2006 Leadership Seminar • Mathematics Professional Development
Speakers’ Biographical Information and Session Descriptions

About Virginia Bastable and Deborah Schifter

Virginia Bastable has been the director of the SummerMath for Teachers Program at Mount Holyoke College since 1993. Prior to that, over the course of a twenty-five-year career as a secondary school mathematics teacher, she earned a Masters in mathematics and an Ed.D. in mathematics education. Bastable has been working in the field of teacher education, designing and conducting summer institutes and academic year courses in both mathematics and mathematics education for teachers of grades K-12. She is currently working in collaboration with EDC, Inc., in Newton and TERC in Cambridge to create a professional development curriculum, Developing Mathematical Ideas, designed to allow teachers to engage with the mathematical ideas of the elementary curriculum and to examine the way students develop those ideas.

Deborah Schifter is a senior scientist at the Education Development Center, Newton, MA. She has worked as an applied mathematician; has taught elementary, secondary, and college level mathematics; and, since 1985, has been a mathematics teacher educator. She has a B.A. in liberal arts from Saint John's College, Annapolis, an M.A. in applied mathematics from the University of Maryland, and an M.S. and Ph.D. in psychology from the University of Massachusetts. Since its inception in 1982, Dr. Schifter has worked with SummerMath, a nationally acclaimed mathematics education program at Mount Holyoke College, and became the director of SummerMath for Teachers in 1988. In 1993, she moved to the Education Development Center where she directs major teacher development projects. She co-authored with Catherine Twomey Fosnot Reconstructing Mathematics Education: Stories of Teachers Meeting the Challenge of Reform and has edited a two-volume anthology of teachers' writing, What's Happening in Math Class? She is currently producing, with Virginia Bastable and Susan Jo Russell, a professional development curriculum series for elementary and middle-grade teachers called Developing Mathematical Ideas. The first five modules, Building a System of Tens, Making Meaning for Operations, Examining Features of Shape, Measuring Space in One, Two, and Three Dimensions and Working with Data, have been published by Pearson Learning Group. The team is currently working on the final two modules: Reasoning Algebraically about Operations and Patterns, Functions, and Change.

Seminar sessions led by Virginia Bastable and Deborah Schifter

General Sessions I-II: Proof at the Elementary Level and Implications for Middle School
During this four-hour session, we will consider the nature of proof at the elementary level and work on creating proofs for one particular relationship about factors. We will also analyze a classroom case in which a third-grade teacher helps her students identify a generalization that has been implicit in their observations, asks them whether this claim is true in all cases, and challenges them to prove it.

General Sessions III-IV: Reasoning about Functions for Elementary Students and Their Teachers
During this four-hour session, we will compare the discourse in two classes where third graders and fifth graders are engaged in the same activity about linear functions. We will also examine a seminar participant’s writing about the same mathematics activity in her classroom and the facilitator’s written response.

About Cathy Carroll and Judy Mumme

Cathy Carroll is co-Principal Investigator for Leadership Curriculum for Mathematics Professional Development, a project funded by the National Science Foundation to develop a video-based case curriculum to support the development of mathematics teacher leaders. She recently served as the mathematics content specialist for Teachers as Learners, a collaborative project of WestEd, WGBH, and the Boston Museum of Science. Previously, Cathy was Director of the Mathematics Renaissance Leadership Alliance, a mathematics leadership initiative funded by the California Department of Education to work with fourteen district-based leadership cadres in developing teacher leadership and administrative support for quality mathematics programs. Earlier she served as associate director for Mathematics Renaissance K-12 and, prior to that, as regional director for the Middle Grades Mathematics Renaissance, a component of California's State Systemic Initiative.

Judy Mumme works on a number of mathematics projects at WestEd. She is Principal Investigator of Leadership Curriculum for Mathematics Professional Development. This NSF-funded project is creating video-based curriculum materials to support the development of leaders of mathematics professional development. She is also Principal Investigator of Developing Facilitators of Practice-Based Professional Development, a project that is
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designed to prepare leaders to facilitate practice-based professional development. This project is also gathering research data on teacher learning (specifically from *Video cases for Mathematics Professional Development* materials). Ms. Mumme previously served as co-PI/Director of the Mathematics Renaissance K-12 and the California Alliance for Mathematics and Science (CAMS), the California State Systemic Initiative. She was a member of the writing committee of the NCTM Standards and a high school and junior high school mathematics teacher for 14 years.

