Thomas Bailey, George and Abby O’Neil Professor of Economics and Education at Teachers College, Columbia University and Director of the Community College Research Center and the Center for the Analysis of Postsecondary Readiness

Recent Reforms in Math Assessment and Developmental Education: Connecting Remediation to College Level Programs of Instruction

The last five years have seen an accelerating pace of reform and innovation in mathematics developmental education. This presentation will discuss reforms taking place in the areas of assessment, course design and content, pedagogy, and student program choice and planning. It will also address the implications for college level courses and the potential unintended consequences of the reforms. An underlying theme in these reforms is that remediation should be more closely connected or integrated with college level programs of study. This involves better coordination of content and pedagogy between remedial and college level courses and assessment and placement systems that take account of student goals. For many students, developmental education is barrier that blocks students from further progress. The presentation will argue that rather than thinking of developmental education as a discrete set of courses focused on a limited set of academic skills, we need to conceptualize the services provided to students who enter college with weak academic skills as part of a comprehensive intake process with the goal of helping students choose and successfully enter a college level program of study.

Deborah Ball, Dean of the School of Education, Arthur F. Thurnau Professor, and William H. Payne Collegiate Professor in Education, University of Michigan

Title and abstract TBA

Rachel Beattie, Director of Productive Persistence, Community College Pathways, The Carnegie Foundation for the Advancement of Teaching

From Gatekeeper to Gateway: Promoting Productive Persistence for Learning in Developmental Mathematics

One of the most promising new ideas for promoting student success in mathematics involves the use of psychological strategies to improve students’ “non-cognitives”—their motivation, engagement, and persistence. At the Carnegie Foundation, our Community College Pathways programs integrate supports for these “non-cognitives” in innovative curricula and pedagogical practices designed for students in developmental mathematics. We call these ideas “Productive Persistence,” or the academic mindsets to persist coupled with the strategies to make that persistence useful for mathematical learning. Academic mindsets are predictive of a variety of motivation and achievement outcomes, and we have found that
these mindsets can be changed. We will present how, guided by the research-based Productive Persistence framework, creating a classroom culture that supports academic mindsets around mathematics can improve student learning.

Kate Belin, Math Teacher, Fannie Lou Hamer Freedom High School

See the abstracts for the plenary session moderated by Noah Heller and the parallel session moderated by Jacob Koehler.

Lauren Brady, Math Teacher & Academic Intervention Specialist, Park East High School

See the abstracts for the plenary session moderated by Noah Heller and the parallel session moderated by Jacob Koehler.

Pamela Burdman, Independent policy analyst for foundations and think tanks on issues related to college readiness and success, former program officer at the William and Flora Hewlett Foundation and formerly an award-winning education reporter for the San Francisco Chronicle

Pamela Burdman will moderate questions from the audience for Uri Treisman’s talk, and help focus a discussion following the talk on the important points and issues arising.

Duane Cooper, Associate Professor and Chair, Department of Mathematics, Morehouse College; Workshop Co-Organizer

Viewing the Problem from the Mathematics Department Chair Perspective

In this panel presentation moderated by Duane Cooper, he will describe challenges faced by his particular department at a small, liberal arts college with a mission to develop Morehouse College’s predominantly Black student population. The centerpiece of their developmental program is a single course, Math 100, College Algebra, and inherent is the challenge of using it to achieve multiple goals and serve multiple populations. The program is broader, with issues prior and subsequent to college algebra, but the heart of the program is Math 100.

Peter Trapa will describe issues as a chair at an institution with very different concerns, the University of Utah. He will explain why developmental math is vitally important to the future of a department like his. He will also explain the ways a chair can get involved in making more effective policy at the state level.

John Squires will follow by discussing three items: (1) redesign of developmental mathematics and its impact, (2) the Tennessee SAILS program, featuring community colleges working with high schools in developmental mathematics, and (3) the SREB’s Math Ready and Literacy Ready courses, putting intervention in senior year of high school.
Phil Dituri, Ph.D., Math Department Chairperson/Instructional Coach/Math Teacher, New Design High School

See the abstracts for the plenary session moderated by Noah Heller and the parallel session moderated by Jacob Koehler.

