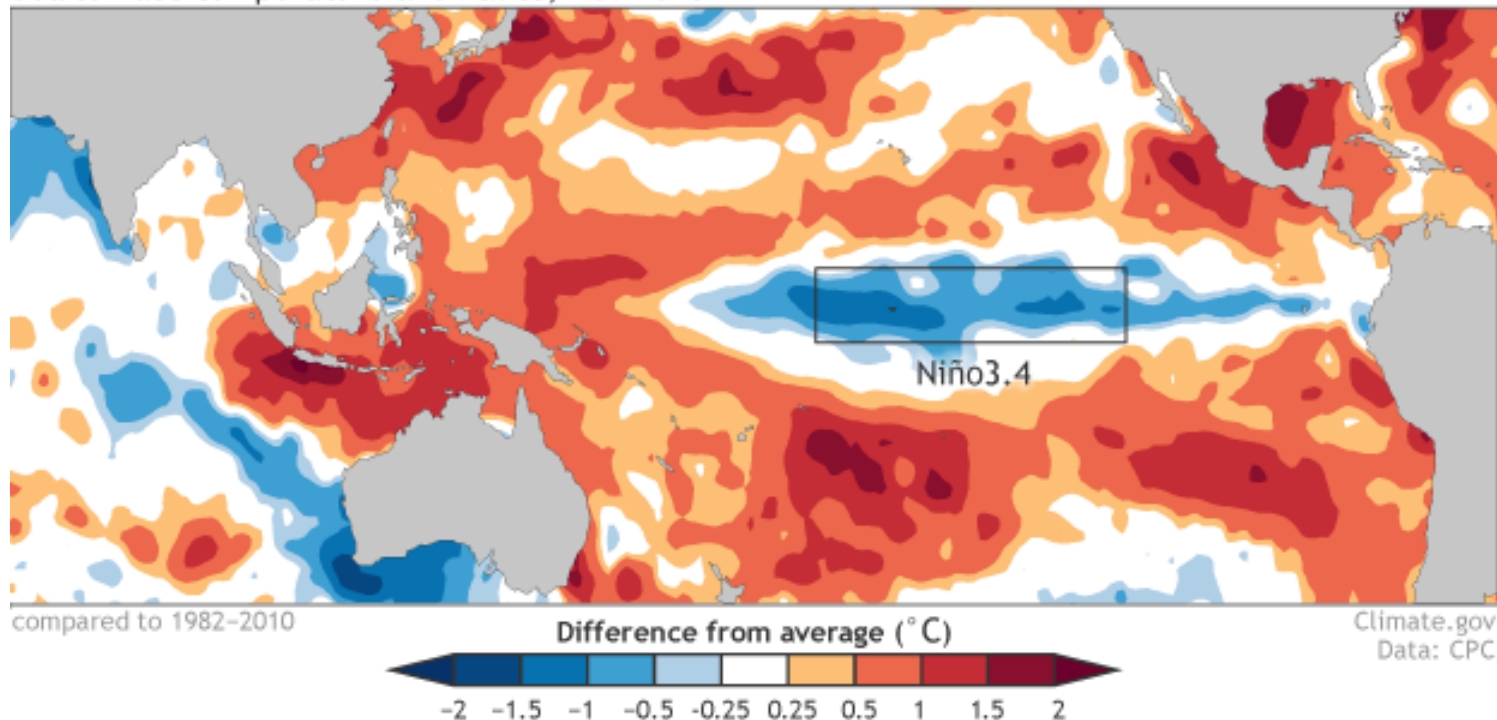


# Collaboration in science research & science communication

Sea surface temperature anomalies, Nov 2016



Stephanie Schollaert Uz, PhD  
PACE Project, Earth Sciences Division  
NASA GSFC (Global Science & Technology Inc.)

