

iMATHination

January 22-23, 2016

3D Printing Across the Curriculum

7th, 8th, 9th, 10th, 11th, 12th-Algebra, Advanced Algebra, Trigonometry, Pre-calculus, Physics, Chemistry, Earth Science, Geometry, Calculus
Charles Abrams and Rachel Johnson

Participants will use 3D printed models to study concepts in math, chemistry, physics, biology, art, earth science, and other disciplines. For example, a model of the Sierpinski tetrahedron is used to illustrate the calculation of area and perimeter in algebra, and to study fractals and limits in calculus. Participants will use worksheets to gain an appreciation of the value of the 3D models for specific content, then discuss how these models could be used in their own classes. A database of ready-to-print models will be explored. Incorporating 3D printing across many disciplines makes it easier to justify the purchase of a higher-end, reliable 3D printer.

Professor Abrams has taught organic chemistry and biochemistry at Truman College for the past thirteen years. He also organizes professional development workshops for science teachers, and conducts research on insect pheromones and water quality analysis with teachers at local K-12 schools.

The Power of Near-Peer Mentoring in Community Programs

7th, 8th, 9th, 10th, 11th, 12th, Administrators-Algebra, Advanced Algebra
Yoseph Coffee and Ashley Rivera

The Young People's Project uses a near-peer mentoring model where teens work with peers and facilitate math games to younger children. In this workshop presenters will demonstrate how to use hands-on games to engage students in learning while simultaneously having fun. The idea is to have so much fun in interactive games that students are gaining math skills and learning concepts that normally would be difficult to them.

Yoseph Coffee is a 6th and 7th grade math teacher as well as an Instructor for one of Chicago's rare teen math literacy programs. He has always been fascinated by math. He relishes the challenge of problem solving and the endlessly intriguing subject that math provides, as the discipline appears limitless.

Ashley Rivera is a college math literacy worker (CMLW) within The Young People's Project Chicago program. She has over two years of experience working with underrepresented youth in math activities goal-setting and career readiness (fix). Ashley graduated from DePaul University with a Bachelor's in Science degree in Health Sciences.

iMATHination Workshop Descriptions

Using Social Media and Tech Resources in the Mathematics Classroom

7th, 8th, 9th, 10th, 11th, 12th, Administrators-Algebra, Advanced Algebra, Trigonometry, Pre-calculus, Geometry, Calculus
Annie Forest

Discover ways to get students talking about math. Through structures, questioning, and activities teachers can improve students' ability to have conversations and make arguments using precise language. Activities such as math/number talks, quiz-quiz-trade, "Get it Together" activities, and Y-charts will be presented along with some tips on how to make them successful in the classroom.

Annie Forest has been teaching middle school math for 12 years and is a National Board Certified Teacher. She received the 2014 ICTM Award for Middle School Teaching and is a state finalist for the 2015 PAEMST. Annie is passionate about giving all students an equitable mathematics education while also addressing their social and emotional learning needs. Follow Annie on Twitter @mrsforest

Let's Talk About Math!

7th, 8th, 9th, 10th, 11th, 12th, Administrators-Algebra, Advanced Algebra, Trigonometry, Pre-calculus, Geometry, Calculus
Annie Forest

Discover ways to get students talking about math. Through structures, questioning, and activities teachers can improve student's ability to have conversations and make argument using precise language. Individual and group activities will be presented along with some tips on how to make them successful in the classroom.

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Future City - a cross-curricular project-based learning unit that lets middle school students do the things that engineers do!

7th, 8th, 9th-Geometry
Joselyn Galvez

Come and learn about a national competition that you can adapt for your classroom or after-school club. Future City leads students through experiences where they tackle a relevant citywide sustainability issue. They imagine, research, design, and build cities of the future that showcase their solution. Along the way, students discover engineering, develop meaningful relationship with career mentors, become more aware citizens, and build their 21st century skills.

In this session, you will participate in hands-on activities to scale up images, design blueprints, develop sustainable waste management systems, and use nets to create buildings and other city structures.

Joselyn Galvez is the 7th grade math teacher at Frank W. Reilly Elementary School. As a former GEAR UP student, she understands the importance of providing students with unique opportunities to explore different careers early on in their lives. She is passionate about enriching her classes with new

iMATHination Workshop Descriptions

initiatives in STEAM.

Mathematics Teachers, Social Justice, and Creative Insubordination

6-12 General Math, Political Science

Dr. Rochelle Gutiérrez (keynote)

Whether people see it or not, math is political. In this session, I will be introducing 6 strategies for creative insubordination that teachers can consider using in their work settings. During our time, teachers will be invited to practice rehearsing, in a collective environment, for particular political scenarios they have faced in their work settings. As a group, we will discuss how you might respond.

