

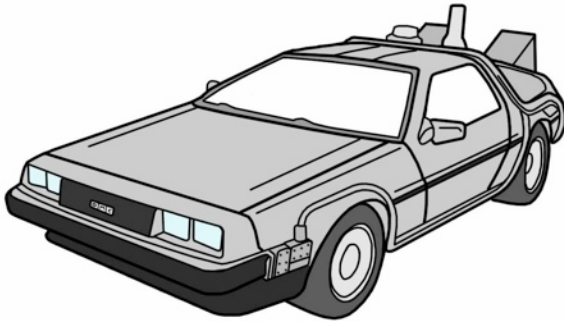
# NEMATYC 2018

44<sup>th</sup> Annual Meeting

## Applying Mathematics to the Future

April 6–7, 2018

Dean College, Franklin, Mass.



# CONFERENCE SCHEDULE

(All locations in Dean's Campus Center)

Saturday, April 7, 2018

- 8:00 a.m. – Registration**  
12:00 p.m. Guidrey Center
- 8:30 a.m. – Welcoming Remarks and Continental Breakfast**  
9:00 a.m. Guidrey Center
- 9:00 a.m. – Presentations**  
9:45 a.m. Campus Center
- 9:45 a.m. – Dedicated Exhibitor Time**  
10:15 p.m. Guidrey Center
- 10:15 a.m. – Presentations**  
11:00 a.m. Campus Center
- 11:00 a.m. – Dedicated Exhibitor Time**  
11:30 a.m. Guidrey Center
- 11:30 a.m. – Presentations**  
12:15 p.m. Campus Center
- 12:15 p.m. – Lunch**  
1:00 p.m. Smith Dining Center
- 1:00 p.m. – Keynote Speaker & Awards**  
1:45 p.m. Guidrey Center
- 2:00 p.m. – Presentations**  
2:45 p.m. Campus Center
- 3:00 p.m. – Business Meeting**  
4:00 p.m. Campanella Board Room

# KEYNOTE SPEAKER

## Dr. Mira Bernstein, Tufts University

"Gerrymandering: Why It's More Complicated Than You Might Think"



Gerrymandering has been with us since at least 1812, when Massachusetts governor Elbridge Gerry tried to gain advantage for his party by drawing such a convoluted-looking electoral district that local newspapers dubbed it "Gerry's salamander". Yet by today's standards, the original "Gerry-mander" was actually quite tame. In the past few decades, big data and increasingly sophisticated redistricting

software have allowed politicians to fine-tune their maps with such precision that it is now common for a party that gets fewer than half the votes, yet win more than half the legislative seats.

Obviously, gerrymandering poses a serious threat to democracy -- but unfortunately, its legal status is in limbo. The Supreme Court has consistently held that some political considerations are legitimate when drawing district lines, but that at some point it becomes unconstitutional. The question is, what is that point? For over 30 years, the Court has struggled to come up with a "judicially discernible and manageable standard" for what constitutes illegal partisan gerrymandering. It now seems clear that the solution will have to include some method of quantifying and measuring the relevant concepts, like "partisan fairness" or "bizarreness of shape". Doing this in a way that makes sense both intuitively, mathematically, and constitutionally turns out to be much trickier than you might think. In this talk, I will describe the recent efforts of mathematicians, statisticians, political scientists, and computer scientists to help the Court solve the gerrymandering puzzle, and discuss the ways in which educators and regular citizens can participate in this process as well.

**Bio:** Mira Bernstein is on the research faculty at Tufts University and a founding member of the Metric Geometry and Gerrymandering Group at Tufts. She received her PhD in pure mathematics from Harvard in 1999, but since 2008 her work has focused on using mathematics to solve social problems -- from exploring the effects of extending health insurance to low-income populations to combatting slavery and forced labor throughout the world. Mira is also very active in mathematics education. She loves getting her students to see that mathematics, far from being scary and boring, is powerful, fascinating, and highly relevant to their lives.

# PRESENTATIONS

Session 1: Campus Center 201 (9:00-9:45 a.m.)

