

## Thursday, July 25<sup>th</sup>

- 8:30 – 9:00 am** Registration *Paul Peck Alumni Center*
- 9:00 – 9:20 am** Opening Session *Paul Peck Alumni Center*
- 9:30 – 11:30 am** Subject Area Sessions
- Exeter and PCMI Problems – Kate Nowak and Elizabeth Statmore, facilitators  
*Curtis 255B*
- Middle School – Fawn Nguyen and Julie Reulbach, facilitators  
*Curtis 258*
- Algebra 1 – Michael Pershan, facilitator  
*One Drexel Plaza 004*
- Geometry – Tina Cardone and Megan Hayes-Golding, facilitators  
*One Drexel Plaza 141*
- Algebra 2 – Max Ray, facilitator  
*3101 Market 181*
- Statistics – Hedge, facilitator  
*Randell 120*
- Pre-Calculus – David Petersen and Sam Shah, facilitators  
*3101 Market 179*
- 11:30 am – 12:30 pm** Lunch (at Drexel – Philly Food Trucks will be here!)
- 12:30 – 1:00 pm** My Favorite... *Paul Peck Alumni Center*  
Sign up Thursday morning to present your favorite whatever. Slots are in 5 minute blocks.
- 1:00 – 2:00 pm** **I Notice, I Wonder – Max Ray** *Paul Peck Alumni Center*  
"What do you notice? What do you wonder?" is a simple pair of questions that have been used to launch lessons, help students get started problem-solving in a welcoming way, wrap up projects, and help students give feedback to each other without being rude. I'll share some different activities I've used & witnessed, as well as some of the reasoning behind why these questions seem to work so well... and what to do when they don't work... and how to pick activities that might help them work extra well.
- 2:15 – 3:15 pm** **Practicing the Five Practices – Christopher Danielson**  
*Curtis 255B*  
Students learn more from mathematical discussions in classrooms where the teacher uses these five practices. Learn what these practices are and develop your skill with them in a supportive environment around a challenging fractions task.
- Problem Posing in Mathematics – Glenn Waddell**  
*Curtis 258*  
Teachers know that asking good questions is a skill learned through practice, and research shows asking great questions impacts learning tremendously. I will review very

briefly some of the research and model how teachers can use better questioning to positively impact learning and learn how to ask better questions.

### **Online Collaborative GeoGebra – Annie Fetter**

*One Drexel Plaza 141*

The Math Forum's Virtual Math Teams project has developed (and continues to refine) an online chat environment that includes text chat, shared whiteboard, and shared GeoGebra. Our project focuses on using this tool to do and study collaborative learning with dynamic mathematics, including having students at different schools collaborate in real time, but it could also be used for online math help. We'll explore the environment, learn about existing opportunities using the software through the VMT project, and discuss other possibilities.

### **Breaking Out of Ourselves – Sam Shah, Tina Cardone, and Julie Reulbach**

*One Drexel Plaza 004*

In the past year, our community has expanded. We're breaking out of ourselves with the creation of blog initiatives (like the "New Blogger Initiation" and the "Day In the Life" initiative, "Made for Math Mondays"). Now there are easy ways for math teachers to join us in our quest to become less sucky teachers. There have also recently been the generation of some collaborative/group blogs which have also expanded the reach of the community: the "One Good Thing," "Math Mistakes," "Visual Patterns," "Math Munch," "Daily Desmos," and "Productive Struggle" blogs. We're blowing up here, and in the best kind of way.

We plan to have a workshop where we brainstorm ideas like these, that expand our reach and help other teachers see the value in the work we do – such as creating an email blast that gets compiled weekly or bi-monthly with good posts around certain topics/subjects, curated by us. At the same time, questions about how we can mobilize ourselves so we can do good beyond in our own classrooms (and beyond our online community) are slowly creeping up. Without losing the grassroots nature of what we are doing – without becoming an organization with a hierarchy and structure – might it be possible to harness our increasing numbers to actually effect change in the things we collectively believe in? We're working for change in our classrooms, but what about changes in our schools, districts, and even nationally? Although this could be done politically, we see it as simply meaning getting our ideas about teaching and learning to the right people. New teachers? University professors? People at the department of education? So they can see us teachers on the ground as having something valuable to share in the conversation.

We're expanding. Should we think about breaking out of ourselves?

### **Dan Meyer + Desmos + Caffeine = ? – Eli Luberoff**

*Randell 120*

We will run through a top secret Desmos + Dan Meyer project: a custom-built, collaborative three-act. After going through the lesson as a class of "students" we'll take a look at the same lesson from the teacher perspective. We'll then dive into the thorny questions: In what ways can technology enhance well-constructed, problem-based lessons? In what ways can it detract or distract? How can we, as technologists and teachers, foster the former and avoid the latter?

