

The National Academies of
SCIENCES • ENGINEERING • MEDICINE
National Academies of Sciences, Engineering, and Medicine Symposium on Assessing
Hard-to-Measure Cognitive, Intrapersonal and Interpersonal Competencies

December 16, 2015
National Academy of Sciences Building, Room 120
2101 Constitution Avenue, NW,
Washington, DC, 20418
DRAFT Agenda 12-3-15

Tuesday, December 15

4:30-6:30 pm Reception at NAS Building West Court
(for arriving participants and members of the committee on assessing competencies)

Wednesday, December 16

NAS 120 (main room)

NAS Members Room (overflow room)

8:30-9:15 Welcome and Introductions

- *Heidi Schweingruber, Director, Board on Science Education*
- *Joan Ferrini-Mundy, Assistant Director for Education and Human Resources, National Science Foundation (NSF)*

9:15-10:30 Session 1: Exploring the Relationships of Cognitive, Intrapersonal and Interpersonal Competencies to STEM Learning and Persistence

Moderator: *Susan Singer, NSF Division of Undergraduate Education*

- *Christine Massey, University of Pennsylvania*
-Reflections on *Education for Life and Work*
- *Gale Sinatra, University of Southern California*
-The role of motivation and emotion in teaching and learning about controversial topics
- *Joan Herman, CRESST, UCLA*
-Reflections on *Assessing 21st Century Skills: A Workshop Summary*
-Overview of Study on Assessing Intrapersonal and Interpersonal Competencies
- Questions, Discussion

10:30-10:45 Break

10:45-12:00 Session 2: Defining and Assessing Competencies

Moderator: *Gregg Solomon, NSF Division of Research on Learning*

Developing Definitions and Assessment Methods

- **Patrick Kyllonen, ETS**
 - Preliminary taxonomy of competencies from *Education for Life and Work*
 - Aligning Competency Types with Measurement Methods

A Research and Development Agenda and a Repository of Instruments

- **Brian Stecher and Laura Hamilton, RAND**

12:00-1:00 **Lunch**

1:00-2:30 Session 3: Funder Interest and Activity in Assessing Competencies

Moderator: Joan Herman, CRESST, UCLA

NSF Research Support: Findings from the NSF Portfolio Review

- **Susan Singer, NSF Division of Undergraduate Education**
- **Evan Heit, NSF Division of Research on Learning**

Other Funders' Research Support: Findings from the Funder Landscape survey.

- **Marc Chun, The William and Flora Hewlett Foundation**

Institute of Educational Sciences Research Support: Portfolio Overview

- **Thomas Brock, Institute of Education Sciences, U.S. Department of Education**

National Institute of Child Health and Development Research Support

- **James Griffin, Child Development and Behavior Branch, National Institute for Child Health and Human Development**

2:30-2:45 **Break** (move to parallel sessions at end of break)

2:45-4:45 Session 4: A Sampling of NSF Projects (audience attends parallel sessions)

2:45-3:45 Parallel Panel Sessions

Panel 1: Gender, Diversity, and Competencies in STEM Pathways, Board Room

Moderator: Margaret Hilton, Board on Science Education

Speaker	NSF Award Title and Abstract
Jennifer Cromley, University of Illinois	A multimethod approach to understanding dropout from STEM gateway courses http://www.nsf.gov/awardsearch/showAward?AWD_ID=0814901&HistoricalAwards=false
Tabbye Chavous, University of Michigan	Race and gender in context: A multi-method of study of risk and resilience in african american college students' pathways in STEM areas http://www.nsf.gov/awardsearch/showAward?AWD_ID=1008327
Nicole Else-Quest,	Gender-ethnic identification and the development of STEM

<i>U. of MD Baltimore County</i>	achievement behaviors https://www.nsf.gov/awardsearch/showAward?AWD_ID=1153678&HistoricalAwards=false
<i>Elsa Villa, University of Texas, El Paso</i>	Latinas in computer science and engineering: A qualitative study examining identity and agency for resilience and persistence http://www.nsf.gov/awardsearch/showAward?AWD_ID=1232447
<i>Joanna Wolfe, Carnegie Mellon University</i>	Uncovering tacit knowledge about gender, communication and interpersonal interactions in engineering http://www.nsf.gov/awardsearch/showAward?AWD_ID=1262274&HistoricalAwards=false
<i>Eric Deemer, Purdue University</i>	The mediating role of stereotype threat and achievement goals in the regulation of scientific motivation http://www.nsf.gov/awardsearch/showAward?AWD_ID=1331962
<i>Bianca Bernstein, Arizona State University</i>	Enhanced resilience training for STEM women in an interactive, multimodal, web-based environment http://www.nsf.gov/awardsearch/showAward?AWD_ID=0910384