# Collaboration in science research



## Multi-decadal variability in tropical Pacific basin-wide chlorophyll from a statistical reconstruction

Stephanie Schollaert Uz<sup>1</sup>, Tony Busalacchi<sup>2</sup>, Tom Smith<sup>3</sup>, Mike Evans<sup>4</sup>, Chris Brown<sup>3</sup>, Eric Hackert<sup>4</sup>

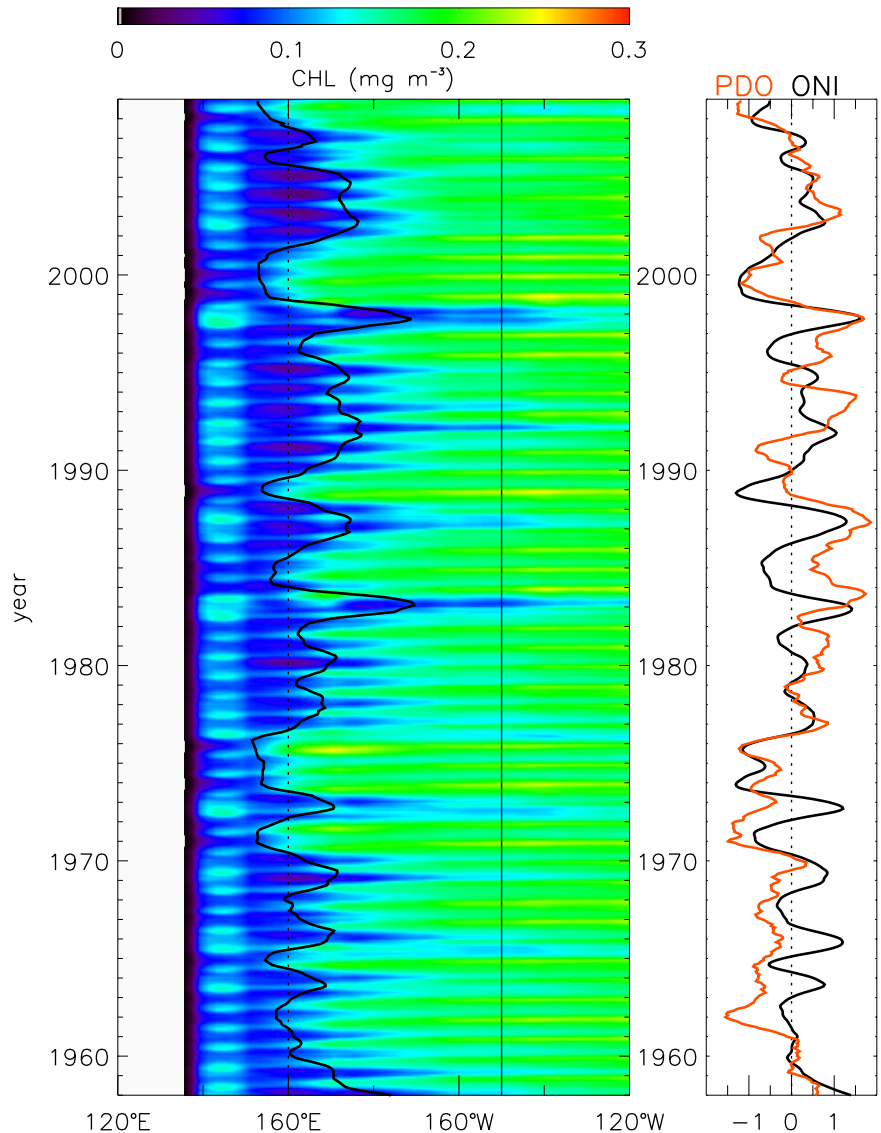
<sup>1</sup>Ocean Ecology Lab, NASA GSFC (GST)

