

The PACE Applications Program

Pursuing impactful and societally-relevant PACE science



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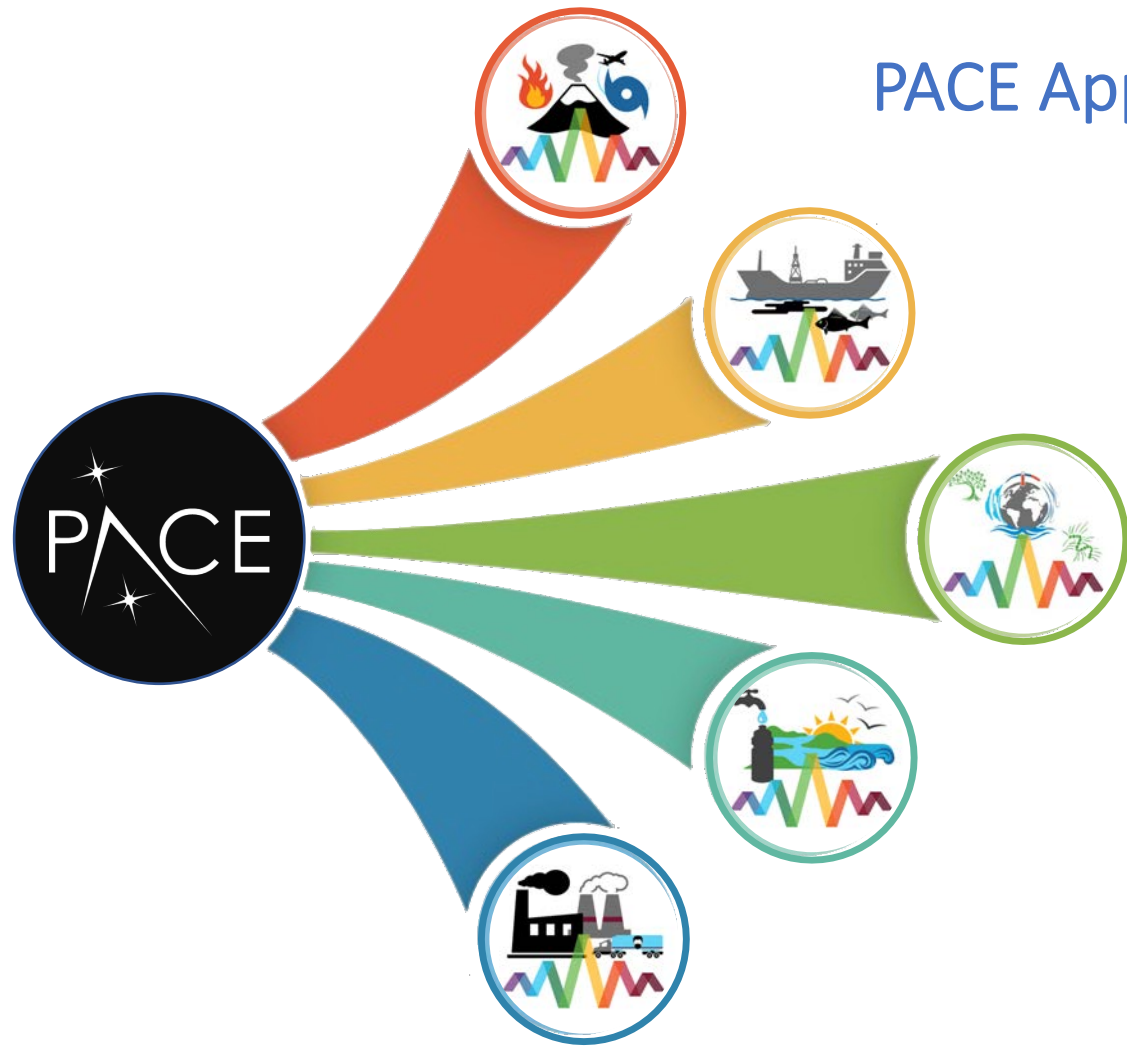


“The equally brilliant and novel advance here is synthesizing that knowledge and applying it in an entirely different way that’s simple and effective.”