Dr. Rochelle Gutiérrez' research focuses on equity in mathematics education, race/class/language issues in teaching and learning mathematics, effective teacher communities, and the kinds of political knowledge that mathematics teachers need to negotiate high stakes education. Her work has been published in such journals as *Mathematical Thinking and Learning*, *Journal for Research in Mathematics Education*, and *Harvard Educational Review*. Before and throughout graduate school, she taught middle and high school mathematics to adolescents in East San José, California.

Using the TI-Nspire App on your iPad to promote better student understanding of Geometry

7th, 8th, 9th, 10th, 11th, 12th-Geometry

Ray Klein

This hands-on session will introduce the TI-Nspire APP for the iPad. The TI-Nspire handheld calculator has long been an avenue for the use of dynamic geometry in the secondary curriculum. Now, this same dynamic geometry software is available on the iPad. In this session we will look at various ways that this iPad APP can be used in a geometry classroom to enhance student understanding of the inherent content. By having students interactively construct geometric figures and then dynamically manipulate them to see these figures in a variety of settings, students can understand general cases, not simply specific cases, and thus promote deeper understanding. The pedagogy of using this technology will be explored by showing how various big ideas from the geometry curriculum can be introduced. In particular, the topic of Transformational Geometry will be showcased in keeping with the Common Core State Standards for Mathematics' push toward this important overarching area of study.

Ray Klein is a retired H.S. Mathematics teacher with over 35 years of teaching experience. He has been a T3 (Teachers Teaching with Technology) instructor since 1995 and has presented numerous local, state, and national workshops on how to better teach mathematics with TI technology.

Creating 24/7 Learning Opportunities using Google Apps for Education

7th, 8th, 9th, 10th, 11th, 12th-Algebra, Advanced Algebra, Trigonometry, Pre-calculus, Physics, Chemistry, Earth Science, Computer Science, Geometry, Forensic Science, Nanoscience, Calculus
Christina Kralik

This class will focus on providing educators the tools to utilize Google Apps for Education in their everyday practice that will give students the opportunity to have hands-on, engaging math practice at their fingertips at school or outside of it. The session will give teachers information on incorporating

iMATHination Workshop Descriptions

Google Docs, Spreadsheets, Drawings, and Slideshow into their everyday curriculum while describing how all these things can be utilized to build student collaboration and 21st Century Skills in any math course. The session will also help teachers set up their own Google Classrooms and will walk them through methods of utilizing this platform to create 24/7 learning opportunities for all their students.

Christina Kralik is the Technology Integrator at West Allis Central High School in Wisconsin. She previously served as a teacher at the West Allis-West Milwaukee Alternative Learning Center where she taught numerous Social Studies and Math courses, including "Math in the Real World." Her experiences at the Learning Center provided her many opportunities to be creative in her lesson designs while utilizing technology that helped prepare students for their future experiences in college and beyond.

Math in the Real World

7th, 8th, 9th, 10th, 11th, 12th-Algebra, Geometry
Christina Kralik

When will I ever use this math in real life?

This session will give teachers already created math lessons and tools to prepare all their students for life outside of the classroom walls. Teachers will leave with engaging lesson plans and ideas that can be used right away in the classroom. The purpose of this course is to equip teachers with tools for using math skills and its concepts in "real world" applications. The course itself will focus on career choice, taxes, saving and spending, creating a budget, buying a car and home, and investing money. Participants will be given lesson plans and activities that have students utilize technology to conduct inquiry and research on these personal finance topics so that money management strategies can be practiced and mastered for use in their future endeavors. All participants will leave with engaging lesson plans and ideas that can be used right away in the classroom that equips students with tools for being ready for the "real world."

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Give Bees a Chance

7th, 8th, 9th, 10th-Algebra, Basic Statistics, Biology/Environmental Science
Karen Lindebrekke

Participants will engage in hands-on, inquiry-based investigations that address the problem of declining bee populations and the effects on food production. How big is this problem? What is causing this problem? How do researchers use mathematics and scientific concepts to address this problem? Participants will investigate the structures of flowers, the processes of pollination and fruit development, and the roles of bees in these processes. They will briefly investigate the diversity, adaptations, and biology of bees and the causes of their decline. They will simulate how scientists determine population size using sampling techniques, basic statistics, ratio and proportional relationships and algebra. They will also use mathematics to estimate how bee decline might affect pollination and fruit production and

iMATHination Workshop Descriptions

to briefly evaluate the feasibility of possible solutions. Participants explore how these investigations connect to various disciplines and align with learning standards.

