

BUILDING THE KNOWLEDGE BASE OF TEACHER LEARNING IN STEM EDUCATION

AGENDA

Day 1, Sunday, November 8, 2009

- 12:00–6:00 PM** **Registration** **UPPER LOBBY**
- 12:00–5:30** **Rooms available for groups to reserve for meetings with program officers and PI-led discussions** (*Sign up at the registration table.*)
- 1:00–2:00** **Luncheon for CADRE Fellows – By Invitation Only** (*Nominating PIs welcome*)
SOUTH AMERICAN A & B
Welcome: *Spud Bradley, DR-K12 Cluster Coordinator, National Science Foundation; Barbara Brauner Berns, Director, Center for Science Education, Education Development Center, Inc.*
- 2:00–5:30** **Poster Set-up** (*for TPC and IMD awardees only*) **CONGRESSIONAL & SENATE**
- 2:30–4:30** **CADRE ELL Working Group** **STATLER B**
- 2:30–4:30** **Nuts & Bolts Session** **FEDERAL A & B**
Presenter: *David Campbell, Program Director, and Kim Bub, Grant Specialist, National Science Foundation*
NSF program officers will guide new PIs through the basic components and practical aspects of leading a DR-K12 project.
- 6:00–7:30** **Dinner Meeting** **PRESIDENTIAL BALLROOM**
Welcome: *Spud Bradley, DR-K12 Cluster Coordinator, National Science Foundation; Barbara Brauner Berns, Director, Center for Science Education, Education Development Center, Inc.*
Introductory Remarks: *Joan Ferrini-Mundy, Executive Officer (Acting), Education and Human Resources, National Science Foundation*
Speaker: *Wanda Ward, Assistant Director (Acting) for Education and Human Resources, National Science Foundation*
Wanda Ward will welcome DR-K12 PIs and guests, and focus on the important work of their project teams. She will discuss the role of DR-K12 in Education and Human Resources (EHR), particularly in relation to the portfolio’s contributions to the overarching EHR themes.
- 7:30–8:30** **Poster Session** (*featuring posters from TPC/IMD awardees*) **CONGRESSIONAL & SENATE**
Dessert Reception
Informal Networking
- 8:30–9:00** **Poster Clean-up**

Meeting Agenda

Day 2, Monday, November 9, 2009

7:00–9:30 AM **Registration** UPPER LOBBY
Informal Networking
Rooms available for groups to reserve for meetings with program officers and PI-led discussions.
(Sign up at the registration table.)

7:30–9:00 **Poster Set-up** (for DR-K12 awardees funded in 2009) CONGRESSIONAL & SENATE

8:00–9:30 **Dissemination Session: Bridging to Practice** FEDERAL B
This working session will explore strategies for increasing the likelihood that resources, models, and technologies will be successfully disseminated to practitioners and discuss options for future dissemination activities under the CADRE umbrella.

8:30–9:30 **Working Breakfast** FOYER I & 2, MEETING ROOM HALLWAY
SIGs and an opportunity for informal networking.

SPECIAL INTEREST GROUPS

Algebra K-12 Facilitators: Paul Goldenberg, Al Cuoco, Education Development Center, Inc.
SOUTH AMERICAN B

Participants will discuss current research and development on algebra, map a future research agenda, and establish an ongoing group.

Gaming Facilitator: Douglas Clark, Vanderbilt University NEW YORK ROOM

In an effort to begin connecting researchers across disciplines and contexts who are involved in gaming, this SIG will give the group the opportunity to learn about each other's research.

Learning Science in Informal Environments Facilitator: Sue Allen, Exploratorium and National Science Foundation MASSACHUSETTS ROOM

The group will discuss NRC's report, *Learning Science in Informal Environments: People, Places, and Pursuits*, and how learning in formal and informal environments can support each other.

Recruitment and Retention Facilitators: Susan Jansen Varnum and Judith Stull OHIO ROOM

The goals of this SIG will be to broaden and deepen participants' understanding of recruitment and retention issues and to forge new collaborative relationships.