Panel 2: Measuring Key Competencies, Room 120

Moderator: *Gül E. Kremer, NSF Division of Undergraduate Education*

Speaker	NSF Award Title and Abstract
<i>Shihong Huang, Florida Atlantic University</i>	Transforming the understanding, assessment and prediction of teamwork effectiveness in software engineering education using machine learning http://www.nsf.gov/awardsearch/showAward?AWD_ID=1140191
<i>Amy Grack Nelson, Science Museum of Minnesota</i>	Collaboration in the 21 st century: Measuring essential skills for the STEM workforce http://nsf.gov/awardsearch/showAward?AWD_ID=1335883
<i>Kenn Barron, James Madison University</i>	Validating a rapid measure of student motivation: Using the expectancy-value theory of motivation to understand student achievement and interest in STEM classrooms http://www.nsf.gov/awardsearch/showAward?AWD_ID=1228661&HistoricalAwards=false
<i>Andrew Krumm, SRI</i>	Developing community and capacity to measure noncognitive factors in digital learning environments http://www.nsf.gov/awardsearch/showAward?AWD_ID=1338487
<i>Ana Luz Porzecanski, American Museum of Natural History</i>	Developing and assessing process skills in conservation biology and other integrative fields http://www.nsf.gov/awardsearch/showAward?AWD_ID=0942789
<i>Barry Stein, Tennessee Technological University</i>	Expanding use of the CAT: Assessing and Improving Critical Thinking http://www.nsf.gov/awardsearch/showAward?AWD_ID=1022789

Panel 3: Collaboration and Communication Competencies, Members' Room

Moderator: *Brian Stecher, RAND*

Speaker	NSF Award Title and Abstract
<i>Julie Cwikla, University of Southern Mississippi</i>	Early fraction learning: Links with prosociality and self and other perspective taking http://www.nsf.gov/awardsearch/showAward?AWD_ID=1262281&HistoricalAwards=false
<i>Danielle McNamara, Arizona State University</i>	Modeling social interaction and STEM learning http://www.nsf.gov/awardsearch/showAward?AWD_ID=1418378
<i>Bradley Barker, University of Nebraska-Lincoln</i>	National robotics in 4-H: Workforce skills for the 21 st century http://www.nsf.gov/awardsearch/showAward?AWD_ID=0833403
<i>Paul Horwitz, Concord Consortium</i>	Teaching teamwork: Electronics instruction in a collaborative environment http://www.nsf.gov/awardsearch/showAward?AWD_ID=1400545
<i>Matthew Ohland, Purdue University</i>	Optimizing student team skill development using evidence-based strategies http://www.nsf.gov/awardsearch/showAward?AWD_ID=1431694
<i>Charles Wallace, Michigan Technological University</i>	Agile communicators: Preparing students for communication-intensive software development through inquiry, critique and reflection http://www.nsf.gov/awardsearch/showAward?AWD_ID=1504860

Panel 4: Key Intrapersonal Competencies (e.g., motivation, mindsets), Room 250

Moderator: *Heidi Schweingruber, Board on Science Education*

Speaker	NSF Award Title and Abstract
<i>Sheri Berkeley, George Mason University</i>	Self-regulation of science learning in the context of educational game creation: A study of middle school students with learning disabilities http://www.nsf.gov/awardsearch/showAward?AWD_ID=1420448
<i>Xueli Wang, University of Wisconsin</i>	Expanding STEM talent through upward transfer: Factors influencing transfer in STEM fields of study from two-year to four-year institutions (including motivational beliefs) http://nsf.gov/awardsearch/showAward?AWD_ID=1430642
<i>Xiaodong Lin, Teachers College, Columbia University</i>	Developing students' growth mindsets to promote science learning (K-12) http://www.nsf.gov/awardsearch/showAward?AWD_ID=124

	7283&HistoricalAwards=false
<i>Lee Shumow, Northern Illinois University</i>	Incremental mindset and utility for science learning and engagement (I-MUScLE): A quasi-experimental study of the impacts of targeted classroom treatments (K-12)
<i>Barbara Schneider, Michigan State University</i>	An international study of student engagement: An EAGER grant http://www.nsf.gov/awardsearch/showAward?AWD_ID=1450756
<i>Ming-Te Wang, University of Pittsburgh</i>	Assessing Student Engagement in Math and Science in Middle School: Classroom, Family, and Peer Effects on Engagement http://nsf.gov/awardsearch/showAward?AWD_ID=1315943

3:45-4:30 Small Group Discussions, Same 4 Rooms —3 to 4 small groups in each room led by pairs of panel speakers

4:30 Break (return to plenary room at end of break)

4:45-5:30 Session 5: Next Steps, Room 120 (main room) **Members Room** (overflow)
Moderator: Christine Massey, University of Pennsylvania

-Reflections on the Day: Key themes and unanswered questions

Fred Oswald, Rice University

Tabbye Chavous, University of Michigan

-Questions and reflections from the audience

-Plans for Moving Forward

5:30 Adjourn Symposium