Alicia C. Dowd, Associate Professor and Co-Director, Center for Urban Education, Rossier School of Education, University of Southern California

*There’s Something Happening Here: Lessons on Transformative Mathematics Education from Colorado’s Equity in Excellence Project*

This session is a call to action to improve racial equity in developmental mathematics education. It provides a model for developmental evaluation that mathematics educators at all levels can implement to measure and monitor progress towards equity in their own departments and colleges. Concrete steps for engaging in transformative educational practices will be provided drawing on lessons from the Center for Urban Education’s Equity in Excellence Project in Colorado, which involved the Community College of Aurora, Metropolitan State University of Denver, and the University of Colorado Denver. The session features the steps the Community College of Aurora (CCA) took, under the leadership of Department Chair James Gray, to improve racial equity in developmental mathematics education at their college. The CCA experience illustrates the principles of equity in action. These are derived from theories of justice as fairness, justice as care, and justice as transformation, which are described in the recently released Teachers College Press book “Engaging the ‘Race Question’: Accountability and Equity in U.S. Higher Education” by Alicia C. Dowd and Estela Mara Bensimon. Audience members will have the opportunity to reflect on the principles of justice and fairness that guide their practice as mathematics educators.

Ann R. Edwards, Director of Advancing Quality Teaching, Community College Pathways, The Carnegie Foundation for the Advancement of Teaching

See the abstract for Rachel Beattie.

Carol A. Edwards, Executive Secretary, TODOS: Mathematics for ALL, and Professor of Mathematics Emerita, St. Louis Community College, Missouri

Dr. Edwards will be a respondent addressing the matters brought up in the presentation by Wade Ellis.

Wade Ellis, Jr., West Valley College (Retired)

*Developmental Mathematics: Is There a Way Forward?*

Curriculum revision, course delivery modifications along with basic student skills instruction have been put in place in developmental mathematics programs with some modest success. Instead, do we need
to change the values, attitudes and practices of the developmental mathematics students and their instructors if we are to see significant improvement in student performance? Some risk factors students have in learning mathematics and factors that play a part in student success will be described and ideas about how to turn risk factors into successful student behaviors will be discussed.

**Audrey Federman, Math Teacher, Eastside Community High School**

See the abstracts for the plenary session moderated by Noah Heller and the parallel session moderated by Jacob Koehler.

**Giselle George, Math Teacher, Eastside Community School**

See the abstracts for the plenary session moderated by Noah Heller and the parallel session moderated by Jacob Koehler.

**Dr. April Lea Go Forth, Executive Director, Resources for Indian Student Education**

*Pedagogy benefitting Native students as well as all groups of students*

Our nation has debated mathematical training of youth for over a century. The concern about math achievement is critical. Knowing must become doing. We know that our Native students’ math achievement is below other groups AND that our Native students can be top performers. What American educators are not addressing, although lagging academic performance demonstrates, is our basic failure to adapt mathematics curriculum to meet the instructional needs of students. This discussion will address successful changes that meet Native student’s learning needs – pedagogy that approaches and benefits all groups of students.

**Deborah L. Harrington, Ed. D., Dean for Student Success for the Los Angeles Community College District and Executive Director of the California Community Colleges’ Success Network (3CSN)**

Dr. Harrington will be a respondent addressing the matters brought up in the presentation by Wade Ellis.

**Harry Hellenbrand, Provost, California State University, Northridge**

*The View from the Provost’s Seat*

**Noah Heller, Program Head, Math for America Master Teacher Fellowship**

(Plenary session moderated by Noah Heller). A group of secondary mathematics teachers will discuss approaches to teaching geared towards high school students likely to place into developmental math courses in college. From test preparation that treats gatekeeper exams as a literacy unto itself to project-based learning outcomes not reflected in standardized assessments, this session examines
pathways into and away from the need for math remediation at the college level. Presenting alternative approaches, this session explores questions about what we value, how we measure, and why some students continue to be identified as not-yet ready for college mathematics. Following a series of short presentations, teachers will engage the audience in a brief panel discussion.