- Heather Tallis

Big Picture

- **Who are we?** *PACE Applications Program!*
- **Why should you care?** *Applied science, science communication, and achieving greater impact!*
- **What can you take away from this?** *A model and a few ideas!*
- **Practice!** Breakout activity to communicate the impact of your science.



PACE Applications Program

- Address community user needs & concerns with PACE data products
- Grow relevance & sustainability of PACE
- Demonstrate the societal value & utility of PACE



The goal of the PACE Applications Program is to foster new partnerships and out-of-the-box thinking that will generate inventive solutions that aid society.

Terminology:

- **Applications** are innovative uses of NASA PACE data products to complement and improve decision-making activities and provide practical solutions to meet societal needs.
- **Applied Research** provides fundamental knowledge of how PACE data products may be scaled & integrated into users' policy, business, and management activities to improve decision-making.
- **End-user communities or stakeholders** include
 - Individuals & groups
 - Public & private sectors
 - National & international organizations
 - Local & global scales



Other Important PACE Applications Definitions:

- **Accessible** data is approachable, free of charge, understandable, with unrestricted access, and in machine-readable formats.
- **Useable** data are delivered in form that meets the needs of different user audiences, is ready for the tasks that the user needs to accomplish, and that has been adapted to the user needs.
- **Actionable** data is info. that can be acted upon or that gives enough insight into the future that the actions that should be taken become clear for decision makers.

PACE: Interdisciplinary applied science objectives

fisheries

biodiversity

HABs

oil leaks

food security

wetlands

terrestrial ecosystems

land use & change



air quality

human health

disasters

climate

resource management

ecological forecasting

pathogens

water quality



PACE Applications Events and Activities: Community Focus Sessions, Needs Assessments (using illustrative user personas), Annual Workshops, Newsletter

<p>This is Tom</p> <p>Occupation: Water Quality Manager</p> <p>Age: 59</p> <p>Location: Tampa, FL</p> <p>Bio/ Backstory:</p> <p>Tom has worked at Florida DEP for 25yrs. He manages a team of over 60 ppl. He has a masters in Marine Biology and is passionate about the environment and recreational fishing. Most of his work has focused on Gulf Coast water quality, focusing on harmful algal blooms, fecal coliforms, and associated recreational beach safety. Tom plans to retire in the next 5-7yrs.</p>	<p>This is Julie</p> <p>Occupation: Postdoc</p> <p>Bio/ Backstory:</p> <p>Julie is a first year post-doctoral research fellow. Her research focuses on organic matter in a variety of marine ecosystems. She has experience in molecular biology, microbiology, and environmental engineering. She plans to continue her research in the field of marine organic matter.</p>	<p>This is Feng</p> <p>Occupation: Senior Scientist</p> <p>Bio/ Backstory:</p> <p>Feng is a Senior Scientist at an environmental consulting firm. He has over 15 years of experience in environmental engineering and project management. He has worked on a variety of projects including water quality, air quality, and environmental impact assessments.</p>	<p>This is Astrid</p> <p>Occupation: Senior Scientist</p> <p>Bio/ Backstory:</p> <p>Astrid works as an engineer in the environmental engineering field. She has over 10 years of experience in environmental engineering and project management. She has worked on a variety of projects including water quality, air quality, and environmental impact assessments.</p>	<p>This is Jake</p> <p>Occupation: Senior Scientist</p> <p>Bio/ Backstory:</p> <p>Jake works at the Gulf of Mexico Program. He has over 10 years of experience in environmental engineering and project management. He has worked on a variety of projects including water quality, air quality, and environmental impact assessments.</p>	<p>This is Claire</p> <p>Occupation: Senior Scientist</p> <p>Bio/ Backstory:</p> <p>Claire works at NOAA's National Oceanic and Atmospheric Administration. She has over 10 years of experience in environmental engineering and project management. She has worked on a variety of projects including water quality, air quality, and environmental impact assessments.</p>	<p>This is John</p> <p>Occupation: Senior Scientist</p> <p>Bio/ Backstory:</p> <p>John is a researcher at the University of Florida. He has over 10 years of experience in environmental engineering and project management. He has worked on a variety of projects including water quality, air quality, and environmental impact assessments.</p>	<p>This is Elena</p> <p>Occupation: Ministry of Environment Scientist</p> <p>Age: 36</p> <p>Location: San Salvador, El Salvador</p> <p>Bio/ Backstory:</p> <p>Elena is a scientist at the Ministry of Environment where she develops models and supports policy making on good fishing practices. She values satellite data to produce maps on sea surface temperatures, chlorophyll concentrations, currents speed and direction, albedo, bathymetry, and the depth of the thermocline. She shares information directly with the local fishing community and with policy makers who use her data to inform their work. In her free time, she enjoys swimming and surfing.</p>
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PACE Terrestrial-land Community Assessment