Social Networking Facilitator: Kimberly Lightle, Ohio State University CALIFORNIA ROOM

The group will discuss current research and practice in educational social networks and questions in this area that still need to be answered.

9:30–11:00 **Interactive Plenary Presentation: Theories of Teacher Learning**
PRESIDENTIAL BALLROOM

Speaker: Suzanne Wilson, Chair, Department of Teacher Education, Michigan State University

In this interactive talk, Wilson will ask each project to make explicit its assumptions about how teachers learn, the forces that matter the most, and how the logic and components of programs reflect those underlying assumptions. Wilson will then consider that array of assumptions in light of relevant scholarship on teaching quality and teacher learning.

11:00–11:15 **Break** CONGRESSIONAL FOYER

11:15–12:15 **Poster Session** (featuring posters from DR-K12 awardees funded in 2009)
CONGRESSIONAL & SENATE

12:15–12:30 PM **Poster Clean-up**

Meeting Agenda

12:30–1:30

Working Luncheon *PRESIDENTIAL BALLROOM, FOYER 1 & 2, MEETING ROOM HALLWAY*
SIGs and an opportunity to meet with DRL program officers.

SPECIAL INTEREST GROUPS

Designed Curriculum in the 21st Century *Facilitator: Jacqueline S. Miller, Education Development Center, Inc.* **NEW YORK ROOM**

The group will revisit the questions raised during last year's session "Designed Curriculum in the Cyber-Age" and address what we have learned.

Discourse and Language *Facilitators: Betina Andrea Zolkower, City University of New York; Elizabeth de Freitas, Adelphi University* **MASSACHUSETTS ROOM**

Participants will discuss questions about communication, discourse, language, interaction, and text in relation to research on teaching/learning, teacher preparation and training, and instructional design.

Early Childhood Education *Facilitator: Karen Worth, Education Development Center, Inc.* **OHIO ROOM**

This meeting will provide an opportunity for participants to discuss their work in early childhood education (pre-K–2) and strategies for ongoing networking and future meetings.

Roles of Technology in STEM Teaching and Learning *Facilitator: Andee Rubin, TERC, Inc.* **FEDERAL B**

Participants will discuss the growing roles of technology in STEM teaching and learning, with a particular focus on the potential for technology to support teacher in their jobs.

Working in Diverse Contexts *Facilitator: Sharon S. Nelson-Barber, WestEd* **CALIFORNIA ROOM**

Participants are asked to share data, questions, and/or dilemmas that arise from the particular sociocultural context of their work.

1:45–3:00

CONCURRENT SESSIONS

Integrating Innovative Technologies in Inquiry Science: Professional Development for Teachers and the Impacts on Teacher and Student Learning *Marcia Linn, University of California at Berkeley; Chad Dorsey, Concord Consortium; Kelly Ryoo, and Libby Gerard, University of California at Berkeley* **FEDERAL A**

This session presents results from four studies investigating professional development support for teachers' use of innovative technologies in inquiry science and the impacts of support on learning.

Mathematics Teachers Teaching English Language Learners: What Knowledge Do They Need? *Mark Driscoll, Education Development Center, Inc.; Dan Heck, Horizon Research, Inc.; Kathryn Chval, University of Missouri* **MASSACHUSETTS ROOM**

Mathematics teachers of English language learners (ELLs) are increasingly expected to help ELLs learn academic language. This session focuses on the question, What knowledge do teachers of mathematics need in order to support the learning of ELLs?

MechAnimations! Designing Mechanical Linkages that Animate Stories

Gary Benenson, City College of New York; Richard Lehrer, Vanderbilt University **OHIO ROOM**

Following a hands-on experience in mechanism design, participants discuss the knowledge of content, pedagogy, and student thinking needed to support similar experiences for children.