<sup>2</sup>University Corporation for Atmospheric Research

<sup>3</sup>National Oceanic and Atmospheric Administration

<sup>4</sup>University of Maryland at College Park

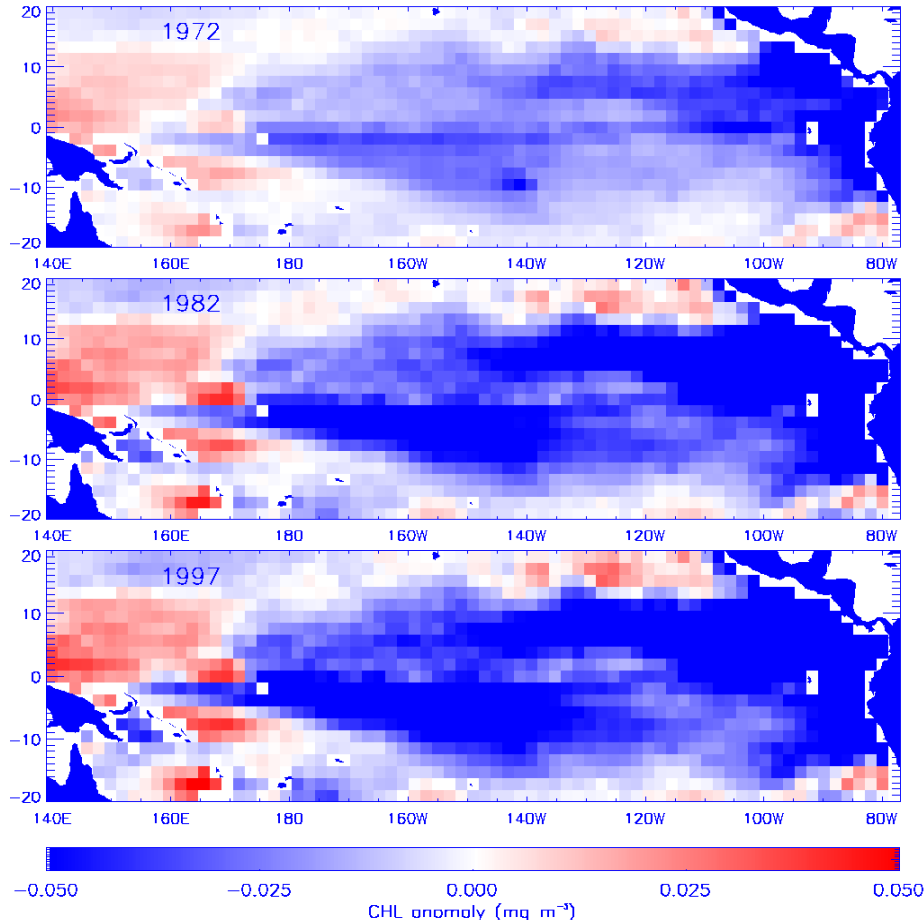
Brings together a team of experts with different skills and ideas.



# Collaboration in science research

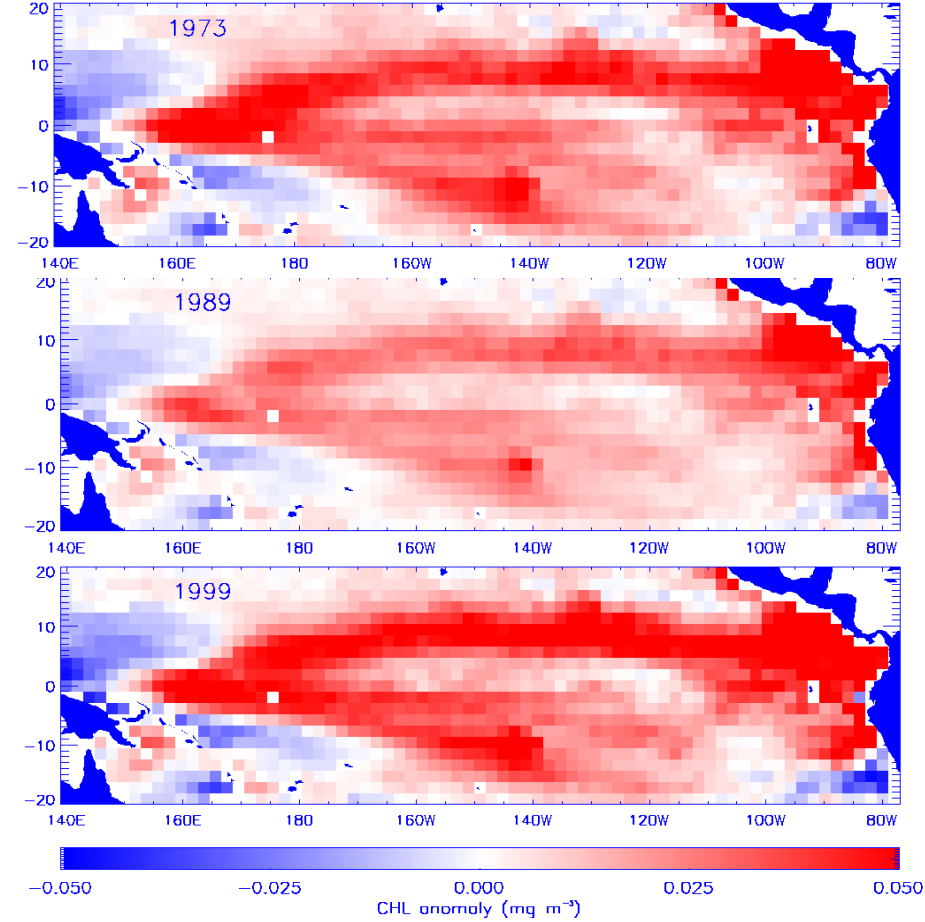
Reference: Schollaert Uz, S., A.J. Busalacchi, T.M. Smith, M.N. Evans, C.W. Brown and E.C. Hackert, In revision, Decadal variability in tropical Pacific basin-wide chlorophyll from a statistical reconstruction: 1958-2008, *J. Climate*.