**Mark Hoover, Research Scientist, School of Education, University of Michigan; Workshop Co-Organizer**

*A Conversation about Practical Next Steps*

For the penultimate session of the workshop, Dr. Hoover will moderate a conversation between workshop speakers and participants addressing the question “Where do we go from here?”

**Gregory V. Larnell, Assistant Professor, Department of Curriculum and Instruction, College of Education, University of Illinois at Chicago**

*Toward unpacking psychosocial phenomena amid mathematics-learning experiences in non-credit-bearing remedial mathematics courses*

In this brief presentation, I will provide an overview of a strand of my work to study empirically and unpack theoretically the mathematics-learning experiences of undergraduates in what I have called “non-credit-bearing remedial mathematics courses” at four-year universities. My work in this domain has focused on the ways in which those mathematics-learning experiences intersect with other forms of experience—e.g., racialized, gendered—and has centered on the experiences of African American and Mexican American students. To engage in this work, I have relied primarily on longitudinal qualitative methods to provide a deeper look at the nature of learners’ experiences in these settings (i.e., ethnography and semi-structured interviews across multiple studies). Following the overview, I will discuss two related psychosocial phenomena that have been evinced in my recent work among African American students in these courses: identity threat and cooling out.

**Nalo Lewis, Math Teacher, Benjamin Banneker Academy**

See the abstracts for the plenary session moderated by Noah Heller and the parallel session moderated by Jacob Koehler.

**William McCallum, University Professor of Mathematics and former Head of the Department of Mathematics at the University of Arizona and lead writer for the Common Core State Standards in Mathematics**

*Tentative title: Developmental Mathematics and the Common Core*

Abstract TBA
Michael Moshos, Math Teacher, Urban Assembly New York Harbor School

See the abstracts for the plenary session moderated by Noah Heller and the parallel session moderated by Jacob Koehler.

Richard Sgarlotti, Mathematics Instructor, Bay College, and Projects Coordinator at the Nah Tah Wahsh Public School Academy; Workshop Co-Organizer

*Non-Cognitive Issues Affecting Student Performance in Mathematics*

Rich Sgarlotti will chair this panel discussion by Rachel Beattie, Ann Edwards, April Go Forth, and Gregory Larnell. See the panelists’ individual abstracts for details.

John Squires, Director of High School to College Readiness, Southern Regional Education Board; Former Department Head of Mathematics, Chattanooga State Community College

See the abstract for Duane Cooper.

Katherine Stevenson, Professor of Mathematics and Director, Developmental Mathematics, California State University, Northridge; Workshop Co-Organizer

*The Good Shepherd*

This talk will:

- Discuss the necessary ingredients for guiding change
- Discuss the different and specific forms of change required in Developmental Mathematics, using California as an example
  - a. Different manifestations of the problem within different institutions
  - b. Different needs of different populations within each institution
  - c. Different agendas for and purposes of change
- Give examples of successful and less successful attempts at change
- Discuss myths surrounding Developmental Mathematics

Peter Trapa, Professor and Chair, Department of Mathematics, University of Utah

See the abstract for Duane Cooper.

P. Uri Treisman, Director of the Charles A. Dana Center and Professor of Mathematics, University of Texas at Austin

Professor Treisman will give the opening plenary talk, with title and abstract to be announced.
Bruce Yoshiwara, Los Angeles Pierce College, Retired

*Developmental Mathematics at Community Colleges*

We hope to address the following questions: What is the content of developmental math courses at community colleges, and what should it be? What are the issues facing community colleges in their developmental math courses and programs? What can 4-year schools learn from community colleges about teaching developmental math? How can 2-year and 4-year schools collaborate to improve developmental math programs?

