



# Community for Advancing Discovery Research in Education

## 2012 CADRE ADVISORY BOARD

(DR K-12 Resource Network)

### Advisory Board Charge

The Advisory Board of the Community for Advancing Discovery Research in Education (CADRE) provides visionary and innovative guidance to the CADRE Leadership Team as it supports projects focused on new STEM education resources, models, and tools. The board members offer their perspectives on CADRE's strategic plan, engage in conversations about promoting the DR K–12 portfolio, and help to define new ways of supporting the DR K–12 program. Generally, board members will assume roles as provocateurs as well as respondents to the Leadership Team's concerns in specific areas in order to meet CADRE's mission. The Board consists of up to 10 individuals from public and private sectors—some who have been DR K–12 principal investigators—demonstrating expertise in areas including, but not limited to, research methodology, innovations in teacher education, curriculum development, cyberlearning/technology, and STEM education. CADRE organizes one in-person group meeting per year, provides updates on CADRE activities, shares important CADRE products such as reports, and provides compensation for board member time.

### 2012 CADRE PI Meeting Advisor Bios

#### John (Spud) Bradley\*

*Retired from the National Science Foundation*

John S. (Spud) Bradley is retired and living in Indian Land, SC, near Charlotte, NC. Current activities include volunteer work, woodworking, tennis, and bicycling. Bradley retired from the National Science Foundation, where he was a program director and administrator in the Education and Human Resources Directorate for approximately 20 years, ending in September 2011. His work involved the development and execution, coordination, and oversight of programs in science, mathematics, and technology for the preK–12 education system. These programs supported the development of instructional materials, professional development for teachers, and doctoral education for professionals in science, mathematics, and technology education.

Prior to the experience in K–12 education at the NSF, Bradley spent three years as an associate executive director of the American Mathematical Society, work that included the establishment of the society's Washington office. Bradley's earlier career was in the Department of Mathematics at the University of Tennessee in Knoxville. He began as an assistant professor in 1964; taught, conducted research, and directed doctoral students in ordinary differential equations; rose through the ranks to professor; and served as department head from 1980 until 1989. Other teaching and research experiences were at the University of Southern Mississippi, George Peabody College, and the University of Dundee, Scotland, during a sabbatical year. He received his BS degree in Mathematics at the University of Southern Mississippi, his MA in Mathematics Education at George Peabody College (now part of Vanderbilt University), and his PhD in Mathematics at the University of Iowa.

## **Phyllis Buchanan**

### *DuPont Corporate Education Program*

Phyllis S. Buchanan brings more than 30 years of experience with the DuPont Corporate Education Program to her current position. She has overseen corporate funding for science education and leading edge research at the university level; identified and contributed to the development of national programs that promote young people's interest in science and technology; and repositioned significant Office of Education resources to the support of K–12 science and mathematics education reform. In managing the Office of Education's ambitious agenda, she weaves together an extensive network of alliances and partners across all educational levels to engage DuPont as a catalyst for educational reform. Buchanan is a board member of the Triangle Coalition for Science and Technology Education; the Delaware Valley Science Fairs, Inc.; the Delaware Foundation for Science and Mathematics Education; Earth Force; SECME, Inc.; and the President's Advisory Board at Clemson University.

Buchanan is a graduate of Widener University (BS and MEd) and a recipient of an honorary doctorate degree from Clemson University. She was recently named as one of 25 women leading the way in higher education in *Diverse: Issues in Higher Education*, March 30, 2012. Buchanan continues to work collaboratively with teachers and educators, and she actively encourages all DuPont employees to contribute expertise and resources to improve science and mathematics education.

## **Chris Dede**

### *Harvard Graduate School of Education*

Chris Dede is a professor of learning technology at the Harvard Graduate School of Education (HGSE). His fundamental interest is the expanded human capabilities for knowledge creation, sharing, and mastery that emerging technologies enable. His teaching models the use of information technology to distribute and orchestrate learning across space, time, and multiple interactive media. His research spans emerging technologies for learning, infusing technology into large-scale educational improvement initiatives, policy formulation and analysis, and leadership in educational innovation. He is currently conducting funded studies to develop and assess learning environments based on modeling and visualization, online teacher professional development, wireless mobile devices for ubiquitous computing, and multiuser virtual environments. Dede also is active in policy initiatives, including creating a widely used State Policy Framework for Assessing Educational Technology Implementation and studying the potential of developing a scalability index for educational innovations. From 2001 to 2004, he served as chair of the Learning and Teaching area at HGSE.

### ***Related NSF DR K–12 project work: \*\****

#### ***EcoMobile: Blended Real and Virtual Immersive Experiences for Learning Complex Causality and Ecosystems Science***

This project studies whether middle school instruction about ecosystem science can be made more engaging and effective by combining immersion experiences in virtual ecosystems with immersion experiences in real ecosystems infused with virtual resources. Project personnel are developing a set of learning resources for deployment by mobile broadband devices that provide students with virtual access to information and simulations while working in the field.

\* new advisor as of 2012.