## **How can we start a class: Activating Student Thinking**

Elena Heineke, Quincy College

Teaching mathematics is about facilitating mathematical development. This means that we cannot get all learners to the same landmarks at the same time and in the same way. First activity during the class is very important, in this time students are directed to think and ask questions about the topic they are about to study. The beginning of a math lesson has the purposes of: mentally preparing students for learning by activating prior knowledge, ensuring that students understand the lesson task and what is expected of them from their work without specifically being told how to do it.

Session 2: Campus Center 202 (9:00-9:45 a.m.)

## **Comparing Traditional and Accelerated Pre-Calculus Courses**

Kim Ward, Eastern Connecticut State University

Precalculus Mathematics and Precalculus Mathematics Plus are two courses in the Math Foundations Program at Eastern Connecticut State University. One is traditional and the other is accelerated. In Spring 2016 we began administering a common portion of the final exam to both forms of the precalculus courses. In this presentation, I will share the differences between the courses, the process for composing and delivering the common portion of the final exam, analyze a few questions from the common portion of the final exam and discuss future plans for modeling student academic practices and performance.

Session 3: Campus Center 203 (9:00-9:45 a.m.)

## **How I teach nonparametric statistics using Excel**

Barry Woods, Unity College

Following last year's NEMATYC conference, I will use Excel 2016 to demonstrate two more nonparametric statistics tests = Kruskal-Wallis and Wilcoxon Rank-Sum. In much the same way that the parametric ANOVA stat can be used to test three or more means, ANOVA can also be used to test two independent means (instead of the two-sample t-test). The nonparametric ANOVA Kruskal-Wallis stat can be used to test three or more medians; Kruskal-Wallis can also be used to test two independent medians (instead of the Wilcoxon Rank-Sum test). Two Tests – One Nonparametric Statistic: 1. Kruskal-Wallis 2. Wilcoxon Rank-Sum =  $\sqrt{\text{Kruskal-Wallis}}$

Session: 4: Campus Center 204 (9:00-9:45 a.m.)

**KNEWTON: Harnessing the Power of Data Insights and Adaptive Learning for Student Success**

Jason Jordon, Knewton

Preparing students who require extra support for success in credit-bearing courses is one of the biggest challenges in higher education. Learn how Knewton, a technology company with a passion for learning, is harnessing the power of data insights and adaptive learning to prepare students for success in the credit-bearing courses ahead of them.

Session 5: Campus Center 205 (9:00-10:30 a.m.)

**Teaching Probability and Decision Making Theory through the Game of Squash**

Carly Eckles, Dover-Sherborn Regional High School

Eike Satake, Emerson College

Pedagogically, one of the most effective ways to raise students' interests, and promote their knowledge, is to provide some relevant examples. In this seminar, we will illustrate the sport of Squash to teach probability-based decision-making theory. Under the current International Rules of Squash, a player can only earn a point if the player is also the server. If the server loses a rally, they lose the serve and the score remains unchanged. The ultimate goal of each player is to be the first to reach nine points to declare the winner. How do we maximize the chance of winning?

Session 6: Campus Center 201 (10:15-11:00 a.m.)

**Round Table Discussion: Student Efficacy Activities in the Mathematics Classroom**

Alex Cotter, Massasoit Community College

One of the key challenges community college educators face is helping students to understand and meet the expectations of the college classroom. Are there activities that you use in your classes to promote student efficacy and good academic habits of mind? Please come and share in a round table discussion format.

Session 7: Campus Center 202 (10:15-11:00 a.m.)

**Corequisite Acceleration: Faculty-Driven Model for Curricular Reform**

Sunny Kang, Bunker Hill Community College

Bunker Hill CC revised its developmental math curriculum in 2012 to improve student progression and completion. Elements critical to the reform include learner-centered teaching, integration of technology, attention to affective outcomes, and adoption of a growth mindset approach. The research, design, and implementation of the new program directly resulted from strong collaboration between the faculty, staff, and administrators while being entirely faculty-driven. More recently, both full-time and part-time faculty designed STEM and Non-STEM corequisite cluster courses that increase completion rates, integrating learner-centered curriculum with scaffolded learning engaging students through collaborative learning and teaching them how to solve contextualized problems. In addition, faculty adopted OER materials to address the financial needs of students. The curriculum also integrates extra supports that developmental students often need, such as supplemental instruction with in-class tutors. Since the reforms in 2012, full-time and part-time instructors have participated in an annual professional development workshop facilitated by full-time faculty with a consistently high participation rate. Participants will complete a pre-session reflection in which participants will be asked to reflect on challenges of broadly engaging faculty in developmental education curricular reform. There will also be an opportunity for a think-share and group brainstorm on addressing specific challenges to broadly engaging faculty in curricular reform work.