Bring your computer!

**3:30 – 4:00 pm**

**Using Mistakes to Inspire Teaching – Michael Pershan**

*One Drexel Plaza 004*

Kids make mistakes, teachers see them, but what do we do with them? There's a whole lot that we can do with student errors, and in this session we'll see how studying mistakes can change the way that you teach. Come prepared to analyze lots of student work, talk about exponents, and consider the possibilities and limitations of using mistakes to inspire instruction.

**Form Follows Functions – Edmund Harriss**

*Curtis 255B*

Functions, one of the central objects of mathematics. They often sit there as inscrutable formulae. Yet they also offer a simple language to create complex and interesting imagery with very little work. As a result they offer a way to begin to play with mathematical ideas, gaining understanding through experiment and seeing what will happen. Thus they can help develop and motivate the study of algebra and lead to calculus.

In this presentation I will look at the visual side of functions and various activities and challenges that can be set with them. For a sort of review check out @samjshah's reaction to my notes: <http://samjshah.com/2013/01/08/families-of-curves/>

**Make Math Memorable: 5 Ways to Boost Engagement – John Berray**

*Curtis 258*

Learn 5 innovative, practical, and easy to implement ways to boost student engagement and create math lessons your students will never forget. Plus, you'll learn about an awesome source for math tasks that spring from human interest stories.

**Musical Mathematics – Gregory Taylor**

*Randell 120*

Songs can be used to make math concepts more fun and memorable; there are many examples of this already online. Some by students. This session would involve learning about some of those videos, provide tips on how to rap or rewrite pop song lyrics, and might include watching a performance.

**Using Google to Manage your SBG workflow – Jamie Ryske and Ashli Black**

*One Drexel Plaza 141*

You have implemented standards based grading but find managing the reassessments can be overwhelming at times. Many have shared their learning targets and how they grade, we will share how to use Google to help manage your SBG workflow. From the simple such as filtering student emails and using calendar to keep track of appointments to more advanced such as setting up a Google form to automatically email you the responses instead of having to go to the spreadsheet.

## Friday, July 26<sup>th</sup>

- 9:00 – 9:25 am** Morning Announcements and My Favorites *Paul Peck Alumni Center*
- 9:30 – 11:30 am** Subject Area Sessions (same as Thursday)
- 11:30 am – 1:00 pm** Lunch (on your own)
- 1:00 – 1:30 pm** Afternoon My Favorites *Paul Peck Alumni Center*
- 1:30 – 2:30 pm** **Still Keeping it Real – Team Mathalicious** *Paul Peck Alumni Center*  
When it comes to romance, how young is too young? Does Domino's charge the right amount for toppings? Is tipping as a percent fair? In this presentation, we'll explore how to use real-world topics to make math class the bitchiest part of every student's day.
- 2:45 – 3:45 pm** **Getting Students to Think Mathematically in Cooperative Groups – Ilana Horn**  
*Curtis 255B*  
I have studied and used a method of collaborative learning called complex instruction (CI) in secondary math classes. CI focuses teachers on the social dynamics that often get in the way of productive mathematical talk. By creating space for kids to share their ideas, kids can be pressed to learn more deeply.
- Math Forum PoW Quick Intro – Suzanne Alejandre**  
*One Drexel Plaza 141*  
Math Forum Online Problems of the Week (PoWs) Quick Intro Part 1 (first 30 minutes) will be an overview of the teacher resources provided with each of the Math Forum's Current Problems of the Week memberships (Current PoWs range from Primary through Trig and Calculus).  
Part 2 (second 30 minutes) will be an overview of  
\* how a student submits online  
\* how a teacher views their work and provides feedback  
\* how the PoWs can be used as an electronic portfolio [Each session participant will receive a Current PoW membership for the 2013-2014 school year if they do not already have one.]
- Conway's Rational Tangles and the Game of SET – Fawn Nguyen**  
*Curtis 258*  
Participants will work together to solve Conway's Rational Tangles, play a few rounds of SET and find various probabilities in the game. Participants are encouraged to join an existing Math Teachers' Circle in their towns or start their own!
- Assessment and the Special Education Student – Kate Clapp**  
*Randell 120*  
Tips and advice for changes that can be made to your assessments to make them more accessible to the special education or struggling students in your classes.