Katherine Yoshiwara, Los Angeles Pierce College, Retired

See the abstract for Bruce Yoshiwara

Lee L. Zia, Deputy Division Director, Division of Undergraduate Education, National Science Foundation

*The recent announcement of NSF funding opportunities for “Increasing College Opportunity Through Improved Mathematics Success in the First Two Years of College”, and other information about NSF*

On December 4, NSF released a Dear Colleague Letter on “Increasing College Opportunity Through Improved Mathematics Success in the First Two Years of College” describing multiple ways that the Foundation will support work to improve student success in the first two years of the mathematics generally taught at two- and four-year colleges. This session will provide information about this opportunity, and more generally about NSF support.

**Parallel session presenters**

Rachel Beattie, Director of Productive Persistence, Community College Pathways, The Carnegie Foundation for the Advancement of Teaching

See the parallel session abstract for Ann R. Edwards.

Kaddour Boukaabar, Ph.D., Professor of Mathematics, California University of Pennsylvania

*Cal U’s Approach to Enhance Developmental Math*

California University of Pennsylvania (Cal U), a member of Pennsylvania’s State System of Higher Education is primarily a teaching institution. Cal U, like many other colleges, has committed to and engaged in improving its developmental math. Cal U’s approach is guided by the following questions: How to optimize Developmental Math students’ learning and increase their course success? How to increase their engagement in and out of the classroom? The purpose of this presentation is to describe our math department’s action to answer these questions and improve developmental math at Cal U. Course coordination, learning management system software, web-based classroom response system,
computer classrooms, work-study tutors, study skills and ample student support are used. MyMathLab’s “course coordinator” feature is used; it is particularly helpful when teaching several sections of the same course. An experienced faculty team-teaches with an adjunct faculty multiple sections of DMA 092, Introductory Algebra. The room is an equipped computer classroom that has forty eight seats and computers. The whole course is set out at the beginning in the software platform. The tenured professor meets the three sections on Mondays or on Tuesdays and lectures over the assigned sections. He asks a couple of questions using Web-based Classroom Response System. He assigns Brain-Paper-and-Pencil (BPP) activities during class time and let students start on the online homework if time permits. The use of team-teaching and motivating instructional methods within a technological framework, make students more engaged in their own learning. It helps them persevere and be successful.

Rosalie Dance, Mathematics Professor, University of the Virgin Islands, Retired

Essential Ingredients, Critical Factors

I will review some basic considerations for design of a developmental mathematics program in the university setting: (1) A curriculum with mathematics content that will suit the needs of students at your institution and mathematical investigations with cultural relevance in contexts of interest and intellectual concern for your students; (2) pedagogical methods that convey high expectations for all students; support inquiry, discovery, understanding, confidence-building – and assure that students see mathematics as a human endeavor for solving problems that concern them; (3) preparation and support of teaching faculty. Finally, I will share one or two examples of mathematics investigations that were designed for developmental course use that illustrate how these three points can be carried out.

Ann R. Edwards, Director of Advancing Quality Teaching, Community College Pathways, The Carnegie Foundation for the Advancement of Teaching

The Carnegie Pathways: Innovating for Student Success in Statway and Quantway

Launched in Fall 2011, the Carnegie Community College Pathways — Statway and Quantway — have dramatically increased student success rates in developmental math in over 50 community colleges across the country, tripling the student success rate in one-half the time. In the Pathways network, faculty work with other practitioners and researchers to design and test instructional and curricular innovations to improve student outcomes. In this session, we describe the innovations that have contributed to the Pathways’ success—relevant and challenging college-level curriculum, instructional routines promoting student motivation and engagement, and pedagogy supporting collaborative learning through productive struggle—and share results from the first three years of implementation.