Q13: What exploratory PACE products might you be interested in? (Terrestrial Community Survey, 2021; Urquhart, Sadoff et al.)

PACE Applications Water Quality & Resources Focus Session

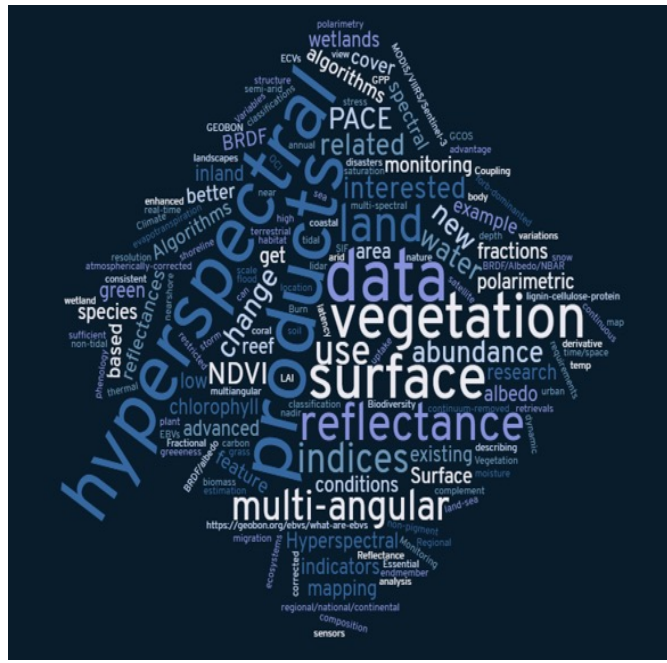
July 28th, 2021

NASA PACE Applications 2021 Workshop

Virtual Event

September 15-16, 2021

<p>This is Tom</p> <p>Occupation: Water Quality Manager</p> <p>Age: 59</p> <p>Location: Tampa, FL</p> <p>Bio/ Backstory:</p> <p>Tom has worked at Florida DEP for 25yrs. He manages a team of over 60 ppl. He has a masters in Marine Biology and is passionate about the environment and recreational fishing. Most of his work has focused on Gulf Coast water quality, focusing on harmful algal blooms, fecal coliforms, and associated recreational beach safety. Tom plans to retire in the next 5-7yrs.</p>	<p>Goals</p> <ul style="list-style-type: none"> Provide accurate, up-to-date info. on coastal HAB and bacteria conditions. Effectively coordinate with other teams/managers on the conditions & risks 	<p>Technical Characteristics</p> <p>Remote Sensing Knowledge: <input type="checkbox"/></p> <p>Computing Power: <input type="checkbox"/></p> <p>Machine Learning & Classification: <input type="checkbox"/></p> <p>Data Pre-processing Ability: <input type="checkbox"/></p>
	<p>Pain Points / Frustrations</p> <ul style="list-style-type: none"> Limited resources for <i>in situ</i> monitoring across Gulf Coast's numerous beaches Lack of technical/computational resources Difficulty communicating risk to citizens and decision-makers Often doesn't understand the limitations of science data Too much information that is difficult to interpret and doesn't scale well with his domain 	<p>Ideal Experience / Must Have</p> <ul style="list-style-type: none"> Easy source of information to convey risk & safety about beach & recreational conditions Free, and/or cheap, access to data for multiple locations Location specific/searchable Data that is delivered routinely, perhaps automated download (?) Easy interface, data doesn't need much time of processing Data that is simple to communicate (color-bar) Data that "talks" to other data