## **Like Gum On Your Shoe: Adding "Stickiness" to Rich Tasks & Math Projects – Elizabeth Statmore**

*One Drexel Plaza 004*

We know that students who experience flow while doing mathematics are dramatically more likely than others to become persevering, intrinsically motivated problem solvers, but not all students can simply drop into the flow state in the math classroom — at least, not without a little help. Students are bombarded with competing messages and ideas and they often lose track of subtle or complex mathematical ideas they are building day by day.

So my guiding question for this year has been, how can I make each problem or rich task so "sticky" students will be less likely to lose it?

One set of powerful brain-based techniques I have found comes from Dan and Chip Heath's book *Made To Stick: Why Some Ideas Survive and Others Die*. Their six core principles of "stickiness" — making an idea Simple, Unexpected, Concrete, Credible, Emotional, and Narrative — are simple but powerful ways of harnessing the insights of brain science to make math tasks, projects, and ideas both more engaging and more memorable for students than other tasks and activities in their lives.

This will be a hands-on "doing" session with plenty of time to brainstorm collaboratively on problem lessons. We will start with a brief anatomy of stickiness and its six elements. Then we will break into interest-based groups to apply these principles in to one or two of stubbornly UN-sticky topics we struggle with in our courses or content areas. Finally, we will share out ideas with the whole group to help enhance the stickiness factor in our tasks and lessons. If there is interest, we can follow up throughout the school year with some Global Math Department sessions to build on our work in this session.

Bring your stubbornly UN-sticky problem or rich task and let us help you find the stickiness within!

**4:00 – 5:00 pm**

## **Extending Student Understanding from Numbers to Variables – Ashli Black**

*One Drexel Plaza 141*

We will take a look at a classroom activity that develops student understanding of variables in the middle grades from the work done in the elementary grades with the number line and integers. This session will be hands on with participants completing the activity and is pulled from the c-TaP (committee for teachers as professionals) CCSSM training for the middle grades that was developed at PCMI in 2012.

## **Devise a Plan to Organize – Tina Cardone**

*One Drexel Plaza 004*

Do you find yourself searching through someones blog archives because you swear they wrote something awesome last month that you absolutely need for class tomorrow? Or do you find the perfect activity that you wrote two years ago, a week after you made up a new one? If either of these things have happened to you, this is the session to attend! Tina (@crstn85), Anna (@BorschtwithAnna), Fawn (@fawnpnguyen), Fouss (@kfouss) and Sam (@samjshah) will share their systems which include dropbox, evernote, livebinder, virtual filing cabinets and actual filing cabinets.

### **Classroom Routines – Counting Circle – Sadie Estrella**

*Curtis 255B*

Using the idea of a counting circle as a classroom routine to help students build mental math strategies, basic math skills and number sense.

### **A Map of Problem-Based Class Designs – Dan Goldner**

*Curtis 258*

Ok, so you want your students to spend a lot of time solving problems, and you have a bunch of candidate problems. How do you organize this? Do all kids solve the same problems? How much choice do they get? What are they doing in class? Out of class? How much time do you spend puzzling vs. writing vs. presenting? Do you permit solving in pairs or groups or not? How does assessment work? When and how do they get feedback? How does grading work? How you do respond to kids that don't engage? How do you make sure kids do enough to prepare for the next course? The premise of this session is that there are many valid answers to each of the questions above, but that different combinations of choices will lead to different behaviors in different circumstances. If the answer is, "It depends on the kids", how exactly? Let's map the feasible and infeasible regions of this choice space. Join the conversation, already in progress, at <http://wp.me/pXvhL-iM>. Then join us at TMC to continue the conversation and draw our map!

### **Making Math Games – James Cleveland**

*Randell 120*

Real authentic math games can be difficult to make - but when we work together, we can make really great stuff. In this session, we'll talk briefly about what makes a good math game -- and then work together to make something new.

## Saturday, July 27<sup>th</sup>

**9:00 – 9:25 am** Morning Announcements and My Favorites *Paul Peck Alumni Center*

**9:30 – 11:30 am** **Peeling it Back: Lesson Writing Sessions – Team Mathalicious**

Three to choose from: Grades 6 and 7 *Curtis 255A*

Grade 8 and Algebra 1 *Curtis 255B*

High School *Curtis 258*

How do you write a real-world lesson from start to finish? In each of these breakout sessions, Karim, Chris, Matt, Ginny, or Kate will share insights into the Mathalicious lesson-writing process. Then, participants work in small groups to develop their own lessons. Teachers will practice identifying interesting questions in the real world and turning them into mathematical understanding.