Professional Learning Communities in STEM Teaching *Kathleen Fulton, National Commission on Teaching and America's Future; Ted Britton, WestEd* **CALIFORNIA ROOM**

In this session, participants discuss knowledge synthesis in process regarding STEM teachers' participation in professional learning communities: What have we learned and what are the implications for other NSF projects?

Teacher Quality, Quality Teaching, and Student Outcomes: Measuring the Relationships *Heather Hill, Harvard University* **SOUTH AMERICAN A & B**

Many assume that better-quality teachers will lead to improvements in the quality of teaching and, thus, student outcomes. Over the past decade, a program has been developed of research around measuring key components of mathematical teacher quality and the mathematical quality of teaching. This session describes the efforts to develop these measures.

The Role of the Institutional Setting in Teachers' Development of Ambitious Instruction in Middle School Mathematics *Kara Jackson, Paul Cobb, and Kristin McGraner, Vanderbilt University* **NEW YORK ROOM**

Three DR-K12 projects report findings on aspects of the institutional setting of teaching that affects teachers' development of ambitious instructional practices in middle-school mathematics.

Understanding the Fidelity of Implementation and Scalability of Mathematics Professional Development Curricula *Babette Moeller and Lynn Goldsmith, Education Development Center, Inc.; Hilda Borko, Stanford University; Jennifer Jacobs, University of Colorado; Nanette Seago, WestEd* **FEDERAL B**

Three DR-K12 projects investigating the implementation of mathematics professional development programs by district-based facilitators discuss with participants their approaches to assessing fidelity and preliminary findings.

Using Teaching Routines with Classroom Network Technology to Support Improved Classroom Assessment *Bill Pennel, Patricia Schank, and Tina Stanford, SRI International* **PAN AMERICAN**

This interactive workshop introduces participants to teaching routines for use with a classroom network technology called Group Scribbles, which supports teachers' invention of classroom assessment activities in Earth science.

What Knowledge Mediates Teachers' Appropriation of High Leverage Practices?

Jennifer Cartier, University of Pittsburgh; Leslie Lancaster, Vanderbilt University **STATLER B**

This session presents an instrument for measuring preservice elementary teachers' application of instructional planning practices and discusses the relationship between these practices and teachers' knowledge.

Rooms available for groups to reserve for meetings. (Sign up at the registration table.)

3:00–3:15

Break **FOYER 2, MEETING ROOM HALLWAY**

3:15–4:30

CONCURRENT SESSIONS

A Framework and Suite of Adaptable Instruments for Examining Fidelity of Implementation *Jeanne Century, University of Chicago* **FEDERAL A**

This session describes a suite of instruments for measuring implementation of instructional materials and ways those instruments have been adapted to other materials and interventions.

Designing Powerful Digital Environments for Professional Development

Cathy Fosnot, Mathematics in the City **MASSACHUSETTS ROOM**

Professional development environments that include digital video allow for the examination of children at work, opportunities to look at students over time, and analysis of the teacher's decision making. This observation begs the question of how best to shape mathematics education courses that build on the use of digital environments. This session examines some possibilities for developing both content and pedagogical knowledge.

Meeting Agenda

Effective Science Teaching for English Language Learners *Trish Stoddart, Marco Bravo, and Jorge Solis, University of California at Santa Cruz* CALIFORNIA ROOM
This session describes the design, implementation, and preliminary findings of the ESTELL project focusing on preparing preservice teachers to teach science to English language learners.

Looking for PCK in All the Wrong Places *Janet Carlson and Joe Taylor, BSCS* NEW YORK ROOM
This interactive session examines the different data sources for evidence of PCK in biology teachers involved in professional development experiences linked to educative curriculum materials.

Target Inquiry: Transforming In-Service Teacher Professional Development and Instruction in High School Chemistry *Ellen Yezierski and Deborah Herrington, Grand Valley State University* FEDERAL B
This session presents results of a four-year longitudinal, mixed-methods study showing how Target Inquiry affects teacher beliefs, transforms teacher practice, and increases student achievement.