PACE Air Quality & Applied Atmospheric Sciences Focus Session

Virtual Event

May 11th, 2022

Join us for the 2022 PACE Applications Workshop!

Keynote and plenary talks, panels, posters, and discussions on:

- PACE Science,
- PACE Applications,
- Community engagement & co-production,
- Mission synergies,
- Accessible data tools & services.



GO REGISTER, GO! <https://pace-applicationsworkshop2022.eventbrite.com>

PACE Early Adopter Program

The PACE Early Adopter program promotes applied science and applications research designed to scale and integrate PACE data into policy, business, and management activities that benefit society and inform decision making.

Goals:

- Expand the user communities with tangible and potential applications that would benefit from the use of PACE data
- Facilitate feedback on PACE data products pre-launch
- Accelerate the use and integration of PACE products into applications post-launch by providing specific support to Early Adopters who commit to engage in pre-launch applied research



Clarissa Anderson

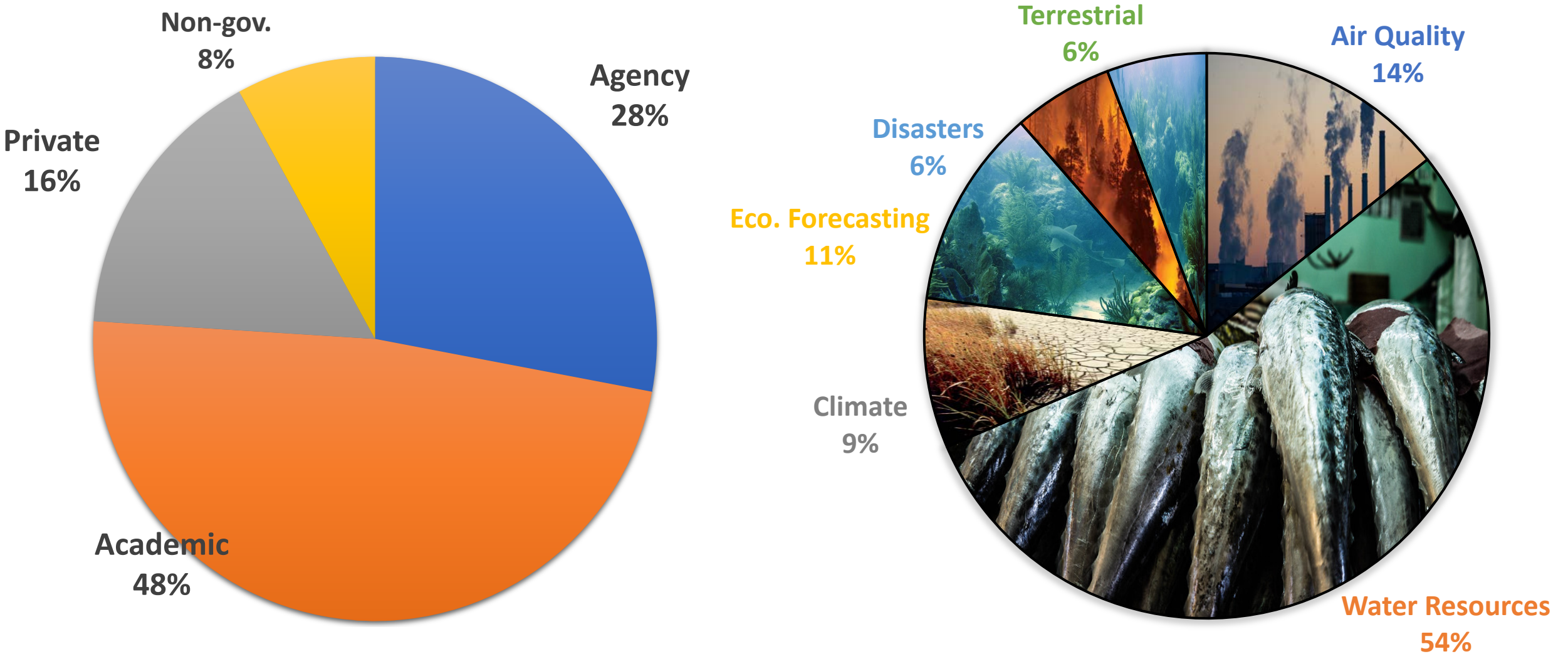
Applying PACE products to the



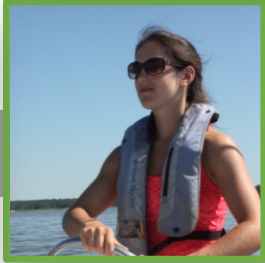
Jordan Borak

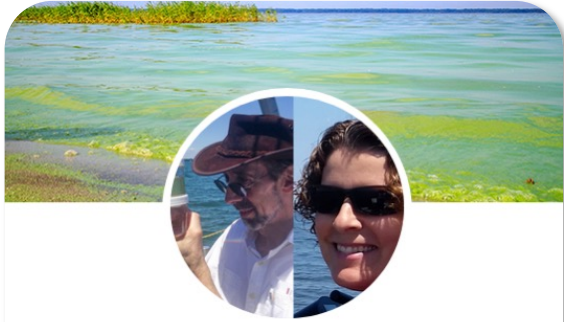
Mapping wetland vegetation

PACE Early Adopter Program: Sector and Thematic Areas



PACE Early Adopters (n=26)





Richard Stumpf

Discriminating algal blooms in turbid coastal, estuarine and large lake environments

Application: Use of hyperspectral remote sensing data to separate harmful algal bloom (HAB) types in inland lakes, coastal beaches, and estuarine environments.