## El Niños



- weakened easterly trade winds
- less upwelling, biological productivity

## La Niñas



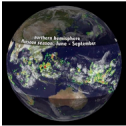
- intensified easterly trade winds
- more upwelling, biological productivity

# Collaboration in science communication

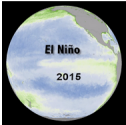


<http://climatebits.org/>

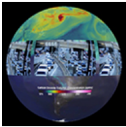
2 min introductory narrated, global visualizations



**Monsoons:** During summer when land heats up, the winds in some tropical areas reverse and bring a large-scale sea breeze and rain over land. [More information](#)



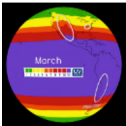
**El Niño:** A change in wind and ocean circulation along the equator in the Pacific that impacts weather patterns around the world and disrupts the marine food web. [More information](#)



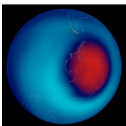
**Carbon Dioxide:** Measurements from the Mauna Loa observatory since 1958 and recent satellite imagery show an annual cycle plus a long-term rise in atmospheric CO<sub>2</sub> levels. [More information](#)



**Fast Carbon, Slow Carbon:** A banana and a chunk of coal are examples of fast and slow carbon cycling between the air and land. [More information](#)

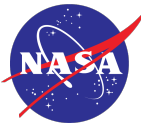


**UV Index:** The strength of ultraviolet radiation received at the surface of the Earth, or UV Index, varies by month, sun angle, clouds, air pollution and land elevation. [More information](#)



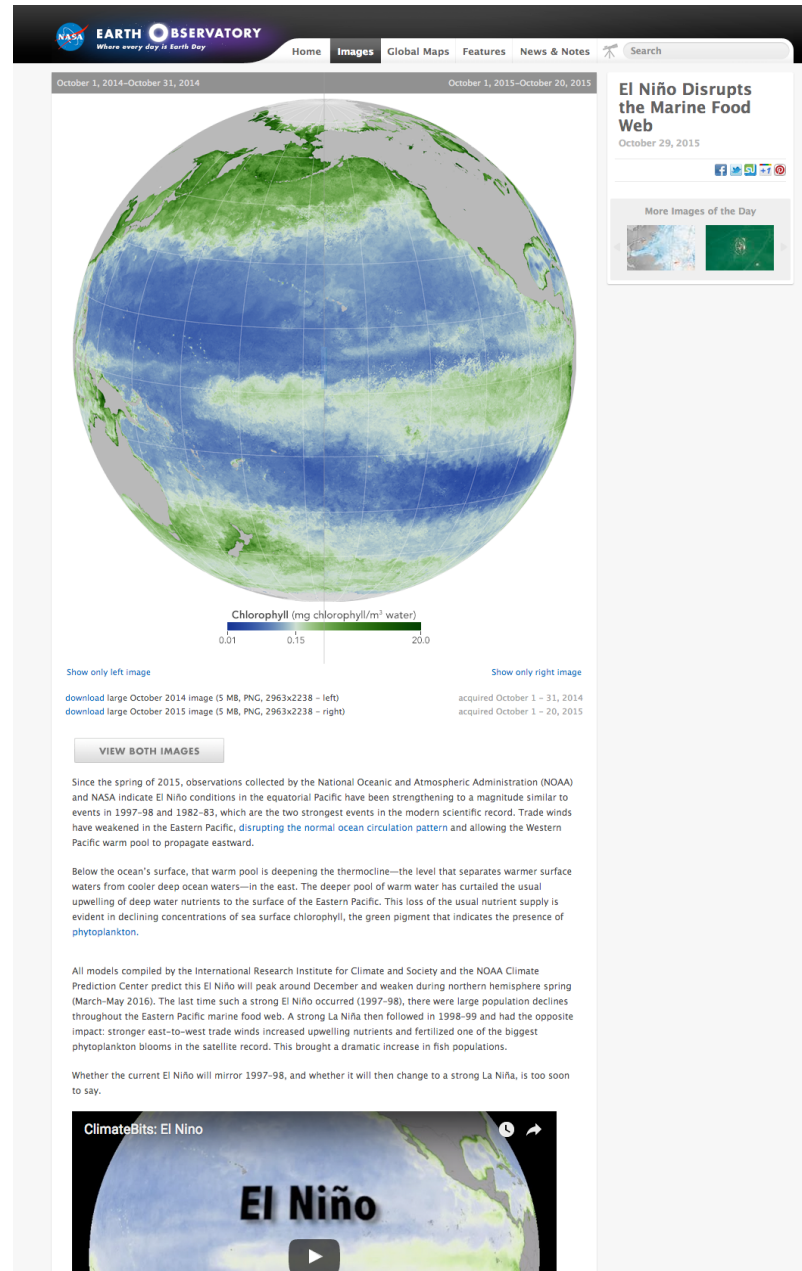
**Ozone Hole:** The annual thinning of the ozone layer above Antarctica is slowly improving, thanks to the Montreal Protocol that limited the use of ozone depleting chemicals. [More information](#)