Tipping Points: A System of Tools and Routines to Support Expert-Like Practice in Early Career Teachers *Jessica Thompson and Mark Windschitl, University of Washington* OHIO ROOM
Presenters share outcomes of a research-based, tool-supported system of induction created to advance novice teachers' capacity to scaffold students' construction of evidence and explanation.

Unpacking Core Teaching Practices in Elementary Mathematics to Support Teacher Learning and Assessment *Timothy Boerst, Pamela Moss, and Merrie Blunk, University of Michigan* PAN AMERICAN
In this session, participants explore analytical language developed to “unpack” core practices in mathematics teaching (e.g., leading discussion) when guiding teacher learning and supporting assessment across contexts.

Using Distance Video Technologies in Research on In-Service Teacher Development *Charles Matthews and James Shymansky, University of Missouri at St. Louis* SOUTH AMERICAN B
This session presents strategies for delivering professional development via interactive television and using videos collected remotely as a data source.

Rooms available for groups to reserve for meetings. (Sign up at the registration table.)

- 4:30–5:30** **Poster Set-up** *(for DR-K12 awardees funded in 2007 & 2008)* PRESIDENTIAL BALLROOM, CONGRESSIONAL & SENATE
- 5:30–6:30** **Poster Session** *(featuring DR-K12 awardees funded in 2007 & 2008)* PRESIDENTIAL BALLROOM, CONGRESSIONAL & SENATE
Reception *(light refreshments served)*
- 6:30–7:00** **Poster Clean-up**
- 6:30** **Dinner on Your Own** *(For those interested, EDC will organize dinner gatherings for new DR-K12 grantees and Fellows.)*
CADRE Assessment Working Group Dinner NEW YORK ROOM

Day 3, Tuesday, November 10, 2009

- 7:30–8:30 AM** **Working Breakfast** **PRESIDENTIAL BALLROOM**
An opportunity to meet with DRL program officers.
- 7:30 AM–2:00 PM** **Rooms available for groups to reserve for meetings with program officers and PI-led discussions** (*Sign up at the registration table.*)
- 8:30–9:30** **Plenary Presentation: *The Opportunity Equation: Transforming Mathematics and Science Education for Citizenship and the Global Economy***
PRESIDENTIAL BALLROOM
Speaker: *Michele Cahill, Vice President, National Programs, and Program Director, Urban Education, Carnegie Corporation of New York*
Cahill discusses the Carnegie-Institute for Advanced Study Commission on Mathematics and Science Education’s recent report in which they challenge the nation to mobilize for coordinated action so that all students—not just a select few, or those fortunate enough to attend certain schools—achieve much higher levels of math and science learning.
- 9:30–10:30** **Panel: *The Opportunity Equation: Implications of Standards*** **PRESIDENTIAL BALLROOM**
Moderator: *Joan Ferrini-Mundy, Executive Officer (Acting), Education and Human Resources, National Science Foundation*
Science Panelist: *Nancy Songer, Professor of Science Education and Learning Technologies at University of Michigan*
Engineering and Technology Panelist: *Christian Schunn, Associate Professor of Psychology, Department of Psychology, University of Pittsburgh*
Mathematics Panelist: *Richard Millman, Director, Center for Education Integrating Science, Mathematics & Computing (CEISM), Georgia Institute of Technology*
Following Cahill’s presentation, the panelists—representing various STEM disciplines—will share their perspectives on the development, implementation, and support of common standards. Panelists will be available in Statler A & B for roundtable discussions by discipline during the next concurrent sessions time block.
- 10:45–12:00** **CONCURRENT SESSIONS**
Assessing the Learning in Cyberlearning: Supporting Teachers with Technology-Embedded Assessment *Kimberle Koile and Paul Horwitz, Concord Consortium; Doug Clark, Vanderbilt University; Diane Jass Ketelhut, Temple University* **SOUTH AMERICAN A & B**
In this session, the presenters discuss findings and experiences regarding technology-embedded assessment and how to support teachers in using it effectively.
- A Successful Professional Development Model for Preparing Teachers to Use Reform-Based Curriculum Effectively** *Lee Ann Sutherland and Joseph Krajcik, University of Michigan* **MASSACHUSETTS ROOM**
In this session, participants experience a PD model that successfully encourages teachers to adopt a curriculum’s underlying philosophy rather than simply to enact it as sequence of activities.
- Content Mentoring of Middle Grades Math and Science Teachers and Its Impact on Teaching Efficacy: Establishing and Nurturing Effective Partnerships among University Faculty, Public School Administrators, and Classroom Teachers** *David Boger, Jane Davis, and Robin Guill Liles, North Carolina A&T State University* **PAN AMERICAN**
This session describes one NSF experimental study’s strategies used to establish and nurture successful, interdisciplinary partnerships among university faculty, public school administrators, and classroom teachers.