Session 8: Campus Center 203 (10:15-11:00 a.m.)

**Collaborative Statistics**

Jie Frye, Bunker Hill Community College

Students in the honor course will analyze a data set and tell a compelling and insightful story. They will team up with students from another honor course and apply a sociological lens to each story. Students will then present their stories on a poster at the 24th Massachusetts Statewide Undergraduate Research Conference. Results of this collaboration will be presented in my presentation.

Session 9: Campus Center 204 (10:15-11:00 a.m.)

**PEARSON EDUCATION: Pearson's MyLab Math: Pathways, Coreqs and Creating a Growth Mindset in Students**

Jay Jenkins, Pearson Education

Learn more about the future of MyLab Math (formerly MyMathLab) as well as current features that create a Growth Mindset for learning in students. This talk will focus on our current initiatives in helping schools develop Pathway courses, Corequisite models and new features that focus on student achievement. The talk is intended to be informative and allow for open discussions of the presented materials.

Session 10: Campus Center 201 (11:30-12:15 p.m.)

**Exploring Cryptography with Cryptool**

Valeria D'Orazio, Massachusetts Maritime Academy

In everyday life, we find ourselves sharing an ever increasing amount of sensitive information online, so much that Internet security is becoming a priority for both businesses and governments worldwide.

Cryptography is the science of designing indispensable protection mechanisms for securing data both on and off the Internet. Cryptool is the world's most-widespread, comprehensive, open-source e-learning educational program in the area of cryptography and cryptoanalysis. The easily approachable graphical user interface, extensive online help, multiple visualizations, analytic tools and algorithms of Cryptool introduce students who have no special knowledge of programming to the field of cryptography. The use of Cryptool facilitates a more interactive learning of cryptography than by many other means.

Session 11: Campus Center 202 (11:30-12:15 p.m.)

**Applying AMATYC's Resources to Your Future**

Judy King, New Hampshire Inst. of Tech. - Concord

AMATYC, NEMATYC's "parent" has many resources available but few of us are aware how many or what they are. This presentation will try to make sense of them and show how to benefit from their use.

Session 12: Campus Center 203 (11:30-12:15 p.m.)

**Integrated Learning. Leonardo da Vinci: Culture, Art and Math**

Evelina Lapierre, Johnson & Wales University

At Johnson & Wales University, we offer integrated learning courses. In the Fall of 2017, I debuted a course that I developed that integrates math, art and culture while examining Leonardo da Vinci's life, art and work as a military engineer. After some growing pains, it has become a popular course that runs nearly every term and is also offered in the summer as a study abroad experience in Florence, Italy. I will share my course syllabus, Johnson & Wales University's definition of integrated learning and our guidelines for developing an integrated learning course.

Session 13: Campus Center 204 (11:30-12:15 p.m.)

**What is ALEKS? Assessment and Learning in Knowledge Spaces**

Am Norgren, McGraw-Hill

What is ALEKS? Assessment and Learning in Knowledge Spaces is a Web-based, artificially intelligent assessment and learning system. ALEKS uses adaptive questioning to quickly and accurately determine exactly what a student knows and doesn't know in a course. ALEKS then instructs the student on the topics she is most ready to learn. As a student works through a course, ALEKS periodically reassesses the student to ensure that topics learned are also retained. ALEKS courses are very complete in their topic coverage and ALEKS avoids multiple-choice questions. A student who shows a high level of mastery of an ALEKS course will be successful in the actual course she is taking. ALEKS also provides the advantages of one-on-one instruction, 24/7, from virtually any Web-based computer for a fraction of the cost of a human tutor. Other questions about ALEKS? [https://www.aleks.com/about\\_aleks/overview](https://www.aleks.com/about_aleks/overview)

Session 14: Campus Center 205 (11:30-12:15 p.m.)