Darolyn A. Flaggs, Doctoral Instructional Assistant, Texas State University

Surpassing the Basics to Support the Holistic Student: An Implementation of the Advanced Caminos with FOCUS Elements Program
Research has shown that students who are the first in their families to pursue postsecondary education, come from low-income backgrounds, or attend academically underperforming high schools are often in need of, and benefit from, student support services (Engle & Tinto, 2008; Smith & Miller, 2009; Rath, 2013). This session will propose a framework that encompasses both Conley’s (2007) Facets of College Readiness model and Martin’s (1973) Supplemental Instruction model to help improve the success of students entering college through increasing their knowledge of college capital and student support services. Special attention will be given to the implementation of the Advanced Caminos with FOCUS Elements Program directed by Dr. Selina Vasquez-Mireles, as this program was successful in establishing an avenue to support student success in mathematics and building students’ knowledge of college capital. As such, this session will describe a systematic program whereby the interests and support needs of students were identified and addressed through seminars, workshops, and activities designed to (a) increase students’ college capital knowledge, (b) promote students’ college integration and socialization, and (c) enhance their academic success in mathematics. Advanced Caminos is an effective, comprehensive academic support system that places students at the core and embraces the idea of college going while encompassing both proactive and intensive student support services for a cohort of high school students.

Linda Gojak, Immediate Past President, National Council of Teachers of Mathematics

Tentative title: The Work of the Conference Board of the Mathematical Sciences Surrounding Developmental Mathematics

Abstract TBA

Susie W. Hakansson, Ph.D., President, TODOS: Mathematics for ALL

Achievement Gap or Opportunity Gap?

A disproportionate number of underrepresented minority students enroll in developmental mathematics courses with the vast majority of these students enrolled in two-year colleges. This brief session will focus on questions related to some of the factors that contribute to underrepresentation of minority groups in mathematics. One of these factors is the opportunity gap that exists for this group of students.

Jeremiah Hower, Visiting Instructor Department of Mathematics and Statistics, Florida International University

Learning Assistants in Lower Division Math Courses

Florida International University utilizes learning assistants in varied ways in a number of disciplines. We will discuss how they are being used in College Algebra, within our Mastery Math Program. This will touch on the training, planning, and organization in place for them. Learning Assistants have been key in helping our students succeed and raising our College Algebra pass rates significantly.
Hongde Hu, Chair and Professor, Department of Mathematics and Statistics, California State University Monterey Bay

*Developing Math Camps for College Preparation*

This presentation offers guidelines on how to design and conduct one- to three-week math camps to help high school juniors/seniors, incoming freshmen and current college students prepare for college-level math courses. We will share such aspects of the Math camps as faculty collaboration in designing effective curricula, early-alert systems for at-risk students, innovative instruction techniques, tutorial assistance in the classroom, and integration of technology instruction and assessment.

Brendan Kelly, Preceptor of Mathematics, Harvard University

*Supporting our Students*

This talk will include a description of the current efforts set up at Harvard and the University of Utah to support students that are not prepared for a first semester calculus class. The two programs both aim to make sure students are provided with the skills and mathematical habits of mind to help students accomplish their future goals. This talk will discuss the approaches at the two universities, comparing the pedagogy, institutional identity, class size, mathematical topics, tutoring opportunities, and student success. The similarities and differences will highlight both successes and obstacles in supporting students.

Jacob Koehler, Mathematics Coordinator, CUNY At Home in College

(Parallel session moderated by Jacob Koehler).

Judith Kysh, Professor of Secondary Education and Mathematics, San Francisco State University

*Revitalizing Algebra in Remedial Courses While Preparing Instructors*

At San Francisco State we have created materials for developmental mathematics courses that are designed to acknowledge and leverage students’ prior leaning and that provide a vehicle for moving forward, while at the same time reviewing what they need to know. During class students work collaboratively on challenging problems. Recognizing that we need to teach these courses differently and that instructors need preparation to do that, for the past several years we have been offering a 3-unit course (teaching workshop) for all of the entering graduate students who teach our developmental courses. We have been using our materials for elementary algebra in all of our sections for the past three years; intermediate algebra is currently in its fourth round of field testing; and we are beginning work on pre-calculus. We also have encouraging data on levels of success.

