NEMATYC 2016
42nd ANNUAL CONFERENCE

Friday–Saturday, April 29-30, 2016

Cape Cod Community College

2240 Iyannough Road

West Barnstable, MA 02668

Mary Kehoe Moynihan

Wanda Garner

Co-chairs

FRIDAY

Friday, April 29, 2016	**Cape Cod CC**	
Registration Open:	2:30 pm – 5:00 pm	**Grossman Common Building**
Exhibitor Displays:	2:30 pm – 5:00 pm	**Cafeteria**
Sessions Begin:	3:15 pm	

Friday Evening Beachfront Pizza Party and Social   6:30 pm – 8:30 pm
Commodore House at the Corsair & Cross Rip Oceanfront Resort
Sponsored by Pearson

SESSIONS

Session 1   **Friday**   **3:15 pm – 4:00 pm**   **Room: Tech 213 (Solarium)**

Aaron Wan	Cape Cod CC	West Barnstable, MA
Mary Kehoe Moynihan	Cape Cod CC	West Barnstable, MA
Panelists from Cape Cod CC:	Scott Anderson	Arts and Design
	Hemant Chikarmane	Microbiology
	Laura Seabury	Nursing

Talking Math in a Non-Math Course

Math is often offered as a service course for other disciplines, but how do our colleagues and students in those disciplines actually view it in their work? In this panel discussion, several faculty members will talk about what kind of math is relevant to their discipline and classrooms. The session will conclude with an open discussion on how to support these ideas in our math classes.

Session 2   **Friday**   **3:15 pm – 4:00 pm**   **Room: North 104**

Eiki Satake   Emerson College   Boston, MA

Teaching an Application of Bayes' Rule for Legal Decision-Making

Although Bayesian methodology has become a powerful approach for describing uncertainty, it has largely been avoided in undergraduate statistics education. Here we demonstrate that one can present Bayes' rule in the classroom through a hypothetical, yet realistic, legal scenario designed to spur the interests of students in introductory- and intermediate-level statistics classes. The teaching scenario described in this research talk not only illustrates the practical application of Bayes' rule to legal decision-making, but also emphasizes the cumulative nature of the Bayesian method in measuring the strength of the evidence. We also introduce DNA analysis, implement a modified version of Bayes' rule,

and utilize Bayes factor in the computation process to further promote students' intellectual curiosities and incite lively discussion pertaining to the jury decision-making process about the defendant's status of guilt.

Session 3   **Friday**   **4:15 pm – 5:00 pm**   **Room: Tech 213 (Solarium)**

Lori Leonard   Fitchburg State Univ   Fitchburg, MA

Supplemental Instruction Pilot in Applied Statistics at Fitchburg State

Fitchburg State University implemented a pilot that placed students with a high school GPA 2.7 and above directly into applied statistics classes, even if they did not pass the Mathematics Placement Test (Elementary Algebra Accuplacer). In addition we added 50 minutes of required supplemental instruction to every section of applied statistics to help underprepared and struggling students. This presentation will give more details about this pilot including the difficulties, benefits, results, what we learned, and potential plans for the future.

Session 4   **Friday**   **4:15 pm – 5:00 pm**   **Room: North 104**

Fei Xue   Univ of Hartford   West Hartford, CT
Mako Haruta   Univ of Hartford   West Hartford, CT

Flipping Calculus: Classrooms Circa 2016 vs. Circa 1996

This session provides an overview and justification of a departmental project to flip Calculus at the University of Hartford. In our newly designed classrooms with round tables and multiple projectors, students at each table are assigned at least one iPad so that they can project their work wirelessly and present to the whole class. Technologies used in our project, such as iPads, a student response system (clickers), and software for creating videos will be introduced. Also, we will discuss how to achieve the same amount of student engagement using mobile equipment that fits in a backpack.

Session 5   **Friday**   **4:15 pm – 5:00 pm**   **Room: Tech 204**

Tony Furtado   Cape Cod CC   West Barnstable, MA

Do You Desmos?

DESMOS is an advanced graphing calculator available online and as a mobile application. Use it once and you will never want to use your old TI again. In this presentation, we'll explore some tips and tricks to using this FREE interactive software in the classroom. Specifically, we'll look at its uses in the teaching of transformation of graphs, systems of equations/inequalities, finding max/min/zeros of polynomial functions, regression analysis, linear programming, and more!

