

Don't Forget to Accept Petitions via Webadvising on  
Monday the 27<sup>th</sup> or Tuesday the 28<sup>th</sup>

## UNDERGRADUATE MATHEMATICS SEMINAR

The information for the next meeting of the seminar is as follows:

**DATE:** MONDAY, October 27<sup>th</sup>

**Time &** 4:15pm – Refreshments in the Math Common Room, **Bailey 204**

**Location:** 4:30pm – Seminar in **Bailey 207**

In this seminar, **Dr. James M. Silva**, a Senior Engineer at General Electric Global Research Center will deliver the following talk:

### TITLE: Life at the Intersection of Chemistry and Mathematics

**ABSTRACT:** Exploratory synthesis of new materials such as engineering thermoplastics and nanomaterials is typically performed in small-scale laboratory experiments and often yields very attractive results. However, translating lab results into large-scale, commercial chemical reactors requires a clear understanding of phenomena such as chemical reaction kinetics and heat transfer. By combining mathematical descriptions of each phenomenon with basic laws of mass and energy conservation, we are able to develop chemical reactor models that are useful in designing larger scale experiments and commercial reactors. This talk describes three types of chemical reactors and demonstrates modeling of their behavior, sometimes giving surprising results.

### Where Are They Now? Ben Bunes '08

Although I graduated in June, life has not changed too much for me. Physically, I am living two doors down from the apartment I lived in as an undergraduate. I still take courses on the Union campus and hang out at my fraternity on the weekends. My academic focus has changed, but my undergraduate studies of mathematics have been a great help to me. I have also started working, and math has helped me in this area as well.

Currently, I am contracted to General Electric as a Cost Engineer. Cost Engineers manage projects to lessen the cost to produce our products. Overall, this leads to over \$300 million of savings annually. My group is responsible for providing accessories for gas turbines, steam turbines, and generators. Mathematics has helped me in this position. I do a fair amount of cost and labor estimates. In doing so, I analyze large amounts of data. My

mathematics background has provided me with a good intuition for verifying these estimates and understanding the associated error. Most importantly, I learned the value of speaking precisely. This has helped me in all of my business communications. Clear communications reduces the time to completion and eliminates extra work due to confusion, allowing for my group to claim more savings for GE.

Math has been the most useful in graduate school. In addition to working, I am also enrolled in the Engineering Management masters program at Union Graduate College. This degree requires many technical courses. These courses typically use mostly applied mathematics, but the theory has been very useful as well. For example, in one of my classes this week, our professor presented some code using well-known Computer Science

techniques. I was able to achieve the same result with less code and processing time using basic set theory. Linear Algebra, as difficult as taking the course was, has paid for all of that pain and suffering tenfold. It greatly simplifies circuit analysis. Matrix math has also been very helpful when working with electric machines. Methods of Applied Mathematics provided me with the theory supporting several areas of electrical engineering, including acoustics, electromagnetics, and semiconductor physics. Real Variable Theory and the Calculus series have also been very useful. So many people just know how to set up integrals without knowing how they actually work. Learning how to build a multi-dimensional integral from a Riemann sum is very useful in understanding how the integral corresponds to the physical system. This has been particularly useful in electromagnetics and semiconductor physics. So many everyday problems are simply implementations of the theory we learn studying mathematics. Understanding the theory behind the problem makes it easier to solve.

Earning a degree in mathematics has been very useful. Mathematics has proved to be extremely useful to me as I continue my education. The courses I am taking are made simpler with a strong math background. Studying mathematics has also helped me to speak more clearly and effectively. The lessons I learned when I would get my homework assignments back with my proofs covered in red ink have stayed with me and I think about them with every email I write. Mathematics has helped me in both the academic and professional areas of my life.

## Resources for Students

- Carney, Sandoe & Associates, <http://www.carneysandoe.com>, an educational recruitment firm that places teachers and administrators in private, independent and like-kind (charter, magnet, pilot and merit) schools across the nation and worldwide, will be holding an information session on Wednesday, November 5th at 7:00 pm in the Becker Career Center 201 and conducting interviews on Thursday, November 6th. CS&A has thousands of positions available in all primary and secondary subjects each year and all services are free to the job-seeking candidate. Students can submit their resume online through the Career Service Office website to be considered for an on-campus interview.
- From the MAA: **U.S. Culture Discourages Girls From Excelling at Math:** A paper titled "Cross-Cultural Analysis of Students with Exceptional Talent in Mathematical Problem Solving," published in the November Notices of the American Mathematical Society suggests many girls possess a high aptitude for mathematics, a new study concludes, but few girls in the United States reach the highest levels of mathematical attainment, and that the nation urgently needs to improve how it identifies and nurtures such gifted children so that this pool of exceptional talent is not wasted. For more, visit <http://www.maa.org/news/101008girls.html>.

## Problem of the Newsletter: October 24, 2008

Unfortunately, no one solved last week's problem. If someone is interested in seeing a solution "soon", contact Professor Friedman (see below). Otherwise, wait until next week when one will be posted.

**Here is this week's problem** (from *The Problem Solving Competition*): Find an expression for the continued radical  $C = \sqrt{m + \sqrt{m + \sqrt{m + \dots}}}$  in terms of  $m$  that does not involve a continued radical. Then determine all positive integers  $m$  so that  $C$  is a positive integer.

Professor Friedman will accept solutions to this problem until 12:00 noon Thursday, October 30<sup>th</sup>. Email your solution to him ([friedmap@union.edu](mailto:friedmap@union.edu)) or put it in his mailbox in the Math Department's office on the second floor of Bailey Hall.