# Collaboration in science communication



## El Nino ClimateBits on Earth Observatory

- team of science writers
- cutting-edge visualizers
- award-winning website
- large following



## Collaboration in science communication

## NASA Earth Observations for easy-to-access satellite images

**NEO** NASA EARTH OBSERVATIONS

<a href="#">ATMOSPHERE</a>	<a href="#">ENERGY</a>	<a href="#">LAND</a>	<a href="#">LIFE</a>	<a href="#">OCEAN</a>	<a href="#">NEWS</a>	<a href="#">ABOUT</a>	<a href="#">0 IMAGES</a> <a href="#">ANALYZE &gt;</a>
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### WELCOME TO NEO!

**Our Mission**

Our mission is to help you picture climate and environmental changes as they occur on our home planet. Here you can browse and download imagery of satellite data from NASA's constellation of Earth Observing System satellites. [Read more](#)

### BROWSE DATASETS BY CATEGORY

#### Atmosphere

[See All](#)

### NEWS

[See All](#)

Sep 14, 2016

**Analysis Tool Development Update**

A replacement is coming in 2017. [Read more](#)

---

**Java and NEO Analysis**

If you are a user of the analysis tool in NEO, you may have noticed that after you installed the latest Java update the analysis tool no longer

## 50 datasets routinely updated and easily accessible

<http://neo.sci.gsfc.nasa.gov/>

# Collaboration in science communication

PACE Communications Coordination: engage within and outside of the project



**NASA.Ocean**

➤ 4K likes



**@NASAOcean**

➤ 1.7K followers

New [NASA Goddard Space Flight Center](#) satellite mission to study microscopic plant life, airborne particles and clouds. For updates: [NASA Oceans](#), [NASA Earth](#) and [pace.gsfc.nasa.gov](#)