Friday Evening Beachfront Pizza Party and Social   6:30 pm – 8:30 pm
Commodore House at the Corsair & Cross Rip Oceanfront Resort
Sponsored by Pearson

SATURDAY

Saturday, April 30, 2016		Cape Cod CC
Continental Breakfast	8:00 am – 8:30 am	**Grossman Common Building**
Welcome	8:30 am – 8:45 am	Cafeteria
Registration Open:	8:00 am – Noon	
Exhibitor Displays:	8:00 am – 4:00 pm	
Sessions Begin:	9:00 am	
Dedicated Exhibitor Time:	11:45 am – 12:15 pm	**Grossman Common, Cafeteria**
Lunch & Awards:	12:15 pm – 1:15 pm	
Keynote Address:	1:15 pm	
Sessions Resume:	2:00 pm	
NEMATYC Business Meeting	4:00 pm – 5:00 pm	Tech 213 (Solarium)

Keynote Address
SATURDAY
1:15 pm – 1:45 pm

Teaching Abstraction-as-Process
Dr. George Cobb   Mount Holyoke College
FEATURED SATURDAY SPEAKER

Professor George Cobb is Professor Emeritus of Mathematics and Statistics at Mount Holyoke College. George has long been an active, influential leader in the teaching of statistics. He is a Fellow of the American Statistical Association (ASA) and a recipient of ASA's Founders Award. He received the USCOTS Lifetime Achievement Award in 2005.

Teaching Abstraction-as-Process
Teaching mathematics at two-year colleges is rightly recognized for two important reasons: (1) Two-year colleges offer a transition from high school to four-year college. (2) Mathematics is useful to non-mathematicians mainly because of its applications.
I applaud both reasons, but in my talk I plan to argue for two more ambitious albeit less recognized reasons. (1) Although TYCs matter because they offer a transition to four-year colleges, they matter even more because they offer a transition from high school classes to life-long learning. (2) Although mathematics can be useful because of its applications, it can be even more useful because it can inspire students to value abstraction-as-process.
These two ambitious goals are related. Applications of mathematics depend on models, and as the statistician George Box wrote, "All models are wrong; some are useful." Finding a good model depends on the process of abstraction: How do we put a messy problem into our crucible, boil off the irrelevant detail, and reveal the crystal of pure structure? If we teach

mathematics as the process of abstraction, we can teach mathematics as part of life long learning.

In my talk I will rely on an example derived from the nastiest-ever academic food fight over the meaning of a big table of 0s and 1s. (Along the way I'll introduce some ideas that underlie the important new computational method known as Markov Chain Monte Carlo.) Resolving the food fight depends on the process of abstraction. Once viewed abstractly, the problem turns out to have a simple structure.

Brief Biographical Highlights

George Cobb has spent his entire life changing his mind and looking for cusps to perch upon. His childhood ambitions, in succession, were to be a herpetologist, a center for the Green Bay Packers, a surgeon, a chemist, and, by the end of his senior year in high school, aspiring ever upward, a mathematician. It is no surprise, therefore, that when he graduated from Dartmouth in 1968 he had been accepted into graduate programs in Russian literature. Like Mae West, he drifted, eventually earning a PhD in statistics from Harvard in 1974, but he maintains his love for mathematics and his conviction that Plato was right: mathematics is the easiest subject, and so every philosopher king should devote a decade to its study before presuming to tackle the harder subjects of politics and sociology. Cobb spent his entire teaching career at Mount Holyoke College, from 1974 until his retirement in 2007, dedicated to this conviction.

SESSIONS

Session 6   **Saturday**   **9:00 am – 9:45 am**   **Room: Tech 213 (Solarium)**

Robert Carver   Stonehill College   North Easton, MA

Updating the GAISE College Report

The first GAISE (Guidelines for Assessment and Instruction in Statistics Education) College Report came out in 2005. Over the past ten years our discipline has changed in many ways, including but not limited to what type of data is easily available, the technology that we use, as well as how we teach students. In this presentation we will briefly start with how the new GAISE 2016 guidelines and goals have changed, including the two new emphases of statistical thinking: giving students experience with multivariable thinking and with the investigative process. So how do you start to implement these new ideas? This presentation will demonstrate an activity that shows how to illustrate multivariable thinking using technology in the classroom, then invite discussion on how the activity can be adapted for different learning environments (flipped classroom, completely online, technology challenged).