Marie McClendon, Math Professor, Pasadena City College

*Basic Skill Math Students Can Be STEM Ready in One Semester*
Incoming community college students are routinely placed into math courses 1 – 4 levels below transferable courses. Many of these students have successfully completed Algebra 2 or above in High School and are forced to repeat material, taught in the same manner, and become quickly discouraged. Pasadena City College allows qualified students to directly enroll in Fast Track Intermediate Algebra providing remediation, peer lead workshops, and individualized counseling throughout the semester. Students remediate their individual math deficiencies while learning Intermediate Algebra. Under-placed students are college math ready in one semester, burnout and dropout rates are reduced, and student success is increased by using pre-semester boot-camps, personalized remediation, embedded counseling, and differentiated instruction. Fast Track Intermediate Algebra has demonstrated success, and the program is expanding to help under-placed STEM declared majors enroll in a paired Fast Track and Introductory Chemistry class. The cohort is able to enroll in Pre-Calculus and General Chemistry the following semester. Intermediate Algebra, Pre-Calculus, Introductory Chemistry and General Chemistry are impacted courses and this provides a direct STEM PATHWAY. The framework for the course, financial impact for both the college and students, the success and the challenges will be provided. Learn from our mistakes and successes.

**Umesh Nagarkatte, Ph.D., Professor and Chair, Department of Mathematics, Medgar Evers College, CUNY**

*Medgar Evers College Math Department Initiative in Theory of Constraints to Stem Attrition*

In urban colleges, student attrition due to absenteeism and failure has been a common problem. Attrition happens because students get bogged down by academic and non-academic issues. In 2002, three faculty members including the Chairperson of Department of Mathematics, Medgar Evers College, CUNY found that The Theory of Constraints (TOC) and its logic-based Thinking Processes (TP) tools can address both types of issues. They had a two-weeks formal “Jonah” training in TOC and TP at Goldratt Institute, New Haven, CT, in January, and the chair got the faculty agreement in departmental meetings for a new approach during Spring 2002. The TP tools are: Evaporating Cloud (necessity logic) helps resolve conflicts, a Branch (sufficiency logic) helps solve word problems and prove theorems as well as see the (negative or positive) consequences of certain actions, an Ambitious Target Tree also called Prerequisite Tree (necessity logic) helps solve certain word problems and curriculum development as well as list obstacles to attain a goal, and develop action and project plans to attain the goal. This talk will describe the successes and lessons learned from the resulting project.

**Diane Resek, Professor Emerita of Mathematics, San Francisco State University**

See the abstract for Judith Kysh.

**Katherine Stevenson, Professor of Mathematics and Director, Developmental Mathematics, California State University, Northridge; Workshop Co-Organizer**

*Keep It, Change It, Flip It*
We will discuss an innovation that started at the CSU for entry level college courses. It has grown into a network of programs at more than half of the CSUs and four LA community colleges engaging over 10,000 students each year. The common theme of the programs is the creation of a “flow of learning.” Each implementation is tailored so as to maximize local talent, resources, and infrastructure.

Jacqueline S. Ward, Ph.D., Assistant Professor, Mathematics, Long Beach City College

*Ethnomathematics in the Developmental Math Classroom*

The presentation summarizes a study exploring developmental students’ beliefs on mathematics and makes a case for incorporating ethnomathematics in the classroom. The study focused on, (1) the cultural characteristics and practices that contribute to learners’ beliefs on mathematics, and (2) how explicitly creating experiences for students to make connections between classroom mathematics and their individual cultures may affect these beliefs. Students’ freehand drawings were analyzed for insights into the cultural basis of their beliefs. Students were introduced to the field of ethnomathematics and asked to mathematize something from their own cultures using concepts from class. Study results and directions for future research will be discussed.

Benjamin Wiles, Assistant Department Head, Mathematics, Purdue University

*Policy, Procedures, and Culture in Curricular Structure and Mathematics Placement*

Over the last ten years, we have seen a 70% decrease (from 2,932 in Fall 2004 to 860 in Fall 2014) in enrollments in Intermediate and College Algebra courses at Purdue University. We will discuss the ecosystem in which this occurred, present high-level statistics, and relate how the Department of Mathematics has positioned itself to provide educational services at appropriate levels to all our students. Future plans for curricular design and symbiosis with developmental mathematics will be covered.

Yoshi Yamato, Director Math Resource Center, Pasadena City College

See the abstract for Marie McClendon.