399,847 people reached

**Boost Unavailable**

Like

Comment

Share



Jariya Suriyong, Mary Barlow and 105 others

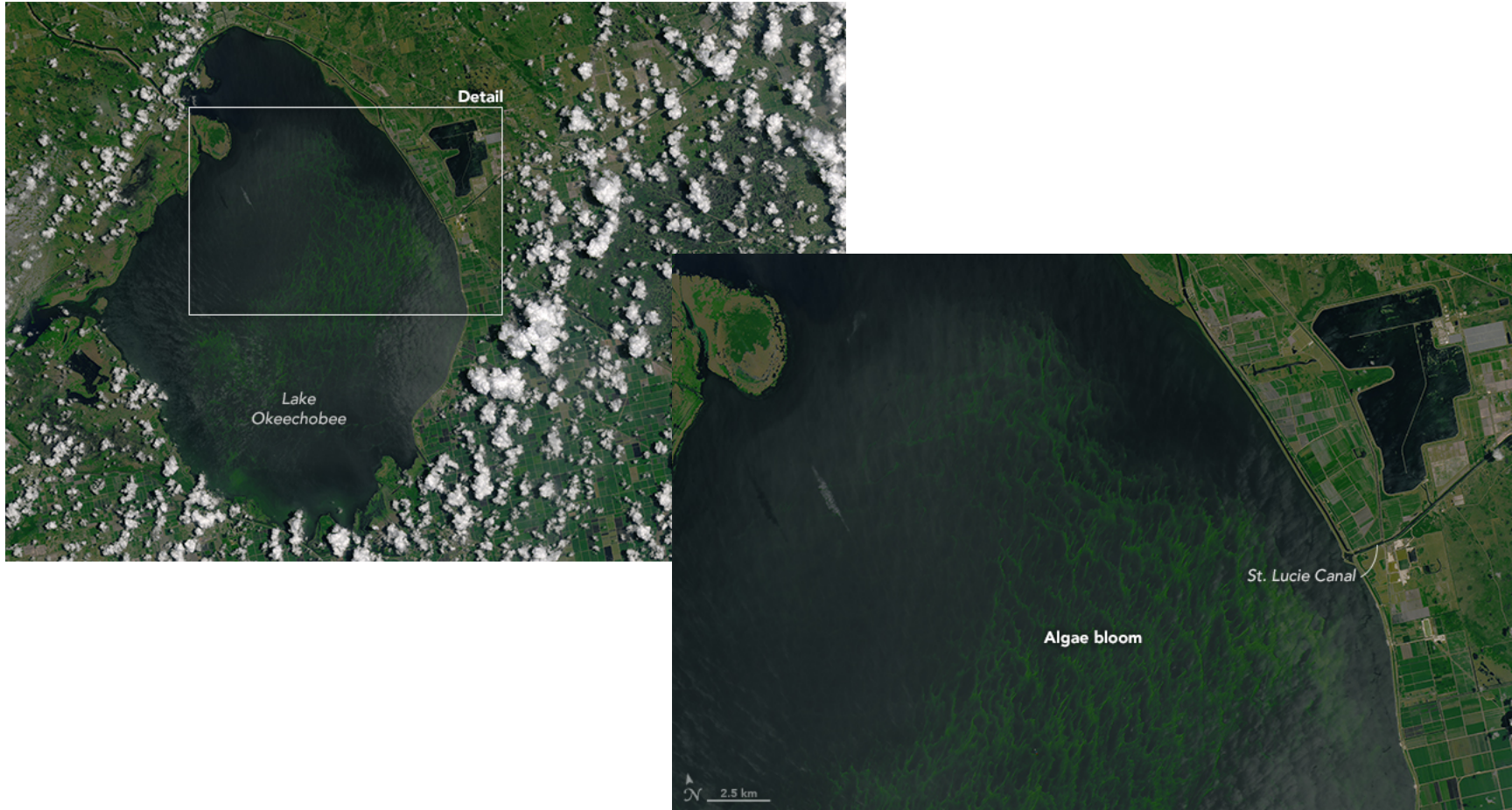
Chronological ▾

181 shares

# Collaboration in science communication



PACE Communications Coordination: engage within and outside of the project



Viewing phytoplankton communities from space leads to more accurate local monitoring and enables society to plan and prepare for disruptions.

# Upcoming collaboration in science research

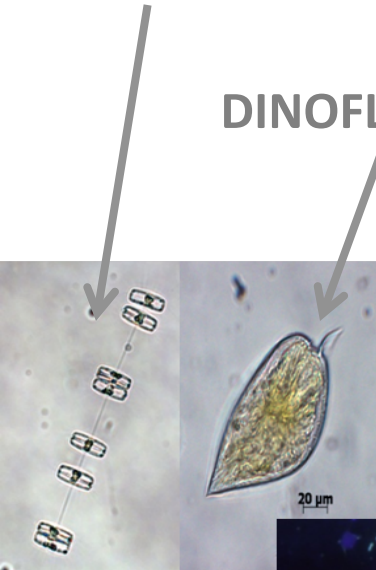


## PHYTOPLANKTON

Many shapes, colors and sizes..