Session 7   **Saturday**   **9:00 am – 9:45 am**   **Room: North 103**

Glenn Newman   Newbury College   Brookline, MA

The Mastery Model in Teaching Beginning Algebra

For the last few years the mathematics department at Newbury College has been concentrating on improving MH103-Intergrated Algebra. Previously the department taught traditional Algebra I and Algebra II. There was a lot of overlap in those two courses so it was decided that one course would suffice. Also, students retook any exam in which they scored less than seventy-five percent. Exams were given during a lab section. At the time students were not required to attend lab except to take exams. Students who did not finish the course but completed three of the five exams were allowed to finish (on their own time) during the following semester. We have since adjusted the course and the passing rates have increased to roughly 80%.

Session 8   **Saturday**   **9:00 am – 9:45 am**   **Room: North 104**

Anne O'Shea   North Shore CC   Danvers, MA

Reach Every Student in Every Class Every Day: Flipping Calculus and Precalculus

Having incorporated only a few "flipped" lessons in my Precalculus and Calculus courses for many years, I finally decided to go all in. In the fall of 2014, I spent my sabbatical semester developing materials for both a flipped Calculus 1 and Precalculus 2 course.   Now in my third semester of using the flipped model, I would like to share some of my successes and failures along the way and resources to help you get started.   Attendees are encouraged to share their experiences with the flipped model as well.

Session 9   **Saturday**   **9:00 am – 9:45 am**   **Room: North 106**

Dave Sobecki   Miami Univ   Hamilton, Ohio

Finally! A Curriculum that WORKS for Non-STEM Students

Here's the worst-kept secret ever: The traditional math curriculum was not designed with non-STEM students in mind. In essence, we've treated every course as preparation for the next course, with little thought to the fact that most students will stop somewhere in the middle. Fortunately, momentum is growing nationally, and of course in New England, for an alternative pathway that is more accessible and (more importantly) more appropriate for non-STEM students. Dave will describe two new courses that will not only fulfill math requirements for non-STEM students more quickly, but will also be a much richer and more useful experience for those students: Math Literacy (developmental level), and Quantitative Reasoning (college level).

Session 10   **Saturday**   **9:00 am – 9:45 am**   **Room: Tech 102**

Joe Heise   New Hampshire Tech Inst   Concord, NH

Solving Linear Programming Problems Using SIMPLEX on a TI-Calculator

This workshop will solve two linear programming problem examples (maximization and minimization), using both the graphical method ("by hand") and a TI-calculator based program, SIMPLEX. We will work through a traditional approach using the simplex method and pivots and then do the same problems using the SIMPLEX program. It's very difficult, if not impossible, to get through a Finite Math course syllabus if linear programming problems are solved "manually." A colleague, Peter Furmonavicius, wrote SIMPLEX for the TI-calculator that reduces the time required to teach linear programming by more than half. Attendees should bring their TI-83/84 calculators. A free copy of the program will be shared. The workshop is self-contained: an attendee does not have to know anything about linear programming - just knowledge of linear equations. We will do everything from scratch.

Session 11   **Saturday**   **10:00 am – 10:45 am**   **Room: North 103**

Billy Jackson   North Shore CC   Danvers, MA

Methods and Results From a Flipped Statistics Classroom

You've heard about flipping your classroom and you've thought about it yourself. It sounds like so much fun (right?!), but so much work (!). This presentation will lay out a simple and portable model for flipping a statistics classroom right down to providing an available affordable textbook ($40) that comes with a complete set of prepared YouTube video lectures, a complete set of group work exercises for class, and an online software (WebAssign) for supplementary practice. The presentation will also discuss the presenter's quantitative findings from one semester of flipping the classroom and results of student surveys.

Session 12   **Saturday**   **10:00 am – 10:45 am**   **Room: North 106**

Nathan Kurtz   Glendale CC   Glendale, CA

MindTap Math Foundations by Cengage Learning

Learning math isn't easy for everyone. That's why MindTap is different. MindTap guides students through the curriculum in a way that fits into their lifestyle. MindTap confirms what students know and helps them persist through what may be difficult. Unlike any other math programs, MindTap draws students into the content through an engaging learning experience. Students learn new skills in quick learning bursts, practice through game activities, and stay in touch with their instructor and classmates using chat and whiteboard tools across the developmental math curriculum.