**Interactive Notebook Workshop: Moving from Beginner to Advanced – Megan Hayes-Golding**

*AEL 279*

The Interactive Math Notebook provides a framework for organizing student work and encouraging student reflection. No matter where you are on the spectrum, this session will help you improve your notebook practice.

Beginners: learn the INB framework, the nonnegotiable elements, and the parts you can pick and choose. Practical tips include how to create activities that fit in an INB, using foldables with INBs, and grading the blasted things.

Intermediates: already know what an INB is? Let's brainstorm uses for the left side pages, how to use foldables effectively, how to avoid landmines that seem like a good idea at the time.

Advanced: be a co-presenter! You'll learn from the experience, I promise.

**Powerful Ideas in Math Class via Programming – David Wees**

*Curtis 250A*

Together we will explore computer programming as a mathematics activity. We will learn about some tools you can use with your students to get started learning how to program, and some of the different ways we can design programming activities which lead to deep mathematical exploration. We will discuss the powerful ideas of math and decide whether programming as an activity allows students to access these powerful ideas.

**11:30 am – 1:00 pm** Lunch (on your own)

**1:00 – 1:30 pm** Afternoon My Favorites *Paul Peck Alumni Center*

**1:30 – 2:30 pm**

**Using Dynamic Graphs to Understand Mathematical Modeling – Eli Luberoff, Desmos  
Paul Peck Alumni Center**

Using free tools available through Desmos, learn how to manipulate math like never before! With intuitive tables of data and dynamic sliders, we will match models to data in a way that's visually engaging, mathematically sound, and Common Core aligned. Join us to work on a fun and useful, interactive lesson that you can take back to your classroom.

**2:45 – 3:45 pm**

**Copernican Mathematics – Sandra Miller**

*Curtis 250A*

In a shift away from the Ptolomaic mindset of a universe that revolved around the Earth, Copernicus revived the idea of a Sun-centered solar system which we now use. As part of his work, he used astronomical observation data to estimate other planets' years, as well as planetary distances from the sun.

How did he do that?

We will use actual observational data, algebra, geometry, and right-triangle trigonometry to see if we can do the same thing. If we have time, we will also calculate the masses of the Earth, the Sun, and Mars, and the escape velocity from Mars.

**Effective Cooperative Groups and Group Tasks – Anna Blinstein and Jessica Bogie**

*Curtis 255A*

Researchers and practitioners have found that students working in small cooperative groups can develop the type of intellectual exchange that fosters creative thinking, productive problem solving, and deeper levels of engagement and investment in the learning process. How do we create an environment where this type of cooperative discussion and mutual support happen? In this interactive session, you will learn how to make cooperative learning work in a standards-based mathematics class. We will share activities, student work, resources and strategies for accountability and management and discuss how groupwork can be adapted to work in your classroom.

**Statistics Bootcamp – Hedge**

*AEL 279*

Why does statistics have such a terrible reputation? Many people will tell you that they hated their statistics courses in college because it was too difficult and too boring. Sadly, this same experience and feeling exists among mathematics teachers as well. The purpose of this presentation is to allow “stats haters” to experience the awesomeness of statistics through my eyes. Everyone knows I love statistics, and hopefully all attendees will walk away with something they can use in their classroom to teach some of the statistics objectives in common core. We will analyze regressions, create confidence intervals, perform hypothesis tests, and (God forbid) have a little fun in the process. But please come with a positive attitude and an open mind. Remember, this IS bootcamp. Be nice, or Hedge will make you drop and give her 20.

**Using Games to Promote Mathematical Thinking – Raj Shah**

*Curtis 255B*

Games allow students to exercise and build mathematical thinking skills while having fun. We will explore several games during the one hour session that you can use in your classroom. In addition, games are ripe with rich mathematics and extensions that can drive deeper classroom investigations. You'll leave with great ideas for games you can play in your class immediately.

**A Photo's Worth a Thousand Diagrams: Turning Pictures Into Problems – Jennifer Silverman**

*Curtis 258*

In this interactive session, you will learn how to use photos from Creative Commons and Public Domain web sources to create authentic problems. You'll see how to search for images you can use, import them into GeoGebra, and add points, lines, measurements, etc. Bring a laptop (tablets or netbooks not recommended), an image you've already found, and/or a topic you'd like to illustrate.

**4:00 – 5:00 pm**

Flex Sessions - A place to add sessions as they come up during the week

**TMC 2014 Planning – Lisa Henry**

*Curtis 255B*

Resource Sharing

**Sunday, July 28<sup>th</sup>**

**9:00 – 11:00 am**

My Favorites and Closing *Paul Peck Alumni Center*