**Seminar sessions led by Cathy Carroll and Judy Mumme**

**General Sessions I and III: Managing Discourse in Professional Development to Promote Teachers’ Mathematical Knowledge: A K-8 Videocase**

**General Sessions II and V: Managing Discourse in Professional Development to Promote Teachers’ Mathematical Knowledge: A Secondary Videocase**

These two different 2-hour sessions will employ video as a tool to analyze and discuss some of the issues and challenges leaders face in professional development. We will engage in a case experience (viewing and discussing a video clip), to analyze and inquire into an instance of practice. The cases will focus on issues in managing discussion around teachers’ mathematical contributions.

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About Linda Foreman

**Linda Cooper Foreman** directs Teachers Development Group (TDG), a non-profit organization whose mission is to improve students’ mathematical understanding and achievement through effective professional development for teachers and administrators. In her work at TDG, a nonprofit affiliate of the Department of Mathematics and Statistics at Portland State University, Foreman collaborates with other mathematics educators and school leaders to design and implement professional development for systemic mathematics reform projects in diverse settings nationwide. Foreman is a former middle and high school teacher and recipient of the Presidential Award for Excellence in Mathematics Teaching and the Oregon Mathematics Education Lifetime Achievement Award. She served for three years on the mathematics development team for the National Assessment of Educational Progress (NAEP), co-authored an NSF-funded middle grades mathematics curriculum, and has contributed to numerous publications on reform-based mathematics instruction and assessment – most recently, *Navigating Through Number and Operations in Grades 6-8* (in press, NCTM). Foreman is currently co-principal investigator and project director for the NSF-funded Mathematics and Science Partnership, Oregon Mathematics Leadership Institute, a 5-year collaboration to deepen the mathematical knowledge and leadership capacity of teachers and administrators from ten Oregon school districts.

**Seminar sessions led by Linda Foreman**

**General Session III and IV: Using Protocols and Tools to Foster Mathematically and Pedagogically Productive Collegial Interaction, Inquiry, and Learning About Students’ Mathematical Thinking**

At the heart of a practice-based approach to mathematics professional learning are communities of teachers working together in an ongoing cycle of inquiry, reflection, and action regarding students’ mathematical thinking and learning needs. To assure that such professional interaction is fruitful in terms of teacher and student learning, teachers need to learn new ways of thinking, talking, and working together – they need structures and strategies that break down the norms of privacy that traditionally typify school mathematics. Protocols and instructional tools that focus teachers’ attention on proven aspects of high-quality mathematics learning and teaching support collaborative sensemaking about students’ conceptions and the implications for instruction. Developing expertise with certain protocols and tools can foster a culture of safe and equitable dialogue, and at the same time support collegial “press” for understanding and deep thinking, thus diminishing the risk that professional conversations remain superficial and convivial. During this two-hour session, we will consider contexts and possibilities for several protocols and tools that support rich collegial work. For example, we will work with the Student Discourse Observation Protocol (SDOP), which supports collaborative inquiry (among teachers and/or among teachers and administrators) regarding ways to move student thinking and discourse along a continuum of cognitive levels – from short answers and explanations/demonstrations of mathematical processes to justifications, conjectures, and generalizations. As additional examples, we will also consider classroom and professional development applications of a Lesson Planning Tool designed for use with the Thinking Through A Lesson Protocol and SDOP.
About Cathy Humphreys

Cathy Humphreys, a middle school mathematics teacher for over 20 years, has been a middle school mathematics coach for the past 8 years. She has been active in professional development for teachers throughout her career, both as an instructor at Stanford University for pre-service secondary mathematics teachers and an instructor for Marilyn Burns Education Associates. She currently is Professional Development Director of the Silicon Valley Mathematics Initiative, a collaborative of over 30 school districts with 60 mathematics coaches, and an instructor for Mathematics Education Collaborative. She is the co-author of two books: *A Collection of Math Lessons for Grades 6-8*, with Marilyn Burns, and, most recently, *Connecting Mathematical Ideas: Middle School Videocases of Teaching and Learning*, with Jo Boaler.

