## UNDERGRADUATE MATH SEMINAR

The first seminar of the term will be

**DATE:**     <mark>**THURSDAY, January 31**</mark>

**Time** &     **12:30pm –** Refreshments in **Bailey 204**

**Location:**     **1:00 –** Seminar in **Bailey 207**

In this seminar, **Professor Kimmo Rosenthal** from the Department of Mathematics at **Union College** will present the following talk:

Professor Kimmo Rosenthal

### Title: The Joy of Abstraction

Abstract: *The imagination is the only genius. It is intrepid and eager and the extreme of its achievement lies in abstraction.* Wallace Stevens

It may seem incongruous for the epigraph to a math talk to be from one of the great American poets. However, while the ubiquity and utility of mathematics is widely acknowledged, its burnish of aestheticism is much less so. Can the old dictum "art for art's sake" be replaced by "math for math's sake"? In this day and age, when relevance, applicability, and connections with other disciplines are touted as paramount, is there still a place for purely abstract mathematics viewed more as an intellectual art form?  Abstraction has always appealed to me and indeed guided me. Why does it often provoke outright hostility? We shall follow the path of abstraction from the set theory of Cantor (called a "corrupter of youth") to point-set topology, followed by the mysterious emergence of Bourbaki (the mathematician who never existed), and finally category theory, which earned the epithet of "abstract nonsense". Of course, there will be some mathematics along the way, reasonably

## My TEU Experience, by Julia Greene '19

This past summer I was one of 12 undergraduate students who participated in the Math Teaching Experiences for Undergraduates program at Brown University. The TEU program, which is funded by the National Science Foundation, is a 6-week immersive experience focused on secondary math education. During the first 2 weeks, we usually had math methods class in the morning and afternoon to learn about math pedagogy. We explored the "Standards for Mathematical Practice," and how to apply them in the classroom. Other days, we participated in workshops hosted by Brown's Education department or members of the Providence community.

Every weekday during the last four weeks, we taught a 1-hour and 40-minute math class in teams of 3 at Brown Summer High School – a summer enrichment program for high school students in and around Providence. At BSHS, students take 2 classes taught by the Math TEUs or Brown's English, Science, and Social Studies/History MAT students.

We were assigned to a team early in the 6 weeks, along with a mentor who sat in on every class, reviewed lesson plans, and gave general teaching advice. I taught a class of 12 students, who represented every high school grade level. Given the wide range of experience and math knowledge, our class focused on exploring interesting problems to promote algebraic thinking. Designing our own curriculum was a highlight of the program as it allowed us to show our students that there is much more to mathematics than what they typically see in a high school class. Making lesson plans, creating worksheets and slideshows, and correcting classwork was definitely time consuming.

However, seeing that our students were truly excited by what they were doing in made everything worth it.

I definitely recommend this program for anyone who is potentially interested in teaching, but also anyone who simply wants to share their passion for math.  Even after a short period of time, there was a strong sense of community among the TEUs, our directors, and mentors, as well as within the BSHS classroom. It really was an inspiring and rewarding experience.

TEU participants receive a stipend of $2,500-$3,500 depending on whether they choose to receive course credit. In addition, on-campus housing, dining hall access, and books/resources are all provided. More information can be found on the TEU website: https://teu.vassar.edu/math/ and in the description below.

## Summer Opportunity: Teaching Experience for Undergraduates (TEUs)

Thinking about teaching high school math?  Union College is part of a network of about 60 liberal arts colleges and universities whose students are allowed to apply for a relatively new summer "Teaching Experience for Undergraduates" (TEU) program at Brown University.  Students selected for this program
- Earn a generous stipend ($2500-$3500) as well as room and board, plus travel expenses to and from Brown University,
- Take a 60-hour course in mathematics pedagogy, and
- Apply what they are learning to teaching urban high school students under the supervision of a master teacher-mentor.

After the TEU program, participants undertake a leadership project at their home institution and have the opportunity to travel to a conference to give a presentation about their experience.

This is a wonderful opportunity for students considering becoming a math teacher.  For more information about the program and how to apply, go to the website TEU.vassar.edu.  **The application deadline is February 28**, and the program starts on June 17.

Interested in science education but perhaps not math education?  The same TEU organization is running a parallel program in science hosted at Trinity College in Hartford, CT!  Information and application materials are available at the same website TEU.vassar.edu. The application deadline is February 28, and the program starts on June 3.

## Math Problem Solving Contest at Union College: Saturday, February 9

Attention Problem Solvers! The 13th annual **University of Rochester Math Olympiad** will be held on **Saturday, February 9** from 9:30am to 12:30pm**.**  This contest consists of four proof-based problems to be solved over the three-hour time period with CASH prizes to the top three performers!  For information about practice sessions, and to participate in this Olympiad, please contact **Professor George Todd** (toddg@union.edu), Bailey 108D.

## Problem of the Newsletter – January 28, 2019

**Last week's problem:**  Unfortunately, no correct solutions to last week's problem were submitted ☹. However, a solution has been posted at the newsletter sites in Bailey Hall.

**This week's problem:** Let $A$ be a set of real numbers that is closed under multiplication, that is, if $x$ and $y$ are in $A$, then so is $xy$.  Let $B$ and $C$ be disjoint subsets of $A$ whose union is $A$.  Given that the product of any *three* (not necessarily distinct) elements of $B$ is in $B$ and that the product of any three elements of $C$ is in $C$, show that at least one of the two subsets $B, C$ is closed under multiplication.

**Professor Friedman** (friedmap@union.edu) will accept solutions until midnight on Friday, February 1.