Significance: Certain algal species, including cyanobacteria, can produce toxins which pose a significant threat to human health through recreational and drinking water exposure. PACE will support targeted HAB management to advise state managers, local health departments, water treatment plants, and the aquaculture and commercial fishing industries. As these advisories are used to manage fisheries, drinking water operations, and recreational beaches, they provide key information to protect the public and human health from toxic algal bloom events.

How PACE helps: PACE OCI will assist in bloom type separation and estimating physiological state of blooms enabling better estimation of toxicity due to HABs.

Stakeholders: State managers in FL, MD, VA, OH, CA. Health departments, water treatment operators, and aquaculture and commercial fisheries.



Image Credit: W. Volgelbein, VIMS



S. Marcela Loría-Salazar

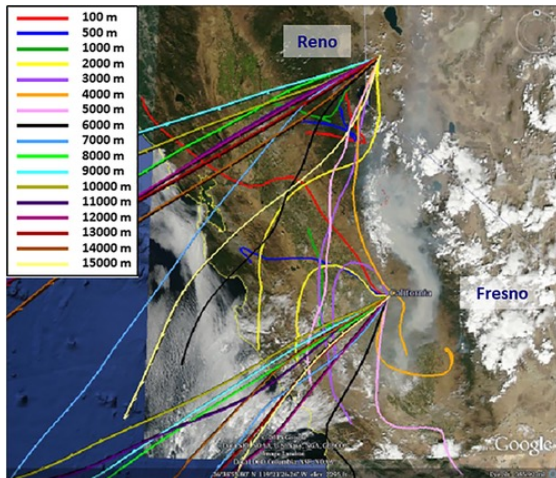
Toward understanding the effect of aerosols on regional weather and human health in the southern Great Plains »

Application: Improved smoke forecasts; Informed health alert forecasts related to pollen, dust, and smoke in the Southern Great Plains

Significance: Aerosol pollution is a growing global public health problem due to wildfires in the US, which especially affects vulnerable human populations. PACE aerosol data will help us advance air quality models to better inform public health alerts in the SGP region of the United States and additional understanding the role of aerosols in regional weather.