Seminar sessions led by Cathy Humphreys

**General Sessions IV and VI**: *Exploring the Notion of Cognitive Demand: How Can We Understand It Better? Why Is It Important? How Can We Help Teachers Get Better at Maintaining It?*

Despite widespread messages in workshops, conferences, books, articles and journals about the importance of having students “do the thinking,” the level of thinking required of students in so many mathematics classrooms remains discouragingly low. The kinds of thinking needed to solve tasks is called cognitive demand, and in this session we will think together about what this means and how we might help teachers give their students the gift of doing their own thinking.

About Linda Levi

Linda Levi worked in the development of *Cognitively Guided Instruction* and has been engaged in CGI research for the past 17 years. She is the director of CGI Initiatives for Teachers Development Group where she is working with a group of CGI professional development leaders to provide CGI workshops to teachers nation wide. Her work in teacher professional development focuses on helping teachers increase their knowledge of children’s mathematics and learn how to use this knowledge to guide mathematics instruction. She is particularly interested in the reciprocal relationship between learning algebra and learning arithmetic.

Seminar sessions led by Linda Levi

**General Sessions I-II and V-VI**: *Using Knowledge of Children's Mathematics to Guide Classroom Discourse: Perspectives from Cognitively Guided Instruction.*

Mathematical discourse is crucial for learning with understanding. Many teachers know they should engage their students in mathematical discourse but struggle over what this discourse should entail. Cognitively Guided Instruction (CGI) is a teacher professional development program that helps teachers understand children's mathematical thinking. Teachers who understand children's mathematics know how to guide classroom discourse so students are talking about the mathematics they need to talk about and teachers are getting the information they need about their students' understanding.

In these four-hour sessions, we will engage in some CGI professional development activities designed to build teachers' knowledge of students’ understanding of base ten number concepts. These activities will address early ideas of grouping in Kindergarten through concepts with decimal numbers in the upper elementary school. While engaging in these activities, we will discuss how to support teachers in increasing their knowledge of children’s mathematics. We will also discuss the role of teachers’ knowledge of children’s mathematics in enhancing classroom discourse.

About Karen Marrongelle, Sean Larsen, Phyllis Leonard, and Kathy Pfaendler

Karen Marrongelle is an assistant professor of mathematics and statistics at Portland State University. Her work focuses on undergraduate mathematics learning and teaching and mathematics teacher education. Karen is co-Principal Investigator for the Oregon Mathematics Leadership Institute (OMLI), a mathematics and science partnership project funded by the National Science Foundation to create sustainable and generative mathematics leadership capacity in Oregon K-12 schools and higher education institutions.

Sean Larsen is also an assistant professor of mathematics and statistics at Portland State University, where his work focuses on the learning and teaching of abstract algebra and curriculum design in that field. Sean is a member of the OMLI Algebra Structures instructional team.
Phyllis Leonard is mathematics department head at Chemeketa Community College in Salem, Oregon. Phyllis is an experienced community college mathematics instructor and works in the preparation of pre-service mathematics teachers. She is also a member of the OMLI Algebra Structures instructional team.

Kathy Pfaendler, another member of the OMLI Algebra Structures instructional team, is an experienced middle and high school teacher. She currently serves as the K-12 Mathematics Coordinator for Beaverton School District. During the past 15 years, Kathy has also provided extensive mathematics professional development for K-12 classroom teachers and administrators from across the United States.

About sessions led by Karen Marrongelle, Sean Larsen, Phyllis Leonard, and Kathy Pfaendler

General Sessions V and VI: Generating Mathematical Discourse Among Teachers: The Role of Professional Development Resources

The purpose of this two-hour session is to explore how using practice-based professional development resources can generate substantive mathematical discussion among teachers. Participants will have the opportunity to experience two examples from the Oregon Mathematics Leadership Institute (OMLI) Algebra Structures course for K-12 classroom teachers. One example focuses on the development of the closure properties of a special set of numbers as described by a third-grade student (Ball, 1993). The second example centers on the development of function composition as initiated by reflection upon an Investigations in Number, Data, and Space curriculum unit. We will examine transcripts of classroom interactions to explore the focus question: Can such tasks help generate substantive discourse among K-12 teachers about their own mathematical knowledge? Participants will assess the quality and quantity of mathematical discourse in the transcripts using a discourse observation protocol in order to address the focus question.