Those traits define their role in ocean carbon cycle

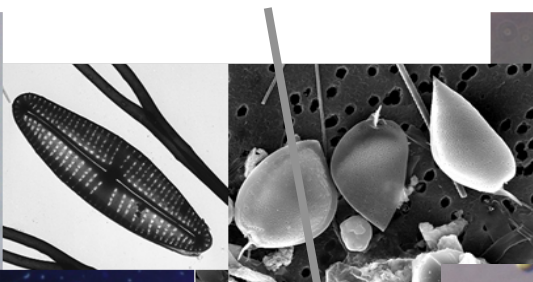
DIATOM



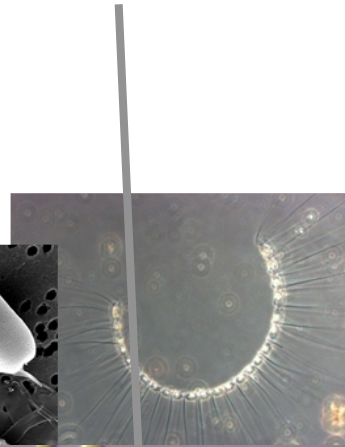
DINOFLAGELLATE



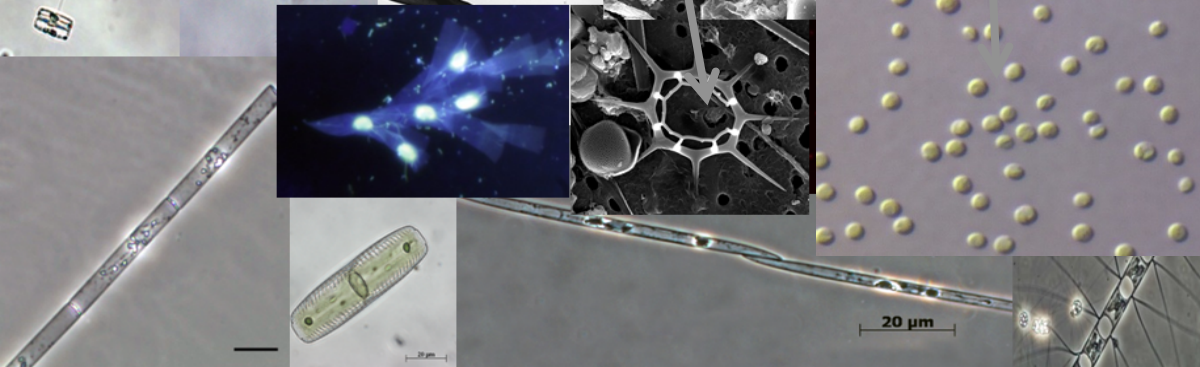
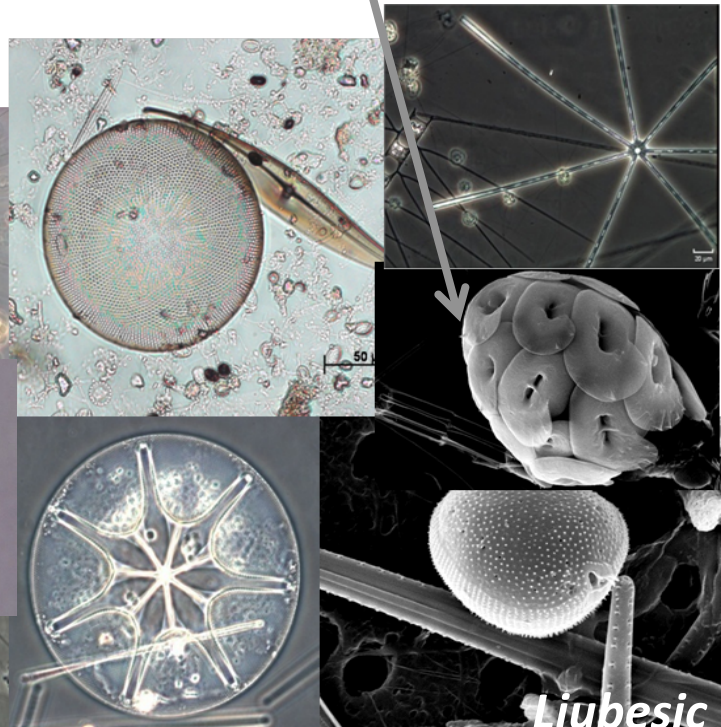
SILICOFLAGELLATE