\*\* includes only active projects for which the advisor is the Principal Investigator.

### *Studying Technology-based Strategies for Enhancing Student Interest in STEM Careers Through Algebra Curricula in Grades 5–9*

This project is examining the relationship between specific technology-based motivational activities and grade 5–9 student interest in STEM careers through a variety of classroom-based experiences. The project will test a series of specific hypotheses relating motivation, self-efficacy, STEM career interest, and mathematics learning to activity assignment.

### **Chad Dorsey**

#### *Concord Consortium*

Chad Dorsey is president and CEO of the Concord Consortium. Dorsey's professional experience ranges across the fields of science, education, and technology. Prior to joining the Concord Consortium, Dorsey led teacher professional development workshops as a member of the Maine Mathematics and Science Alliance. There he developed technology-embedded assessments, analyzed Web-based phenomena and representations for an online library, and co-authored an NSTA Press book of science formative assessment probes. Dorsey has also taught science in classrooms from middle schools through college and has guided educational reform efforts at the district-wide and whole-school levels. While earning his BA in Physics at St. Olaf College and his MA in Physics at the University of Oregon, Dorsey conducted experimental fluid mechanics research, built software models of Antarctic ice streams, and dragged a radar sled by hand across South Cascade Glacier. Dorsey is a member of CADRE's science curriculum SIG.

### **Karen King**

#### *National Council of Teachers of Mathematics (transitioning to the National Science Foundation)*

Karen D. King is transitioning to become program director at the National Science Foundation in the Division of Research on Learning in Formal and Informal Settings in the Education and Human Resources Directorate. She most recently served as director of research for the National Council of Teachers of Mathematics, the largest professional association of mathematics teachers in the world, serving the U.S. and Canada. King's current research focuses on urban mathematics reform, the mathematics preparation of elementary and secondary teachers, and the policies of mathematics teacher professional development. She has been the principal investigator or co-principal investigator of National Science Foundation-funded grants totaling over \$2M and recently co-edited a book titled *Disrupting Tradition: Research and Practice Pathways in Mathematics Education* with William Tate IV and Celia Rousseau Anderson. She also serves as part of the writing team for the revision of *The Mathematical Education of Teachers*, which describes the mathematics teachers need to know and be able to do to be successful in light of the *Common Core State Standards in Mathematics*.

King has served as associate editor of the *Journal for Research in Mathematics Education* and was a member of the RAND Mathematics Study Panel, which made recommendations to the U.S. Department of Education about future research funding in mathematics education. She received a PhD in 1997 at the University of Maryland, where she conducted research on mathematics teacher thinking. She also serves on numerous committees focusing on research in mathematics education and teacher education with national organizations.

\* new advisor as of 2012.

\*\* includes only active projects for which the advisor is the Principal Investigator.

**Related NSF DR K–12 project work: \*\***

***Teachers' Use of Standards-based Instructional Materials***

This study explores the ways middle school mathematics teachers implement standards-based curriculum materials in urban schools. It takes the view that instructional materials are cultural tools and examines how teachers use these tools to plan and implement the curricula in their classrooms. The study is using a mixed methods approach that combines surveys of teachers in 30 schools in the Newark Public Schools district and closer observations of teachers in selected case schools.

**Okhee Lee**

***New York University***

Okhee Lee's research areas include science education, language and culture, and teacher education. Her current research involves the scale-up of a teacher professional development intervention to promote science learning and language development of English language learners (ELLs). She is a 2009 Fellow of the American Educational Research Association (AERA) and received the Distinguished Career Award from the AERA Scholars of Color in Education in 2003. She was awarded a 1993–95 National Academy of Education Spencer Post-doctoral Fellowship. Lee has directed research and teacher enhancement projects funded by the National Science Foundation, U.S. Department of Education, Spencer Foundation, and other sources. She received her doctorate from Michigan State University in 1989 and taught in the School of Education at the University of Miami prior to coming to New York University, Steinhardt.

**Related NSF DR K–12 project work: \*\***

***Promoting Science Among English Language Learners (P-SELL) Scale-Up***

This effectiveness study focuses on the scale-up of a model of curricular and teacher professional development intervention aimed at improving science achievement of all students, especially ELLs. The model consists of three basic components: (1) inquiry-oriented science curricula, (2) teacher professional development for science instruction with these students, and (3) school resources for science instruction.

***Promoting Science Among English Language Learners (P-SELL) within a High-stakes Testing Policy***

***Context***

Project staff are examining and improving elementary school teachers' knowledge, beliefs, and practices involving their teaching of science to ELLs within the policy context of high-stakes testing and accountability in science. The four major research and development areas are (1) teachers' initial knowledge, beliefs, and practices; (2) professional development intervention; (3) policy contexts; and (4) change over time in teachers and ELL students.

**Sharon Lynch\***

***George Washington University***

Sharon Lynch is a science educator and researcher who has focused on science education policy and science education policy research. She has written several peer-reviewed articles on science education policy, school practice, and equity issues, and has published a book, *Equity and Science Education Reform* (2000). She has a recent chapter (2011), "Equity and U.S. Science Education Policy from the GI Bill to NCLB: From Opportunity Denied to Mandated Outcomes" for a new book titled *Research in Science Education: The Role of*

\* new advisor as of 2012.

