Education and Public Participation
Value to the Science Community and Vice Versa
CERES Education and Communication

Science Communications and Education

**Education Team**
Lin Chambers, Lead
Ann Martin, Evaluator

Focus: CAN Award Education Components
- S’COOL/GLOBE Integration
  - Sarah McCrea
  - Support: Tina Rogerson
- GLOBE at Langley
  - Tina Harte
  - Support: Preston Lewis, Sarah McCrea
- MY NASA DATA
  - Preston Lewis
  - Support: Tina Harte, Daniel Oostra, Penny Oots

Continuing Mission Related Education Support
- CERES
  - Lin Chambers
- CALIPSO
  - Jessica Taylor
- SAGE III on ISS
  - Kristyn Damadeo
- TEMPO
  - Margaret Pippin
- DISCOVER/KORUS-AQ
  - Amber Richards
  - Lin Chambers

*Additional Support from Translators Personnel (Camelia Dellar) and ASDC Personnel

Communications Team

Denise Lineberry
Aimee Amin
Jim Closs
Jay Madigan
Tim Marvel
Changes in the NASA Education and Communication Model

- Starting in 2015, Missions are no longer required to set aside 1% of funding for mission-specific education efforts.
- Instead, Cooperative Agreements for thematic educational content and activities were awarded in late 2015.
- Missions can still set aside funds for communications or fund additional education as needed.
- Full SMD Education awardee list: http://www.nasa.gov/feature/list-of-science-education-partners-for-nasa-stem-agreements

Slide Credit: Jessica Taylor and Dr. Todd Ellis, CALIPSO Science team Meeting 2016
What Continues under New Plan?

- **Communications**
  - Earth Right Now
  - Earth Observatory
  - Science Visualization Studio

- **Education**
  - Funded Projects from 2015 CAN Awards
  - The GLOBE Program
  - MY NASA DATA
  - S’COOL
  - Office of Education Efforts: NIFS, Educator Professional Development, STEM Engagement activities, and Outreach Events
New Communication Priorities

**NASA Communications**

**Agency Communications Priorities**

- **Earth Right Now.** Your planet is changing. We're on it. #EarthRightNow
  NASA's fleet of satellites, its airborne missions and researchers address some of the critical challenges facing our planet today and in the future: climate change, sea level rise, freshwater resources, and extreme weather events.

- **ISS.** Off the Earth, for the Earth. #ISS
  The International Space Station is a blueprint for global cooperation and scientific advancements, a destination for growing a commercial marketplace in low-Earth orbit, and a test bed for demonstrating new technologies. The space station is the springboard to NASA's next great leap in exploration, including future missions to an asteroid and Mars.

- **Mars.** Join us on the journey. #JourneytoMars
  We are on a journey to Mars. Today our robotic scientific explorers are blazing the trail. Together, humans and robotics will pioneer the next giant leap in exploration.

- **Technology.** Technology drives exploration. #NASATech
  We develop, test and fly transformative capabilities and cutting edge exploration technologies. Our technology development provides the onramp for new ideas, maturing them from early stage through flight and giving wings to the innovation economy.

- **Aeronautics.** NASA is with you when you fly. #FlyNASA
  Every U.S. aircraft and air traffic control tower uses NASA-developed technology. We're committed to transforming aviation by reducing its environmental impact, maintaining safety, and revolutionizing aircraft shapes and propulsion.

- **Solar System and Beyond.** NASA: We're Out There. #NASABeyond
  NASA's exploration spans the universe. Observing the sun and its effects on Earth. Delving deep into our solar system. Looking beyond to worlds around other stars. Probing the mysterious structures and origins of our universe. Everywhere imaginable, NASA is out there.

*Slide Credit: Jessica Taylor and Dr. Todd Ellis, CALIPSO Science team Meeting 2016*
Science Directorate Education Scope

Focus on providing many opportunities to involve educators (formal/informal), reaching students and the citizen science community, in real world science.

The SD EPO Team...
- Collaborates with the education community to bring authentic Earth science practices and real-world data into the classroom.
- Provides Learners with unique NASA experiences, engaging activities, and advanced technology.
- Provides products developed and reviewed by science and education experts.

Our goals include inspiring the next generation of Science, Technology, Engineering and Mathematics (STEM) professionals and improving STEM literacy by providing innovative participation pathways for educators, formal and informal, to reach students and the public.
If you don’t collect a data point now, you will never be able to collect it again
MY NASA DATA Over the Year
MY NASA DATA What’s Next

Moving Forward...

- NESEC asset for multiple applications to get NSAS Earth Science into the hands of Educators and Students.

- Collaboration with Intel ISEF and the Creation of the NASA Earth System Science Award Criteria

- Mission Earth partnership, vertically integrating NASA assets and resources across grade band and developing an effective educator professional development model.
S’COOL & GLOBE Collaboration

Insights from S’COOL Participant Educators

In the summer of 2015, S’COOL conducted in-depth one-on-one interviews with educators who participate in the S’COOL Project alone or with The GLOBE Program. The small number of interviewees ensured NASA compliance with the Paperwork Reduction Act, and also enabled collection of deep, rich qualitative data from respondents. Teachers represented primarily elementary and middle school classrooms, the key grade bands for which S’COOL heavily aligns with curriculum and standards. Educator input and feedback may serve as a helpful guide as S’COOL and GLOBE work together in the future.