PICOEUKARYOTES



COCCOLITHOPHORE



# Upcoming collaboration in science research



## Expedition to investigate ocean particles from sea to space

A month-long campaign across the Pacific on the *R/V Falkor* will monitor the diversity of oceanic phytoplankton, microscopic plant-like organisms, and their impact on the marine carbon cycle. Novel measurements will be compared to satellite observations and used in the formulation of the upcoming Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) mission.

# Upcoming collaboration in science research



*R/V Falkor* expedition to investigate ocean particles from sea to space



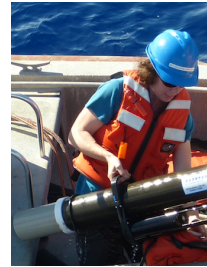
**Chief scientist: Ivona Cetinic**  
**NASA Goddard (USRA)**

phytoplankton ecologist, improving phytoplankton diversity estimates from space with in-situ optical measurements and water samples.



**Wayne Slade**  
**Sequoia Scientific, Inc.**

oceanographer and engineer, develops technology to characterize particle sizes in the ocean.



**Meg Estapa**  
**Skidmore College**

biogeochemical oceanographer, uses sediment traps, in situ optical sensors and satellite data to study the ocean's biological carbon pump.



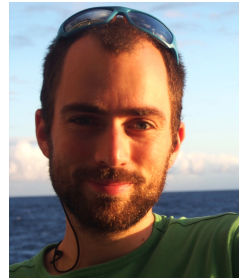
**Antonio Mannino**  
**NASA Goddard**

PACE Deputy Project Scientist (Ocean), uses in situ sensors and satellite data to study particulate and dissolved organic carbon.



**Stephanie Schollaert Uz**  
**NASA Goddard (GST)**

physical oceanographer, exploring the response of biology to wind and ocean forcing; coordinating communication for PACE.



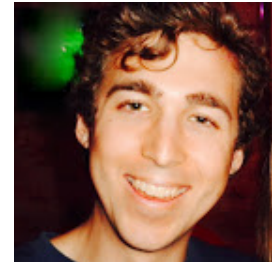
**Hugo Berthelot**  
**Université de Bretagne Occidentale**

measures the carbon and nitrogen uptake rates by plankton to study the influence of different communities on the ecosystem dynamics.



**Benjamin Knorlein**  
**Brown University**

uses holographic microscopy to extract phytoplankton data using high-performance computers.



**Noah Walcutt**  
**University of Rhode Island**

measures carbon export from the surface ocean to the mesopelagic through in situ imaging to monitor particulate sinking

# Upcoming collaboration in science research

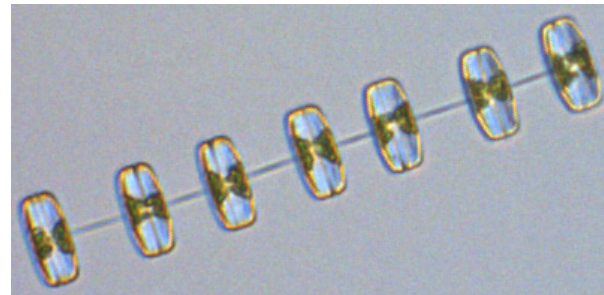


**Learn more about the expedition!**

**Dec 6 webinar – teaser (5 min)**

**Jan 17 webinar – Chief Scientist Ivona Cetinic (10 min)**

**Feb shipboard webinar (45 min) – date and time TBD**



# Summary



- **Collaboration within your group, interdisciplinary, interagency and/or international**
- **Can increase the breadth and depth of the science research**
- **Good collaboration: mutual respect, curiosity about a problem and contributions that advance the science**
- **Bad collaboration: stuck, uninspired, too focused on limitations, incompatible personalities**
- **Importance of communication, both within a project and externally (presenting at science meetings, writing up papers, press conferences, social media outlets) and the benefit of science writers, visualizers, producers.**