About Amy Morse

Amy Morse is a Project Director in the Center for the Development of Teaching at the Education Development Center in Newton, MA. She works primarily as a consultant to the Elementary Math Department of the Boston Public Schools. Morse’s work involves supporting the implementation of a citywide restructuring of math education across 87 elementary schools and developing and facilitating professional development for the cadre of elementary math coaches. In addition, Morse consults with a range of school districts regarding coaching and teacher professional development. An emerging component of this work is the development of coach-written cases based on the many layers of the coaching role and experience. The development of professional development materials based on this case material is funded by grants from the Exxon Mobil Foundation and the National Science Foundation.

Seminar sessions led by Amy Morse

General Sessions III and IV: Professional Development for Math Coaches: Coming to See Mathematics in a New Light

In this two-hour session, we will consider the contexts for and themes of new learning for math specialists and coaches. In the process of developing a disciplined and reflective practice, having opportunities for coaches to carefully examine and refine their own work is essential and it is also important that we come to understand more deeply the role that coaches play. To that end, we will focus on the writing of one coach as she works to understand the ideas fifth grade students’ wrestle with in order to make sense of the relationship between fractions and percents and what these ideas mean for classroom learning. As the case writer reflects on the classroom discussion, she also comes to see the complexity of this stage of mathematical understanding in a new way for herself. The writing became a vehicle for her coach colleagues’ learning and, in turn now, for our own. During the session we will do some mathematics together, read the short case and work in small groups on focus questions. We will end by having a whole group discussion of the potential for coach-written case work as a professional development tool for coaches and other math leaders.
About Nanette Seago

Nanette Seago currently serves as Co-PI for two NSF projects, a ROLE project: Turning to the Evidence: What Teachers Learn by Using Classroom Records and Artifacts in Mathematics Instruction and a teacher enhancement project: Developing Facilitators of Practice-Based Professional Development. Since July 1998, Nanette Seago has served as the Project Director and Co-PI for the Video Cases for Mathematics Professional Development Project (VCMPD), funded by the National Science to develop professional development curriculum materials. In 2002, Seago collaborated with LessonLab in the development of the TIMSS-R public release videos and the design of an online course sponsored by Intel Corporation entitled: TIMSS Video Studies: Explorations of Algebra Teaching. She is lead author of Learning and Teaching Linear Functions: Video Cases for Mathematics Professional Development, 6-10.

Seminar sessions led by Nanette Seago

General Sessions I and II: Mathematical Knowledge for Teaching—What Does It Mean to Learn It?
This session is designed to provide participants an opportunity to examine various aspects of what it might mean to learn Mathematical Knowledge for Teaching (MKT) through the analysis of two teachers pre and post responses to an instrument designed to measure MKT. We will use this experience as we engage in a discussion of the issues and challenges in measuring MKT within professional development settings.

General Sessions III and IV: Adaptation and Fidelity in Using Professional Development Materials—Is It Possible?
What does it mean to use professional development materials with fidelity? Can one adapt materials with fidelity? What might it mean to make productive adaptations? This session will explore these questions within the context of one set of professional development materials. We will work together to make productive adaptations to an existing set of materials, and then discuss how adaptation with fidelity might generalize beyond this set of materials.

About Cathy Seeley

Dr. Cathy Seeley is the President of NCTM, the world’s largest mathematics education organization, with 90,000 members and 25 affiliates in the United States and Canada. NCTM is a public voice of mathematics education and provides leadership to ensure mathematics learning of the highest quality for all students. Dr. Seeley has had a distinguished career in mathematics education. In the 1980’s, she served as the Director of Mathematics (K-12) at the Texas Education Agency. In the 1990’s, she served as Director of Policy and Professional Development for the Texas Statewide Systemic Initiative in Mathematics and Science. She also worked on the development of mathematics specifications for the 1996 National Assessment of Educational Progress and as a writer for the National Board for Professional Teaching Standards.