How PACE can help: The use and evaluation of aerosol data from NASA PACE mission will advance smoke air quality models by (1) improving the spatial resolution with respect to MODIS aerosol products, especially for combined AOD-height retrieval, and (2) potentially advancing aerosol characterization from the two-multiangle polarimeters.

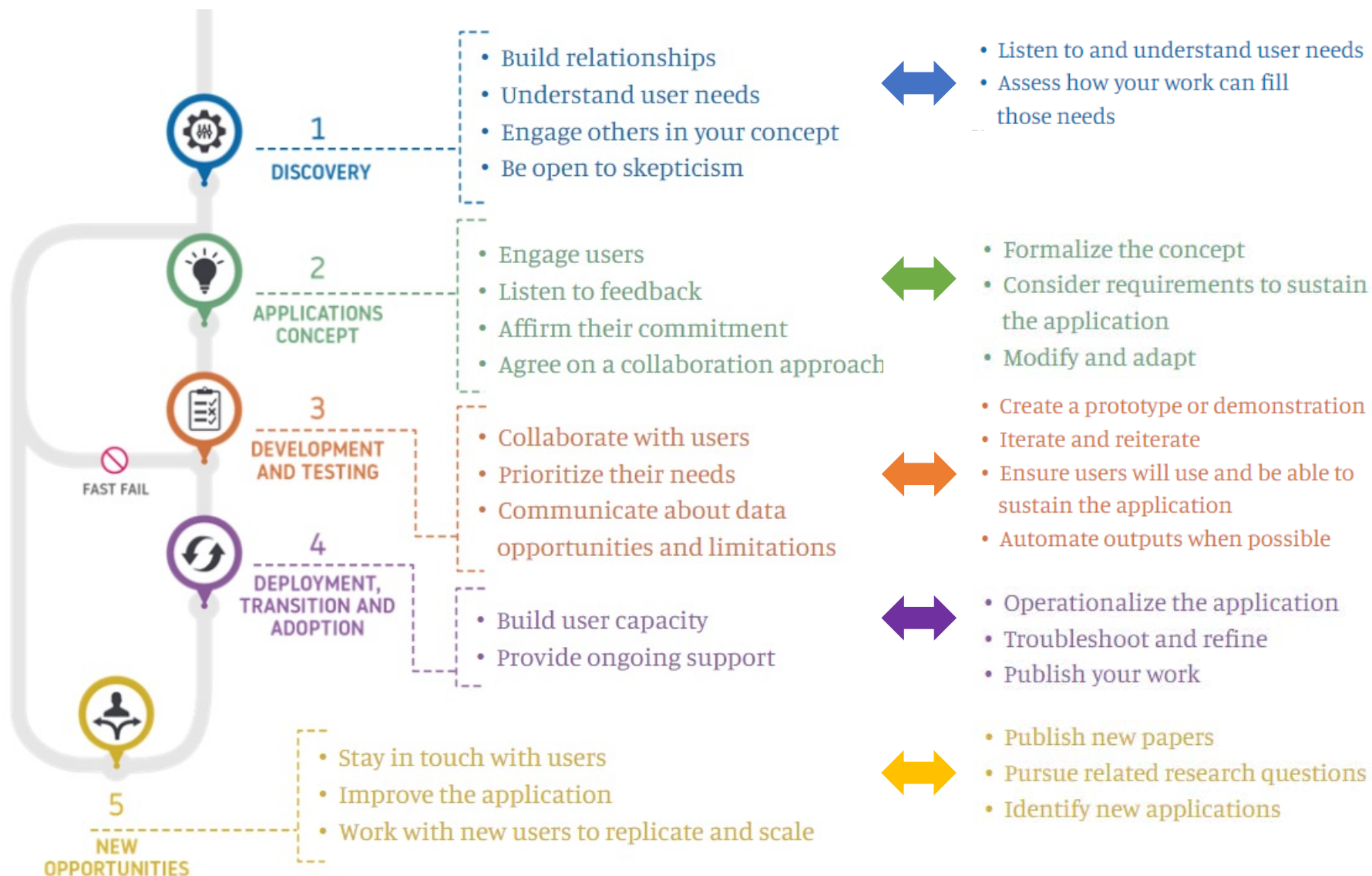
Stakeholders: Oklahoma MESONET Fire Network; Oklahoma Air Quality Division