Karen Lindebrekke is Director of Programs at iBIO Institute EDUCATE Center. Formerly she was a PBL professional development specialist at IMSA, an editor/writer of curricula and assessments, and a mathematics and science teacher for 15 years. She holds a M.S. Ed. in Curriculum and Instruction and a B.A. in Zoology.

Build a Robo-Submarine!

7th, 8th, 9th, 10th, 11th, 12th, Administrators-Physics, Earth Science, Computer Science, Engineering
Juan Madrigal and Conor Klaus

In this robotics engineering project, you will build an underwater robot, that moves up, down, left, right, and forward using balloons, motors, propellers, and plastic bottles. After putting these pieces together, you will have a cool robot that works underwater and is lots of fun to experiment with. The world's oceans are home to the most strange and amazing plants and creatures. One way to learn about these plants and animals is to use underwater robots. Robots are machines often made to do jobs that are boring, repetitive, or dangerous for humans, like detecting leaks in gas pipelines, or getting rid of landmines. Robots can work in harsh environments, like the ocean or in space, unsafe for humans. Through this project you will learn key STEM principles, and robotics concepts.

Juan M. Madrigal has been teaching middle school math for 11 years. Juan holds a Master's degree in Mathematics from DePaul University and has worked with the NEIU Gear Up Robotics Summer Academy for 4 years. Juan has initiated Robotics Programs in three Chicago Public Schools. In February 2015, The Museum of Science and Industry recognized The De Diego Robotics Team and was invited to be part of the cutting ribbon ceremony for their new exhibit "Robot Revolution".

Conor Klaus taught 7th and 8th grade science from 2000 to 2012. From 2012 to present he has been teaching science to 5th and 6th graders. Conor Klaus has obtained a Science Bachelor's Degree in Geology 2000 (Cornell College). He has been a participant to the following developments; Volcanology Research Project 1999 (UNA Costa Rica), Toyota Tapestry Grant Winner 2005, and SEPUP Science Curriculum Professional Development Leader.

Euclid, Descartes and Klein: 21st Century Geometries in the Common Core

9th, 10th, 11th-Algebra, Advanced Algebra, Trigonometry, Geometry
Andreas Mueller and Olaniran Nusirat

Common Core requires Geometry to include the Euclidean axiomatic system, Transformational argumentation, and work in Coordinate Geometry, but does not talk about the interrelationship of the three, especially when it comes to proofs. This workshop aims to not only clarify that relationship, but give ideas on how to integrate all three through concrete examples involving compass and straightedge construction, technology applications, patty paper and other manipulative uses. We will explore what tools are necessary for Transformational and Coordinational proofs and constructions instead of compass and straightedge, the tools of Euclidean constructions. Integration of technology apps such as Geogebra, Sketchpad, and Ti84 will be discussed and its uses explored. Participants are encouraged to bring their computers, tablets, and smart phones.

iMATHination Workshop Descriptions

Andreas Mueller has taught Prealgebra through AP Calculus and IB Mathematics in CPS for over 20 years and teaches at Prairie State College. He has been a math coach in various schools and taught a year in Evanston. Andreas has given Math and technology workshops at CPS, UIC and DePaul.

Nusirat Olaniran is a dedicated teacher and compassionate person who has taught Geometry, Algebra, Trigonometry at CPS and Thornton Fractional South for over 12 years. Nusirat is a member of the Metropolitan Math Club.

Not Just "Louder and Slower": Re-Engaging to Repair Students' Misconceptions

7th, 8th, 9th, 10th, Administrators-Algebra, Advanced Algebra, Geometry

Sendhil Revuluri

As anyone who's ever tried to teach their dog to whistle knows, learning and teaching are unfortunately not the same thing. When we assess our students after instruction, we may uncover some important gaps or misconceptions. Is there something we can do to help move students' understanding forward besides re-teaching: the old "louder and slower" approach? We'll practice a structure to respond through "re-engagement" — to surface and repair misconceptions in a way that involves and challenges all students. You'll also look at some ways to analyze students' work and leave with guidance on where to find rich, high-quality mathematical tasks and supporting materials on a variety of important topics — for free. Come equip yourself with some valuable techniques to help your students meet the demands of the Common Core State Standards for Mathematics.