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*Public Policy in K-12 Science Education*, edited by DeBoer of AAAS. Another chapter, “ISO Metaphor and Theory for Scale-up Research: Eagles in the Anacostia” and activity systems will appear in the *Second International Handbook of Science Education*, edited by Fraser, Tobin, & McRobbie in 2012. Lynch has also written articles on science teacher education policy and ability grouping.

Her most recent major research project was Scaling Up Highly Rated Science Curricula in Diverse Student Populations: Using Evidence to Close Achievement Gaps, a \$5M+ project funded by the NSF/Interagency Research Initiative. This project focused on implementation, feasibility, scale-up, and sustainability issues for middle school science curriculum materials. An article summing up the results of that six-year study will be published in February 2012 in the *Journal of Research in Science Teaching* and is titled “A Retrospective View of a Study of Middle School Science Curriculum Materials: Implementation, Scale-up, and Sustainability in Changing Policy Environment.” Lynch is currently the PI on a new NSF DR K–12 project, Opportunity Structures for Preparation and Inspiration (OSPri).

Lynch is president-elect of the NARST (National Association of Research in Science Teaching), a worldwide organization for improving science teaching and learning through research. She serves on many national committees on science education and is a frequent contributor at national conferences.

**Related NSF DR K–12 project work: \*\***

*Multiple Instrumental Case Studies of Inclusive STEM-focused High Schools: Opportunity Structures for Preparation and Inspiration (OSPri).*

The aim of this project is to examine opportunity structures provided to students by inclusive STEM-focused high schools, with an emphasis on studying schools that serve students from underrepresented groups. The project is studying inclusive STEM-focused high schools across the United States to determine what defines them. The research team initially identified 10 candidate critical components that define STEM-focused high schools and is refining and further clarifying the critical components through the research study.

## **Jakita Thomas\***

### *Spelman College*

Jakita O. Thomas is an assistant professor of Computer and Information Science at Spelman College in Atlanta, GA. Thomas’s research interests include promoting access to healthcare information and services for underserved populations; exploring and describing the development of computational algorithmic thinking; and improving reasoning using expert cases, scientific reasoning, complex cognitive skills learning, and computer-supported collaborative learning. She received a BS in Computer and Information Science with a minor in Mathematics from Spelman College in 1999. In 2006, Thomas was conferred a PhD in Computer Science with a specialization in the Learning Sciences and Technology from the Georgia Institute of Technology in Atlanta, GA, where she was a Presidential Fellow, National Physical Science Consortium Fellow, tutor, mentor, and research assistant. Prior to her current position at Spelman College, Thomas was a research staff member in the Service Design and People and Practices groups at IBM Research – Almaden in San Jose, CA. Thomas is a member of the Cognitive Science Society, International Society of the Learning Sciences, Association of Computing Machinery, African-American PhDs in Computer Science, and Golden Key National Honor Society. Thomas has been awarded over \$440K in funding to support her research.

\* new advisor as of 2012.

\*\* includes only active projects for which the advisor is the Principal Investigator.

***Related NSF DR K-12 project work: \*\****

***CAREER: Supporting Computational Algorithmic Thinking (SCAT)—Exploring the Development of Computational Algorithmic Thinking Capabilities in African-American Middle School Girls***

This project includes activities that develop computational thinking and encourage middle school African-American girls to consider careers in computer science. Over a three-year period, the girls attend summer camp sessions of two weeks, during which they learn to design interactive games. Experts in computational algorithmic thinking as well as undergraduate computer science majors at Spelman College guide the middle-school students in their design of games and exploration of related STEM careers.

**Suzanne Wilson**

***Michigan State University***

Suzanne Wilson is a professor and chair of the Department of Teacher Education and director of the College of Education's Center for the Scholarship of Teaching at Michigan State University. Her work spans several domains, including teacher learning, teacher knowledge, and the connection between educational policy and teachers' practice. She has conducted research on history and mathematics teaching and has reviewed the literature on teacher professional development and teacher education. Her current work focuses on developing sound measures for tracking what teachers learn in teacher preparation, induction, and professional development programs. Her areas of expertise include curriculum policy, history of teachers and teaching, mathematics reform, teacher assessment, teacher education and learning, teacher education policy, educational general and reform policy, scholarship of teaching, and the teaching of history. Wilson has participated in a CADRE Fellows webinar and has been a plenary session speaker at a DR K–12 PI Meeting.

***Related NSF DR K-12 project work: \*\****

***Learning Science as Inquiry with the Urban Advantage: Formal-Informal Collaborations to Increase Science Literacy and Student Learning***

This project hypothesizes that learners must have access to the real work of scientists if they are to learn both about the nature of science and to do inquiry themselves. It explores the question, “How can informal science education institutions best design resources to support teachers, school administrators, and families in the teaching and learning of students to conduct scientific investigations and better understand the nature of science?”

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