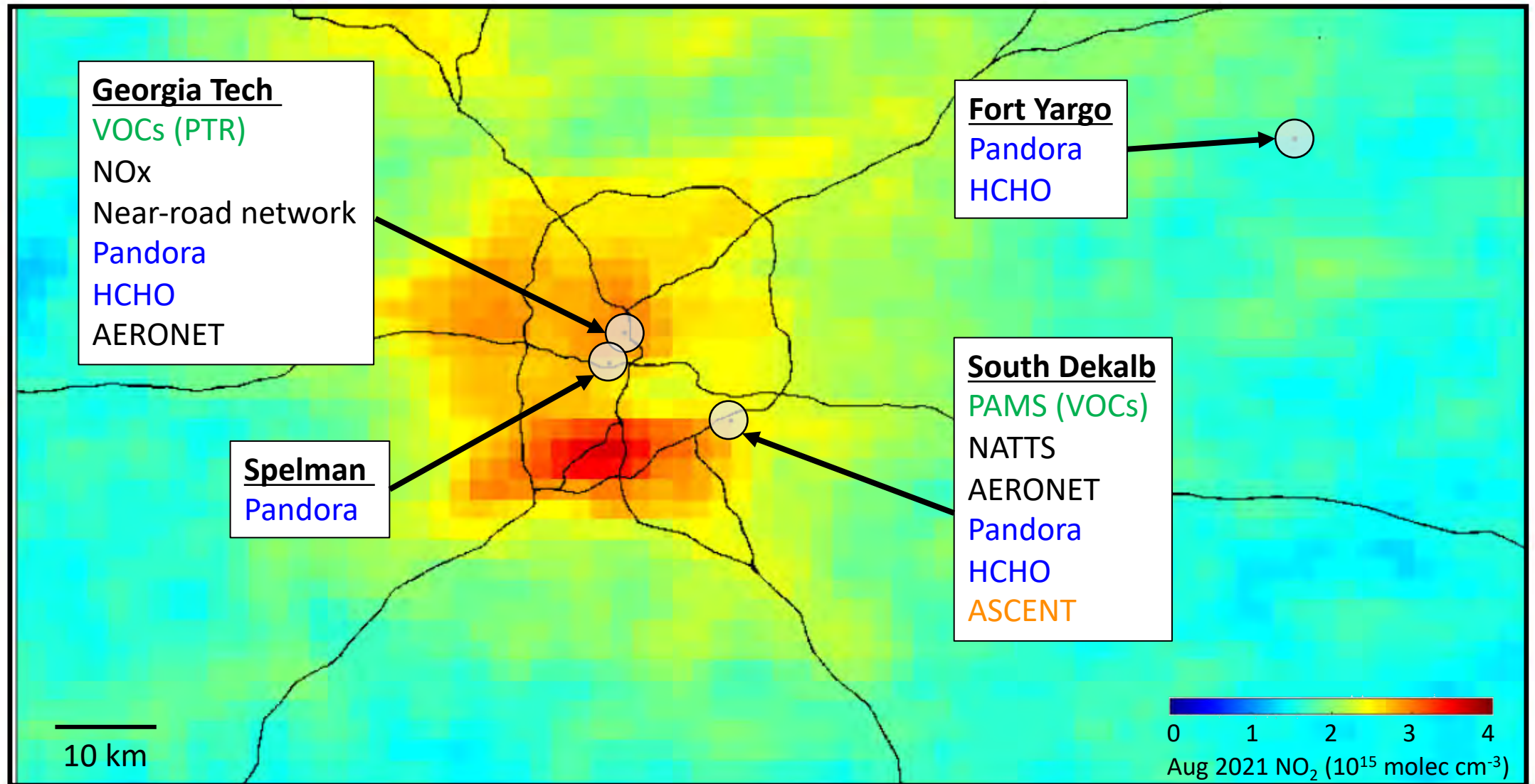
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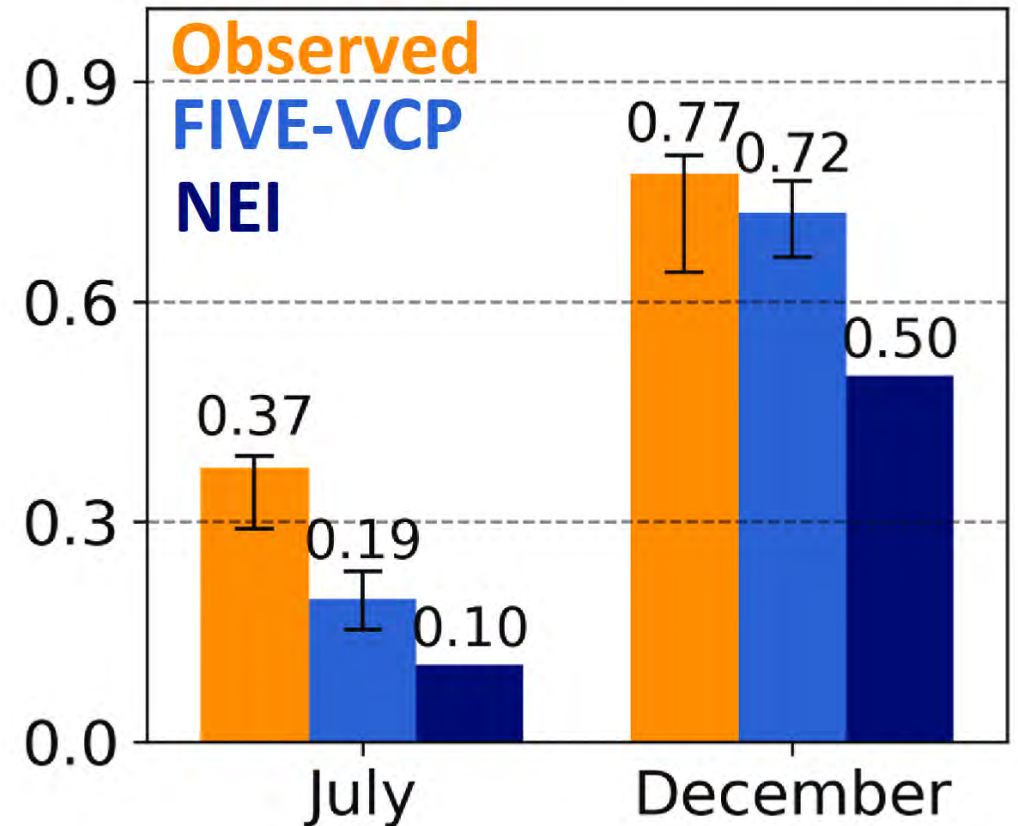
Ground-Based Observations in Atlanta in Summer 2023



Long-term dataset available to provide context for 2023

- VCP tracers observable via PTR over 3 summers (2020-2022)
- Source apportionment suggests inventories underestimate summer anthropogenic monoterpenes
- Implications for SOA formation will be investigated using concurrent aerosol and OVOC measurements

(Anthro MTs)/(Total MTs)



Peng *et al.*, Atmos. Environ., 2022