**A Programmer's Guide to MyOpenMath**

Joseph Manthey, University of Saint Joseph

MyOpenMath is a free learning management system providing online interactive homework. One of the limitations of using MyOpenMath is that the question libraries are smaller than those of its commercial competitors. In this session, we will learn to use the Internet Mathematics Assessment System (IMathAS) to write our own questions and thus contribute to the growing open educational resources (OER) ecosystem.



Session 15: Campus Center 201 (2:00-2:45 p.m.)

**Exploring a Holistic Math Pedagogy: An Educator's Experience**

Dena Feldman

According to the Occupational Information Network (O\*NET)\*, a "Bright Outlook" is predicted for quantitative occupations in the next decade, including jobs for mathematicians, software developers, and data analysts. To help prevent a workforce gap, math departments at two-year colleges are obviously called to increase student interest in — and success through — their quantitative- and logic-intense coursework. To help to address this challenge, this talk presents one perspective on "holistic" math pedagogy for two-year college courses. Built on personal experience, the talk outlines methodology, teaching strategies, and tactics to implement this viewpoint.

\*Sponsored by the U.S. Department of Labor/Employment and Training Administration

Session 16: Campus Center 202 (2:00-2:45 p.m.)

**OER Initiatives From Pilot to Movement**

Sophia Georgiakaki, Tompkins Cortland CC

Tompkins Cortland Community College started using OER in Fall 2011 in two sections of Intermediate Algebra. Today, OER is used in all sections of Intermediate Algebra, College Algebra, Precalculus and Statistics. Until Fall 2017, 3,497 students have used OER and have saved around \$480,000 in textbook costs. Many other disciplines also use OER and a complete AAS program is offered with no textbook cost. Data, resources, experiences, and future plans will be shared.

Session 17: Campus Center 203 (2:00-2:45 p.m.)

**Do you use multiple choice questions?**

Magdalena Luca, Mass. College of Pharmacy & Health Sciences

Multiple choice questions are used in many mathematics courses, but some courses are better suited to include such questions on exams. Often, writing good questions is more complex and time consuming than writing open ended ones. In this presentation, I will examine research-based recommendations for writing good questions, present the advantages and disadvantages of using such questions, and share several examples I use in calculus and statistics. As always, I would like to involve all participants in a discussion about writing good multiple choice questions in math, in the hopes that we can all benefit in the "future" from this exchange of ideas.

Session 18: Library Commons - 1st Floor Lab (2:00-2:45 p.m.)

**Teaching Statistics with R Programming**

Billy Jackson, North Shore Community College

R and Python are emerging as the leaders in the field of data science today, both of which are free open-source software, and constantly being improved by package developers. Fluency in one of those languages is a requisite for many jobs in the field of data science today and in the future. This talk will take users through downloading and installing R and its friendly user interface RStudio. The talk will also introduce how it can be used to tackle problems in the statistics class alongside the OER textbook OpenIntro Statistics.

Please visit <https://tinyurl.com/nematyc18eval> to complete an evaluation of the 2018 NEMATYC Conference.

**THANK YOU!**

**Dean College** for the donations and support

**Pearson Education** for sponsoring the Friday night social.

**Our Exhibitors**





## Connecting to the Dean College Guest Wi-Fi

To connect your computer, tablet or smartphone to the Dean College Guest Wi-Fi, take the following steps:

1. Locate your available wireless networks.
2. Select **Dean College Guest**.
3. Enter network password: **discoverdean** (case sensitive).
4. You will be prompted to enter your name and email address (personal or work). If log in screen does not appear, open your web browser (Safari, Internet Explorer, Mozilla FireFox or Google Chrome).
5. Check the box to Accept the terms of use and hit the Register button.
6. On next screen hit the Log In button.

This completes the Guest WiFi Registration process. *Dean Guest accounts are valid for 24 hours. If you need a time extension on the account, contact the Technology Service Center.*