Sendhil Revuluri was a founding math teacher of a new high school in the South Bronx, where he was recognized as a Math for America Master Teacher. He now works with teachers and administrators in high-needs districts to influence practice, infuse effective tools, and support improvement and joint problem-solving. He has facilitated professional development across the region and presented across the country.

Math Talks Build Engagement, Mental Math, and Reasoning

7th, 8th, 9th, 10th, Administrators-Algebra, Advanced Algebra, Geometry

Sendhil Revuluri

"Math talks" are quick routines that you can implement in your classroom within days. They can raise student engagement, build flexible mental math strategies, and help students construct arguments and critique reasoning, promoting discourse overall and helping them to make important connections. We will engage in math talks, explore supporting resources, and devise new math talk prompts for a variety of content areas.

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Invisible Enemies: Weaving the M in S.T.E.M

7th, 8th, 9th-General math and pre-algebra

Theresa Robinson

iMATHination Workshop Descriptions

Math is everywhere! This session is great for the educator who is interested in how to support math literacy across disciplines. Participants will learn to be both the expert and explorer while diving into a unit that was collaboratively designed around the text "Invisible Enemies: Stories of Infectious Diseases". Young adults love this book that is a collection of stories about the history of infectious diseases. The unit integrated literacy, science, math, and social studies to support math conceptual understanding and real world applications. The session describes how assessment for learning was used as well as the results of the implementation of the unit with approximately 50 Chicago Public middle school students who participated in the summer academy.

Theresa Robinson is an Associate Professor and Director of Secondary Education. She earned a B.S. in biology and secondary education and a Ph.D. in curriculum and instruction, from SIU–Carbondale. She taught grades 9-12 science in CPS and serves the profession by providing science and math professional development. She is an active member of the National Science Teachers Association and AACTE.

Energy Engineers

7th, 8th, 9th, 10th, 11th, 12th, Administrators-Algebra, Physics, Earth Science
Seth Severns, Eve Tulbert, and Radha Ramachandran

The Energy Engineers program engages middle grade and high school students in conducting energy audits and "greening" school energy usage through multi-subject activities, and the making and display of a school "Smart Lamp" (linked to the school's new Smart Meter). This session will help you integrate this program into your classroom activities.

Seth Severns is the Education Director at the University of Chicago's Center for Robust Decision Making in Climate and Energy Policy. At RDCEP, Seth translates complex climate and energy models into hands-on, project based STEM learning experiences for students in K-12.

Eve Tulbert is a co-founder on the Planet Lab initiative, an effort to create socially networked science experiences for youth with research and innovation "missions" that help people and the planet.

Theater and Improv for the Math Classroom

7th, 8th, 9th, 10th, 11th, 12th-Algebra, Advanced Algebra, Trigonometry, Pre-calculus, Physics, Chemistry, Earth Science, Geometry, Calculus
Steven Starr and John Starrs

Learn theater games and techniques that you can apply in the classroom to enliven lessons and to engage students.

Steven Starr is a retired CPS mathematics teacher who taught at Lake View High School, developing a successful AP Calculus program where minority and low income students were motivated to take advanced mathematics. He continues to be involved in mathematics education, sharing ideas at numerous workshops, working with student teachers, and teaching!

John Starrs is a Chicago Actor, Poet, and improv teacher who has also worked with teachers and students in Chicago Public Schools.

iMATHination Workshop Descriptions

“What’s Fair?” Using Mathematics to Model Issues of Fairness

7th, 8th, 9th, 10th, 11th, 12th-Algebra, Advanced Algebra, Equity

Steve Starr

Experience the highlights of a unit where students have explored the mathematics of:

- FAIR DIVISION –in real world situations.
- GAME THEORY -how our decisions affect others and their decisions affect us.
- EQUAL CHANCES & DISTRIBUTION OF RESOURCES –how mathematics can help us develop our own model of a fair society.

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Engaging Students Through Project Based Learning in HS Mathematics 8th,

9th, 10th, 11th, 12th-Algebra, Advanced Algebra, Trigonometry, Geometry, Calculus

Salvador Venegas and Isaias Hernandez

High school students typically ask, "when are we going to use this in real life." Project based learning in the high school mathematics classroom provide students an opportunity to apply math content to their life. For example, students build rockets to explore quadratic functions, practice random sampling techniques to explore racial profiling and measure school ramps to assess ADA requirements. Attend this session to learn about these and other math project ideas.

Salvador Venegas, a nationally board certified teacher, is the Mathematics Department Chair at Infinity Math, Science, and Technology High School.

Isaias Hernandez is an Algebra teacher at Infinity Math, Science and Technology High School.