THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine
Division on Engineering and Physical Sciences

Space Studies Board
Board on Science Education

Sharing the Adventure with the Student: Exploring the Intersections of NASA Space Science and Education - A Workshop

December 2-3, 2014
National Academy of Sciences Building, Auditorium
2101 Constitution Ave NW, Washington DC

Tuesday, December 2, 2014

7:30 am	**Registration Opens**	
8:30 am	**Welcome and Introduction** *Outlining the Goals of the Workshop*	**Michael Moloney** *SSB Director* **Committee Co-Chairs:** **Phil Christensen** *Arizona State University* **Brett Moulding** *Utah Partnership for Effective Science Teaching and Learning*
8:40 am	**Welcome from NASA**	**Kristen Erickson** *NASA SMD*
8:50 am	**Introduction to the Keynote Speaker**	
8:55 am	**Keynote Presentation:** *Sharing the Adventure with the Student:* *How do Authentic Experiences Reach Students* *Interaction with the audience*	**John Mather** *NASA GSFC* *(35 minutes)* *(20 minutes)*
9:50 am	**Setting the Stage** **Discussion Panel: NASA Education Forum Leads** **Laura Peticolas**, *University of California, Berkeley* **Theresa Schwerin,** *Institute for Global Environmental Strategies* **Stephanie Shipp,** *Lunar and Planetary Institute* **Denise Smith,** *Space Science Telescope Institute*	*(40 minutes)*
10:30 am	**Coffee Break**	

11:00 am **SESSION 1: A New Vision for K-12 Science and Engineering Education and NASA SMD Education**

Moderator: Brett Moulding, *Utah Partnership for Effective Science Teaching and Learning*

Guiding Questions and Focus:

- Present an overview of NGSS and the role of NASA in supporting science and engineering education.
- How can/does NASA interact effectively with the education system to support K-12 science and engineering education?
- What opportunities does NASA SMD have to better support the new vision described in the NRC's *A Framework for K-12 Science Education*?
- How can/does NASA integrate the science and engineering talent of NASA SMD into the SMD education programs?

Keynote Presentation: *(30 minutes)*
Stephen Pruitt, *Achieve*

Panel Discussion: *(20 minutes)*

Maya Garcia, *Office of the State Superintendent of Education D.C.*
John Ristvey, *University Corporation for Atmospheric Research*
Holly Ryer, *Space Telescope Science Institute*
Sam Shaw, *South Dakota Department of Education*

Audience Joins the Discussion *(20 minutes)*

12:15 pm **Lunch Provided in the Great Hall**

1:30 pm **SESSION 2: Space Science Education Curriculum and Materials**

Moderator: Richard McCray, *NAS, University of California, Berkeley*

Guiding Questions and Focus:

- How do the instructional strategies advocated for in the NASA education programs match the Vision for Science Education described in the NRC Framework for K-12 Science Education?
- How can NASA best encourage and support teachers to use NASA education resources in the classroom?
- What is the mechanism by which NASA education programs' instructional content material will be aligned to the Framework and NGSS?
- How will NASA programs measure how well NASA EPO materials align to the NGSS?
- Information technology is changing the way science is done (data mining and simulations, for example) – what new possibilities does this development raise for the science classroom?

Keynote Presentation: *(30 minutes)*
Edna DeVore, *SETI Institute*
Bringing Space Down to Earth and into the Classroom

Panel Discussion: *(25 minutes)*

Beth Johnston, *Principal at Endeavour Elementary School*
Mordecai Mac Low, *American Museum of Natural History, Columbia*
Cassandra Soeffing, *Institute for Global Environmental Strategies*
Belinda Wilkes, *Chandra X-Ray Center*

Audience Joins the Discussion *(35 minutes)*

3:00 pm **Coffee Break**

3:30 pm **SESSION 3: Collaboration Among NASA SMD and K-12 Districts, Schools, and Teachers**

Moderator: Mitchell Nathan, *University of Wisconsin- Madison*

Guiding Questions and Focus:

- What are institutional arrangements that provide effective platforms for facilitating successful collaborations?
- How are evidence-based models for successful collaborations or partnerships being communicated across NASA education programs?
- How are proven models or strategies for scaling up and sustaining collaborations and partnerships being used in the NASA education programs?
- What are the barriers to accomplishing common goals across collaborating organizations? How can these barriers be overcome?

Keynote Presentation: *(20 minutes)*
Gordon Kingsley, *Georgia Tech*
Building the STEM Partnership Toolkit: Choosing Your Spots Carefully, Measuring Twice, and Finding Your Spanner When You Need It

Poster Session: *(45 minutes)*

Nancy Ali
Space Sciences Lab
Lindsay Bartolone
Southwest Research Institute
Lin Chambers
NASA Langley Research Center
Troy Cline
NASA GSFC
Anita Davis
Sigma Space
Bonnie Eisenhamer
Space Telescope Science Institute
Dorian Janney
NASA GSFC
Andrea Jones
Planetary Science Institute
Sheri Klug-Boonstra
Arizona State University
Keliann LaConte
Lunar and Planetary Institute
Kathleen Lestition
Chandra X-Ray Center
Nancy Maryboy and David Begay
Indigenous Education Institute
Tony Murphy
Globe
Luisa Rebull
Spitzer Science Center
Daniella Scalice
NASA Ames Research Center

Panel Discussion: *(25 minutes)*

Kathryn Flanagan, *Space Telescope Science Institute*
James Lochner, *Universities Space Research Association*
Michelle Thaller, *NASA GSFC*