Design Patterns: Creating Evidence-centered Assessment Tasks *Britte Cheng, SRI International; Robert Mislery, University of Maryland* **FEDERAL B**

This session describes an interdisciplinary design methodology and design patterns for improving the validity of inferences about the performance of students on science assessments.

Exploring the Impact of No Child Left Behind (NCLB) Accountability Pressures on Instructional Practices in Urban School Science Classrooms: Conceptual and Theoretical Considerations *Obed Norman, Morgan State University* **NEW YORK ROOM**

NCLB defines success exclusively as test scores, fostering strategies that compromise substantive learning. This session focuses on conceptual and theoretical frameworks for exploring this issue.

Formative Assessment Delivery System (FADS) and Uses for Teachers in Curriculum Development *Mark Wilson, University of California at Berkeley; Kathleen Scalise, University of Oregon* **FEDERAL A**

This presentation shares new tools—with feedback and automated scoring—that make it easy for teachers to engage in high-quality formative assessment for their classrooms.

Project Instrument Development—What We Have Learned: Implications for Differentiated Professional Development *Mary Hobbs and Amy Moreland, University of Texas at Austin* **CALIFORNIA ROOM**

The session summarizes the results of research identifying pivotal experiences of career science teachers and suggests implications and applications for professional development delivery.

Standards: Continuing Conversations *Richard Millman, Georgia Institute of Technology; Christian Schunn, University of Pittsburgh; Nancy Songer, University of Michigan* **STATLER A & B**

Join the panelists from the plenary presentation to continue conversations about common standards in each of the STEM disciplines.

Teaching Mathematics; Teaching Students; Teaching Mathematics to Students: Teachers' Trajectories toward Mathematical Knowledge for Teaching

Patrick Thompson and Christina Miller, Arizona State University **OHIO ROOM**

This session considers teachers' transitions from teacher-centered mathematics to student-centered mathematics, including issues of meaning, coherence, and learnability, as well as the importance of working with colleagues.

Rooms available for groups to reserve for meetings. (Sign up at the registration table.)

12:15–2:00 PM

Working Lunch **PRESIDENTIAL BALLROOM**

Plenary Presentation: *Connecting the Measurement and Improvement of Teaching to Teaching Quality* (*Synthesis of Research on Teacher Learning*)

Speaker: *Courtney Bell, Associate Research Scientist, ETS, Learning and Teaching Research Group*

Given the current policy pressure to improve teaching quality, in this closing session, Bell will consider three evidentiary sources that might be used to judge teaching quality. After reviewing the strength of the validity evidence for observational protocols, artifact protocols, and instructional collections, Bell will consider the ways in which researchers and developers might shape their work so that it both responds to and reshapes the current policy pressure.

Concluding Remarks: *Joan Ferrini-Mundy, Executive Officer (Acting), Education and Human Resources, National Science Foundation*

2:00–2:30

Evaluation and Adjourn