Session 13   **Saturday**   **10:00 am – 11:30 am**   **Room: Tech 213 (Solarium)**

Maureen Woolhouse	Quinsigamond CC	Worcester, MA
Andreana M. Grimaldo	Quinsigamond CC	Worcester, MA
Meredith Watts	Massachusetts Bay CC	Framingham, MA
Linda Dart-Kathios	Middlesex CC	Lowell, MA
Autumn Alden	Bristol CC	Fall River, MA
David Timmons	North Shore CC	Danvers, MA

High School GPA in College Math Placement - Take 2

At NEMATYC 2015, a panel was convened to discuss the pilot programs used by several campuses for placement of students into their mathematics courses using high school GPA. Back by popular demand, let's reconvene and talk some more! Let's discuss current pilot programs, updated data, and more recent Board of Higher Education recommendations. Gather information on what has worked, and what lessons learned may assist you in designing a successful structure at your college. This session will include open sharing and discussion between institutions.

Session 14   **Saturday**   **10:00 am – 11:30 am**   **Room: North 104**

Jay Jenkins	Pearson Education	Boston, MA

Creating the Right Path for Your Students Using Math Technology

Whether you are new to MyMathLab or have used it for years, this workshop will present new functionality, approaches, and features that will help you create, edit, and implement successful courses for STEM and NON-STEM Pathways. Along the way we will discuss features that can encourage retention and success through personalized and mastery-based learning. We will also spend time going over our exciting new features for interactivity in the classroom, Adaptive Practice, and NEW Mathspace assignments that emphasize the steps and process.

Session 15   **Saturday**   **11:00 am – 11:45 am**   **Room: North 103**

Phyllis Keenan	Greenfield CC	Greenfield, MA

Improving Learning for Developmental Math Students with Hidden Disabilities

Find out about methods to provide more successful learning outcomes for the first semester developmental math students with hidden disabilities. Many students in these courses have hidden disabilities such as anxiety, high functioning autism, ADHD, or PTSD which affects their learning. The first semester students also have the challenges of learning to be a college student. Topics covered include setting up the classroom, the course, and the instruction to improve learning for the students.

Session 16   **Saturday**   **11:00 am – 11:45 am**   **Room: North 106**

Barry Woods   Unity College   Unity, ME

Bonferroni Confidence Intervals Using Excel

While Tukey multiple comparison tests are used to find significant differences in means after a significant ANOVA, Bonferroni confidence intervals are used to find significant differences in proportions after a significant chi-square goodness of fit test. Excel and the TI graphing calculator will be used to construct such confidence intervals. Examples using M&Ms and from Wildlife Biology will be used to demonstrate the construction of the Bonferroni Confidence Intervals.

Session 17   **Saturday**   **11:00 am – 11:45 am**   **Room: Tech 102**

Mel Henriksen   Wentworth Inst of Tech   Boston, MA

Leveraging Common Technologies for Classroom Use

We've used several common technologies to enhance the classroom experience and alter the office hour experience. These activities include wireless interactive video in the classroom, virtual office hours using an iPad, Gotomeeting, and several other apps, Clickerless clickers using any web device routinely wirelessly project from an iPad to the classroom screen. Materials projected include live lecture notes, live plots and graphics. By using multi-touch gestures material can be easily zoomed and translated to emphasize key points. All this can be done while walking around and engaging students in the discussion. We connect with one or more students over the web for virtual office hours, using a virtual white board. Armed with the proper technology on their end, students can try their hand at solutions as we observe. Rather than distribute dedicated clickers, we hold in-class quizzes or engage in peer-teaching time using the "clickers" students already have: their phones

Session 18   **Saturday**   **2:00 pm – 2:45 pm**   **Room: North 103**

Magdalena Luca   MCPHS Univ   Boston, MA

Addressing First-Year Students' Math Issues

At our university, students are enrolled in a variety of health sciences programs, from pharmacy to dental hygiene, nursing, and health management. In the last decade, new courses were designed, and significant curriculum changes were successfully implemented in all programs in order to address general student retention, motivation to do mathematics, and success in obtaining professional licenses. This presentation will describe program-specific initiatives undertaken by the mathematics faculty: the development of several new courses such as Math for Nurses, Math for Dental Hygienists, Biostatistics, and Business Math and Computer Applications; the redesign of the Statistics course; and the creation of a Math & Physics Center. Data supporting our students' improved success will also be presented. Participants will engage in a discussion about what challenges they face when teaching math to first-year students, and how they overcome such challenges.

