

NNN Contributions

NETWORK FOR ACADEMIC RENEWAL CONFERENCE

TRANSFORMING STEM EDUCATION: Inquiry, Innovation, Inclusion, and Evidence

Westin Gaslamp Quarter | San Diego, California October 31 – November 2, 2013

Pre-Conference Workshops

Integrating Sustainability and Quantitative Reasoning across the Disciplines

Workshop facilitators from the National Numeracy Network will share a new approach to applying quantitative reasoning in solving authentic and urgent problems affecting the Earth. Participants will work together in teams to develop activities, projects, and modules that use mathematics and real - world data to investigate and model sustainability topics, including the health of our global commons, the creation and usage of energy, population growth and biodiversity, social justice, and climate change. These and other data - driven topics are designed to engage students actively in the classroom and motivate students to pursue STEM courses and fields of study more deeply.

Caren Diefenderfer, Professor of Mathematics—Hollins University; Eric Gaze, Director, Quantitative Reasoning Program—Bowdoin College; and Corrine Taylor, Director, Quantitative Reasoning Program—Wellesley College. Sponsored by the National Numeracy Network

Concurrent Sessions

CS 6: HEDs Up — National Numeracy Network This session will include three presentations followed by time for questions and discussion.

THEME 1: ADVANCING INTEGRATIVE AND PROBLEM-CENTERED STEM LEARNING.

The National Numeracy Network: An Informational Session.

The National Numeracy Network (NNN) promotes education that integrates quantitative skills across all disciplines and at all levels. Towards this goal, the network supports faculty development, curriculum design, assessment strategies, education research and systemic change. The network is the professional organization serving and promoting collaborations among those students, educators, academic centers, educational institutions, professional societies, and corporate partners sharing our vision. The network also strives to keep issues of quantitative literacy at the forefront of national and international conversations about educational priorities. Members of the NNN will share information on various activities and projects of the organization, including the NNN open-access journal, *Numeracy: Advancing Education in Quantitative Literacy*. Caren Diefenderfer, Professor of Mathematics—Hollins University; Eric Gaze, Director of the Quantitative Reasoning Program—Bowdoin College; Corri Taylor, Director of the QR Program — Wellesley College; and Nathan Grawe, Associate Professor Economics — Carleton College

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THEME 1: ADVANCING INTEGRATIVE AND PROBLEM-CENTERED STEM LEARNING

Should a Quantitative Reasoning Foundations Course Satisfy a Prerequisite for Mathematical Proficiency?

A college remedial math course reviews and instructs on concepts that students have often been exposed to multiple times, usually without meaningful context. These courses stand as the gatekeepers for many majors and career paths, as well as degree completion. Yet even students who pass through the gate struggle to transfer skills to subsequent courses. A quantitative reasoning course that emphasizes algebraic thinking, modeling, and appropriate uses of technology can meet the same need as the remedial math course and better equip students to problem solve, think critically, and effectively communicate quantitative ideas. Margot Black, Math Skills Center Director — Lewis & Clark College

THEME 2: SUPPORTING UNDERREPRESENTED STUDENT ACHIEVEMENT AND REVERSING THE TALENT LOSS IN STEM FIELDS

Quantway®: Carnegie's Networked Improvement Community Approach to Mathematics.

The Carnegie Foundation for the Advancement of Teaching created the quantitative reasoning course Quantway® as an alternative to the traditional beginning algebra and intermediate algebra developmental math courses found at most community colleges. This mathematics pathway has proven to provide three times the success in half the time for getting students through their math requirements in order to pursue a college degree. A large part of this success can be credited to the use of a Networked Improvement Community (NIC) working around a common problem to develop and improve the quantitative reasoning curriculum, faculty teaching abilities, and associated support tools. The facilitator will describe the Quantway® pathway and the varied aspects of our NIC. She will also argue and provide evidence that such a community is important for sustained work on an educational reform project. Cinnamon Hillyard, Senior Associate, Director of Network Development and Relations—Carnegie Foundation for the Advancement of Teaching.

Source: <http://www.aacu.org/meetings/stem/13>

Integrating Sustainability and Quantitative Reasoning across the Disciplines

2013 STEM Higher Education Conference: Featured Speakers



Caren Diefenderfer, Hollins University

Caren L. Diefenderfer, professor of mathematics, joined the Hollins University faculty in 1977. Her scholarly interests have included work in approximation theory, graph theory and computer graphics, and applications of linear algebra and abstract algebra. She has been a co-PI on two recent NSF grants, Quantitative Reasoning and the Contemporary World (QRCW, 2007-2011) and Using Research to Shape Instruction and Placement (URSIP, 2011-present).

Diefenderfer is currently the MD-DC-VA governor of the Mathematics Association of America. She is also the president of the National Numeracy Network (NNN) and has been on the NNN Board of Directors since 2008. Diefenderfer served as chief reader for the College Board's Advanced Placement Calculus program from 2004 to 2007. In that role, she was one of a group of scholars responsible for setting standards for the national examination.

A summa cum laude mathematics graduate of Dartmouth College, Diefenderfer earned M.A. and Ph.D. degrees from the University of California at Santa Barbara.



Eric Gaze, Bowdoin College

Eric Gaze directs the Quantitative Reasoning (QR) program at Bowdoin College. He is a past chair of SIGMAA-QL, board member of the National Numeracy Network (NNN), and NNN Vice President. He writes a column, Ratiocination, for the NNN website: <http://serc.carleton.edu/nnn/columns.html>. Dr. Gaze has given talks and led workshops on the topics of QR Across the Curriculum, Creating a QR Entry Point Course, Writing with Numbers, QR Assessment, and Running a QR Program. He is the principal investigator for a National Science Foundation Teaching Undergraduate Education in Science, Technology, and Mathematics grant (2012-13), Quantitative Literacy and Reasoning Assessment (QLRA) DUE 1140562. This collaborative project builds on Bowdoin College's QR instrument. Prior to coming to Bowdoin, Dr. Gaze led the development of a Masters in Numeracy program for K-12 teachers at Alfred University as an associate professor of mathematics and education.

Source: <http://www.aacu.org/meetings/stem/13>