Teachers recognize the value of GLOBE and the new opportunities that it will bring to S’COOL, but hope to maintain S’COOL’s unique strengths (which are particularly relevant at elementary levels).

Teachers perceive that:

• S’COOL is a smaller, simpler, more focused program that is a very strong fit for elementary grade bands, in terms of both curriculum standards and prerequisite student skills.
• The advantages of S’COOL include an accessible, helpful team that provides one-on-one assistance; ideal alignment between cloud observation activities and the elementary/middle school curriculum; and the ROVER citizen scientist pathway.

• GLOBE is a larger, more complex program with a rigorous protocol approach that is a better fit for older students.
• The advantages of GLOBE include a larger, worldwide presence; the ability to observe mid-day; data access and visualization tools; inclusion of other parameters beyond clouds; and the ability for students to log in to the site separately from their teachers.

Teachers are concerned that:

• The changing relationship between S’COOL and GLOBE may cause some confusion among S’COOL participant teachers who are not already familiar with GLOBE.
• S’COOL’s content that supports learning (including teacher implementation tips, lesson plans, and activities) may be difficult to find or access within the GLOBE structure.

Teachers suggest that:

• Both programs could benefit from a “Venn diagram” approach where S’COOL maintains its strengths and approach but incorporates the advantages of GLOBE, listed above.
Moving Forward...

- **S’COOL integration into the GLOBE Program**
  - Formal application: Updated Cloud Observation Protocol, NEW hard copy materials, training slides, online data input, communication to internal and external GLOBE community, training opportunities around NEW cloud protocol
  - Informal application: Clouds is the first protocol translated to the GLOBE Observer APP, designed to extend GLOBE’s audience and participation

- **Mission Earth partnership, vertically integrating NASA assets and resources across grade band and developing an effective educator professional development model.**
CERES, Engaging Educators, Students and Public Learners for the past 19 years

You can Observer
You can Analyze
You can Be A Scientist
The Value of Science

There is value in Science/Science Community Participation in Education and Public Engagement!
Research shows that students benefit greatly from being involved in scientific inquiry, because they model the actual scientific process and they are more engaged in the learning environment.

Students learn how to collect data, interpret data, analyze data, think about the data and what might have affected the data, and present their data.
Science Communication

- Why should you care about being a good science communicator?
  - Advancement of Science (Audience: Scientists)
  - $$$ (Audience: Scientists and Science Leadership)
  - $$$ (Audience: Congress & the Public)
  - Inspiring Other to Care about Science (Audience: Public & Students)

*Slide Credit: Jessica Taylor and Dr. Todd Ellis, CALIPSO Science team Meeting 2016*
What’s Next Knowing Your Audience

- We often are asked to give public talks, but if you’ve done these, you know that it’s very different than a science team talk

- We are available as a resource to help you tailor your talk for your audience, and to hone your message points

*Slide Credit: Jessica Taylor and Dr. Todd Ellis, CALIPSO Science team Meeting 2016*
Knowing Your Audience

- Communicating your science is your responsibility.
- Think about the take away first. Imagine that your audience asks “So What?” at the end, and design your talk backwards from there.
- Tell a story: Think about the character, setting, conflict, plot, theme [http://users.aber.ac.uk/jpm/ellsa/ellsa_elements.html](http://users.aber.ac.uk/jpm/ellsa/ellsa_elements.html).
- Don’t use jargon.
- Share challenges and rewards.
- Talk about your career path: Working hard and growth, team work, valuable courses, when did you “know” what you wanted to do, are there opportunities for internships.
1. Make personal connections to dispel stereotypes.
2. Use positive messaging to show how STEM makes the world a better place.
3. Share your passion.
4. Make it hands-on and interactive.
5. Foster a growth mindset and perseverance.
6. Show the way: offer resources and guidance.
7. Follow-up and invite feedback.
Many schools in the U.S. are adopting or considering the Framework for K-12 Science Education (which underpins the Next Gen Science Standards)

One aspect of this framework is the Process of Science

Science & Engineering Practices for K-12

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information
Knowing Your Audience: Education

- It is important to share your process:
  - How did you decide to study this question?
  - How did you figure out this was a testable hypothesis?
  - When did you decide you knew something worth sharing with others?
  - What did presenting your research/feedback from others tell you about your results?

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Resources

- OASIS Resources Catalog or contact the SD Education team:
  - Hardcopy Handouts
  - Activity Kits
  - Table Demonstrations
  - Presentation Content
  - Web resources
Why is observing, studying, and monitoring clouds important?
How You Can Share Your Science Story!

- Collaborate with the SD Education Team throughout the year
  - GLOBE Integration Home Page Videos
  - NWA Conference 9/2016, Weather Fest and Technical Talks
  - Professional Development
  - Research
  - Etc...
Thank YOU!

We are here to help support your efforts!  

sdepo@lists.nasa.gov

Sarah McCrea  
Sarah.mccrea@nasa.gov