Seminar session led by Cathy Seeley

Closing Keynote: We are honored to have Cathy Seeley’s national perspective to bring closure to this seminar, to provide compelling rationale for using our seminar learning as a starting point for providing enhanced professional learning for all teachers and administrators with whom we work, and to inspire continued thought and inquiry about meaningful mathematics professional development related to mathematical knowledge for teaching and the role of teacher discourse in the development of such knowledge.

About Margaret (Peg) Schwan Smith

Margaret Schwan Smith is an Associate Professor in the Department of Instruction and Learning in the School of Education at the University of Pittsburgh. She has a doctorate in mathematics education and has taught mathematics at the junior high, high school and college levels. She currently works with preservice elementary, middle, and high school mathematics teachers at the University of Pittsburgh, with doctoral students in mathematics education who are interested in becoming teacher educators, and with practicing middle and high school mathematics teachers and coaches through several NSF-funded projects. She was the coordinator of the QUASAR project between 1990 and 1997 where she focused primarily on supporting and studying the professional development of project teachers.
Dr. Smith is the co-author of several books including Implementing Standards-Based Mathematics Instruction: A Casebook for Professional Development (Teachers College Press, 2000) that grew out of the work of the QUASAR Project. In addition, she has authored a book entitled, Practice-Based Professional Development for Teachers of Mathematics (NCTM, 2001) which explores a particular type of professional development that connects the ongoing professional development of teachers to the actual work of teaching. She is the lead author on three books of narrative cases recently published by Teachers College Press that grew out of the work of the NSF-funded COMET (Cases of Mathematics Instruction to Enhance Teaching) Project.

Dr. Smith is currently the director of the NSF-funded ESP project that is focusing on enhancing the preparation of preservice secondary mathematics teachers. In November 2005 she was elected to the Board of Directors of the National Council of Teachers of Mathematics (2006-2009). She was recently selected to receive a 2006 Chancellor’s Distinguished Teaching Award given annually to honor outstanding faculty at the University of Pittsburgh.

Seminar sessions led by Peg Smith

Opening Keynote: Orchestrating Productive Mathematical Discussions: Helping Teachers Learn to Better Incorporate Student Thinking

Orchestrating discussions that use student-developed work as the launching point places significant pedagogical demands on the teacher (e.g., Ball, 2001; Chazan & Ball, 2001; Lampert, 2001). Teachers must make rapid online diagnoses of students’ understandings, compare them with desired mathematical outcomes, and then fashion a response that will help move both the responding student and the rest of the class towards a more sophisticated understanding of the mathematics in question. This session will focus on a pedagogical model that specifies five key practices that teachers can learn in order to use student responses more effectively: 1) anticipating likely student responses prior to the lesson; 2) monitoring students’ responses as they engage with the task; 3) selecting particular students to present their mathematical responses; 4) purposefully sequencing the student responses that will be displayed, and 5) helping the class make mathematical connections between different students’ responses (Stein, Engle, Hughes, & Smith, submitted).

General Sessions I-II: Selecting, Sequencing, and Connecting Student Responses: Critical Steps in Orchestrating Productive Discourse

By making purposeful choices about which responses should be presented and in what order, teachers can maximize the chances that their mathematical goals for the discussion will be achieved. During this four-hour session, we will engage in an activity that is intended to simulate these critical steps in orchestrating productive discourse.

Friday Plenary Session: Thinking Through a Lesson: Planning as a Tool for Teacher Learning and Improved Practice.

Lesson plans created by U.S. teachers tend to focus on what students will be able to do (e.g., graph a linear function) rather than on what students will understand about mathematics (e.g., that the slope of the line represents the constant rate of change between the two variables which can be demonstrated graphically or by finding the constant difference in a table of values). Hence, the emphasis is often on how to help students perform a procedure (e.g., make a table and plot the points to be graphed) rather than on how to advance students’ thinking (e.g., help them understand what graph tells you about the relationship between the quantities). In addition, there is generally limited attention during the planning process to the anticipated interaction between a teacher and her students (e.g., if students use different scales in their graphs, how will I help them understand that the lines have the same slope).