Audience Joins the Discussion *(30 minutes)*

5:30 pm **Adjourn for the day**

5:30 - 7:30 pm **Reception in the Great Hall**
All workshop participants are welcome

Wednesday, December 3, 2014

8:00 am **Registration Opens**

9:00 am **Welcome** — **Committee Co-Chairs**
Summary of Day 1 — **Phil Christensen**, **Brett Moulding**

9:15 am **SESSION 4: Supporting Science and Engineering Teachers through Professional Development**

Moderator: Albert Byers, *National Science Teachers Association*

Guiding Questions and Focus:
- How are standards for professional development used in NASA professional development programs?
- How do the mechanisms and programs by which NASA programs meet the needs of in-service teachers, and how does this differ from the ways NASA programs meet the needs of pre-service teachers?
- What are the most effective and widely used delivery models (online, train the trainers, professional learning communities, summer seminars, internships) for NASA professional development programs?
- What are example strategies for partnering scientists and educators?

Keynote Presentation: *(30 minutes)*
Bill Penuel, *University of Colorado, Boulder*

Panel Discussion: *(25 minutes)*
Annette DeCharon, *University of Maine*
Sheri Klug-Boonstra, *Arizona State University*
Mariel Milano, *Orange County Public Schools, Florida*

Audience Joins the Discussion *(35 minutes)*

10:45 am **Coffee Break**

11:15 am **SESSION 5: Part 1 – Evaluation of Education**

Moderator: Theresa Schwerin, *Institute for Global Environmental Strategies*

Guiding Questions and Focus:
- What are current leading theories of STEM education evaluation (e.g., evidence-based, logic models)?
- Selecting the most appropriate assessment(s) for a given situation is a common challenge across education evaluation. What are leading factors or best practices that you recommend in selecting the most appropriate assessment(s) for a given situation?

- The goal of many STEM-related professional development efforts is to facilitate a change or increase in teacher effectiveness that in turn increases student learning. Additionally many efforts aspire to increase students' awareness/interest in STEM careers or students' desire to pursue more STEM-related coursework during high school and college. These impacts are sometimes challenging to capture as part of an evaluation. What are some methods or data that might shed light on these often elusive goals?
- What can we realistically measure? What can't we?
- What are the attributes of the evaluation tools that are consistent with effective evaluation of education programs?

Keynote Presentation: *(45 minutes)*
Steve Schneider, *WestEd*
Making the Right Choices: How to Get the Most Value out of eVALUation!

12:00 pm **Lunch provided in the Great Hall**

1:15 pm **SESSION 5: Part 2 – Evaluation in Practice within NASA SMD**

Moderator: Theresa Schwerin, *Institute for Global Environmental Strategies*

Guiding Questions and Focus:
- Why and how does NASA evaluate the programs it executes?
- What are examples of evidence that the evaluation of NASA's programs is providing useful information to improve the programs?
- How does NASA make a difference in STEM education, and how is this known?
- What are the greatest challenges or barriers that people have encountered related to SMD education evaluation? What strategies have been used or recommended for addressing these barriers?
- How does the evaluation of NASA programs compare to the model presented for education by the speaker in Part 1 of this session?
- What is the mechanism by which the results of evaluation change NASA education programs?

Keynote Presentation: *(20 minutes)*
Hilarie Davis, *TLC Inc.*
Using Evaluation to Increase and Measure the Impact of Education

Panel Discussion: *(25 minutes)*
Bonnie Eisenhamer, *Space Telescope Science Institute*
Jenny Gutbezahl, *Brandeis University*
Frances Lawrenz, *University of Minnesota*

Audience Joins the Discussion *(30 minutes)*

2:30 pm **SESSION 6: Enabling Actions**

Moderator: James Manning, *Education Consultant*

Engage the audience in breakout groups related to each of the previous sessions.

Instructions *(5 minutes)*
Discussion/Breakout Groups Meet *(40 minutes)*

Breakout 1: Aligning to Standards

- What actions can NASA take to build upon, leverage, and/or expand its current efforts to align to and support the new vision described in the NRC's *A Framework for K-12 Science Education*, NGSS, and other standards initiatives?
- What new opportunities can be explored, and what challenges need to be overcome?

Breakout 2: Curriculum Support Resources

- What actions can NASA take to build upon, leverage, and/or expand its current efforts to translate its science into curriculum support materials and resources for formal and informal education and encourage educator use?
- What new opportunities can be explored, and what challenges need to be overcome?

Breakout 3: Collaborations

- What actions can NASA take to build upon, leverage, and/or expand its current collaborations among scientists, teachers, and formal and informal education institutions?
- What new opportunities can be explored, and what challenges need to be overcome?

Breakout 4: Professional Development

- What actions can NASA take to build upon, leverage, and/or expand its current efforts to provide professional development support to pre-service and in-service teachers and informal educators?
- What new opportunities can be explored, and what challenges need to be overcome?

Breakout 5: Evaluation

- What actions can NASA take to build upon, leverage, and/or expand its current efforts in measuring and assessing its impact in science and engineering education?
- What new opportunities can be explored, and what challenges need to be overcome?

3:15 pm **Coffee Break**

3:30 pm	**SESSION 6: Enabling Actions Continued**	
	Moderator: James Manning, *Education Consultant*	
	Reporting of Group Discussions	*(10 minutes per group, 5 minutes for questions)*
4:45 pm	**Summary and Wrap Up**	**Committee Co-Chairs** **Phil Christensen** **Brett Moulding**
5:00 pm	**Adjourn**	