HYSPLIT 24-h back-trajectories (100–15,000 m) from the North American Model (NAM) at 12-km resolution at Fresno, CA, and Reno, NV, on August 31, 2013, superimposed onto a MODIS Aqua true-color image from NASA World View. MODIS, MODerate Resolution Imaging Spectroradiometer.

Effective user engagement and co-production = more practical, useful, impactful science

What does this look like in practice?



NASA Application Readiness Levels





- OVERVIEW
- COMMUNITY OF PRACTICE
- EARLY ADOPTERS
- GET INVOLVED
- CAPABILITY MATRIX
- TEAM

PACE will benefit society by delivering high-quality observations of **ocean color** and **atmospheric aerosols**. **PACE technologies** are designed to study the earth in new ways and deliver

A key activity is the PACE Applications Program, which engages individuals and groups to use PACE data for their projects. We work with you — scientists, policy makers, public health practitioners, and industry professionals — to apply PACE data to practical societal needs. The goal of the PACE Applications Program is to foster new partnerships and out-of-the-box thinking that will generate inventive solutions that aid society. These efforts support the [NASA Applied Sciences Program](#).

We will strive to effectively transition individuals and groups from being potential users to those who actively employ PACE observations to address environmental issues. Individuals or organizations in both communities can be public or private, federal or regional entities, with local, national, or international scopes for their applications. PACE Applications promotes justice, equity, diversity and inclusion, routine outreach and communication, capacity building, implementing and iterating on feedback, as well as the coordination of diverse

Applications

...tive design and cutting-edge

Quick Links

- [Community of Practice](#) ▶
- [Early Adopters](#) ▶
- [Get Involved](#) ▶
- [Applications Team](#) ▶
- [PACE Community Newsletter \(PDF, 4.6MB\)](#) ▶
- [Applications Plan \(PDF, 1.8MB\)](#) ▶
- [Applications Capability Matrix](#) ▶

Breakout Activity!

You're each working on amazing things. How do you communicate the **IMPACT** of your research?

1. Break into groups of 5. Take turns “pitching” the impact/value of your research to an **environmental manager** (*2mins each*).

Consider:

- What are the manager's goals?
- How does your research impact (positively/negatively) their work?
- How will they “ultimately” apply the output of your research? Directly? Indirectly?

2. Nominate one pitch to share with the class during report-out.

PACE Applications Further Reading

PACE Applications (Community of Practice, Early Adopters, more): <https://pace.oceansciences.org/applications.htm>

PACE Events: <https://pace.oceansciences.org/events.htm>

PACE Early Adopter Program: https://pace.oceansciences.org/app_adopters.htm

Other Helpful Resources

NASA Applied Sciences: <https://appliedsciences.nasa.gov/>

NASA Applied Sciences Applications Guidebook: <https://appliedsciences.nasa.gov/guidebook/>

NASA Resources on Communicating Science:

https://www.nasa.gov/centers/hq/library/find/bibliographies/communicating_science

Alan Alda Center for Communicating Science: <https://aldacenter.org/>

NASA Application Readiness Levels: <https://www.nasa.gov/sites/default/files/files/ExpandedARLDefinitions4813.pdf>

**How can
PACE Applications
help you??**

Stay in touch!

Erin Urquhart & Natasha Sadoff

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<https://pace.gsfc.nasa.gov>