Session 19 **Saturday** **2:00 pm – 2:45 pm** **Room: North 104**

George Cobb Mount Holyoke College South Hadley, MA

Open Conversation with Dr. Cobb
Participants are invited to continue the conversation with our keynote speaker, Dr. George Cobb, in an open informal format.

Session 20 **Saturday** **2:00 pm – 2:45 pm** **Room: North 106**

Jillian McLeod U.S Coast Guard Academy New London, CT

Rado's Columns Condition

In 1933 Richard Rado characterized all finite partition regular matrices using the columns condition. Partition regular matrices arise in finite and infinite Ramsey theory and correspond to the coefficient matrix of a linear system of homogeneous equations having a monochromatic solution under any finite partition of the natural numbers. The columns condition consists of two very linear algebraic properties that characterize such matrices. In this presentation, Jillian will generate examples that can be used in the classroom to facilitate discussions about spanning sets, rank, null space, and dependence.

Session 21 **Saturday** **2:00 pm – 3:30 pm** **Room: Tech 213 (Solarium)**

Myrta Groeneveld Manchester CC Manchester, CT

What Do You Know About Math_____?

What do I know about math_____? What is an accelerated combined course? How are the students placed into an accelerated course? What is embedded support for such course? How much support is needed to increase retention and success? Manchester Community College has redesigned the developmental mathematics sequence twice. From fall 2011 to spring 2013 we offered Pre-algebra and Elementary Algebra using Flexible Emporium. Since fall 2013 we have offered accelerated combined courses of Pre-algebra and Elementary Algebra, Elementary Algebra and Elementary Algebra and Intermediate Algebra. This model modularizes the course content of pre-algebra, elementary algebra and intermediate algebra into eight modules and adopts a mastery approach. Come and find out how this model is working and what the passing rate is.

Session 22   **Saturday**   **3:00 pm – 3:45 pm**   **Room: North 103**

Robert Cournoyer   Wentworth Inst of Tech   Boston, MA

Designing Straight, Spiral, and Circular Staircases

Two problems will be demonstrated leading to a design of spiral and circular staircases. The first
problem will show how a straight staircase can be designed that conforms with local building codes as
well as an architectural "comfort" rule. The presentation shows how the building codes and the
architectural "comfort" rule can be translated into simple linear inequalities. The graphing of these
linear inequalities leads to a feasibility region. The second problem will build upon the first. By using
the properties of isosceles triangles and some simple right triangle trigonometry, spiral and circular
staircases can be designed to conform to local building codes as well as a "comfort" rule.

Session 23   **Saturday**   **3:00 pm – 3:45 pm**   **Room: North 106**

Andreana M. Grimaldo   Quinsigamond CC   Worcester, MA

Let's Share "Apps"!

Come join a session of sharing that will feature many proven classroom "apps" and strategies that can
be put to use immediately! Discussion will include implementing and controlling the use of students'
devices to enhance, and not undermine, learning. The audience will be encouraged to share their
favorite "apps" and their implementation into the classroom. For new, experienced, or skeptical
"app"-ers.

Session 24   **Saturday**   **3:00 pm – 3:45 pm**   **Room: Tech 102**

Valeria D'Orazio   Quinsigamond CC   Worcester, MA

Statistics Using SAS

Community colleges offer students a practical way to transition to employment in a real-world
environment. STEM occupations are among the fastest growing job fields, and SAS (Statistical Analysis
System) programmers are in high demand. Using a free version of SAS, instructors can demonstrate
methods to perform common statistical procedures, which allow students to gain hands-on experience
with real-world applications. Because of the predefined, built-in "Tasks" element of SAS, students can
use this product to investigate data without any programming skill required.

Thank you for participating in the conference. Have a safe trip home.

Mary and Wanda

Many thanks to our sponsors!

Cengage

CenterofMath

MathTV

McGraw-Hill

Pearson

NEMATYC

RELAX, REFRESH, RENEW *AGAIN*
@ CAPE COD COMMUNITY COLLEGE

Front cover logo Nick Heaney, back cover logo Kelly Richardson; CCCC Arts and Design students