In this session, I will share a protocol that we have developed for guiding the planning process. In our work, we have found that by moving beyond a focus on the structural components often associated with lesson planning (e.g., listing the materials needed, describing the way students are grouped, specifying teacher actions) to a deeper consideration of how teachers are going to advance students’ mathematical understanding during the lesson, teachers begin to engage with mathematical ideas at the heart of the lesson and to consider the mathematics from the child’s point of view. As one teacher with whom we have worked noted in her reflection on using the protocol: “I was trying to think up the problems or those issues that would come up, and given my student population, I really had to put their heads on – the kids heads on. And that’s what really we should do, but that is not the way we are trained.”
About Gini Stimpson

Dr. Virginia C. Stimpson works with elementary teacher leaders in six districts as a co-PI on an NSF-funded Leadership Grant, Expanding the Community of Mathematics Leaders. Previously she worked with secondary mathematics teachers in the same six school districts as a co-PI on an NSF-funded Local Systemic Initiative, Creating a Community of Mathematics Learners. Gini served as the evaluator of Facilitating Lenses on Learning: Developing Leadership to Support Excellent Teaching in Elementary Mathematics which is located at EDC with Barbara Scott Nelson as PI. Gini was a high school mathematics and physics teacher at Mercer Island High School for thirty-five years and the mathematics curriculum lead in the Mercer Island School District for five years. At the University of Washington she co-taught with Dr. G. S. Monk an NSF-funded program, "Teaching Mathematics for Conceptual Understanding," taught an EMSA-funded program "Teaching Mathematics to the Middle School Student," and both the Elementary and Secondary Math Methods courses for preservice teachers. She worked as a member of the staff for the DMI Facilitators Network, as an instructor at SummerMath and SummerMath for Teachers programs and has been co-researcher with Dr. Jim Minstrell on grants from the NSF, NIE, and the McDonnell Foundation related to the teaching and learning of physics and mathematics. She is past chair of the NCTM Research Advisory Committee.

Seminar sessions led by Gini Stimpson

General Sessions V and VI: Lenses on Learning Supervision: Focusing on Mathematical Thinking

As part of an NSF-supported project, we used the Lenses on Learning professional development materials to support collaborative teams of principals, teacher leaders, and coaches as they developed common understandings of classroom practices that increase students' understanding of key mathematical concepts and processes. Participants used the Lenses on Learning Observation Guide to focus on the building of intellectual community, mathematical content, and the pedagogy in videotaped episodes of K-8 mathematics lessons and teachers in their own buildings. After analyzing the teaching and learning through a particular lens, the participants considered how pre- and post-observation conferences could be radically altered to encourage a teacher's continued construction of knowledge and development of an orientation of curiosity about students' mathematical thinking. During this session, we will experience an example from this work while focusing on building intellectual community.

About Ruth Moody Tsu

Ruth Moody Tsu is Director of Equity Initiatives for Teachers Development Group where she works with other staff members to provide systemic support to districts to improve all students' mathematical understanding and achievement through meaningful, effective professional development. She provides leadership for the ongoing development of the Designing Groupwork in Mathematics courses, which are based on Complex Instruction, a model of groupwork developed by Dr. Elizabeth Cohen at Stanford University. Prior to her current work, Ruth taught in junior high and high schools for sixteen years and served as the department chair of an urban high school in which the members of the department chose to examine their practice and subsequently made major changes in all aspects of the teaching and learning of mathematics at that school. The principles of Complex Instruction were pivotal to the changes made and led Ruth to a focus on the need to develop structures for peer-supported cooperative learning and attention to issues of status as they emerge in the classroom.

Seminar sessions led by Ruth Moody Tsu

General Sessions V and VI: Practices that Support Equitable Participation and High-Level Discourse in the Teaching and Learning of Mathematics

Experience practices and consider supports that promote equitable participation in high-level mathematical discourse. Participants will have time to reflect thoughtfully and share their thinking, feelings, and ideas.