

UNDERGRADUATE MATH SEMINAR

This week's seminar, as well as next week's, will be on **Tuesday**. Further, this week's will be in the late afternoon.

DATE: **Tuesday, May 21**

Time & **3:30 pm** – Refreshments in **Bailey 204**

Location: **4:00 pm** – Seminar in **Bailey 207**

In this seminar, jointly sponsored with the Union College Economics Department, **Professor Ashley Piggins**, an economist from the **National University of Ireland (NUI) at Galway**, will present the following talk.



Professor Ashley Piggins

Title: Rationalizable Voting Rules and the S-Correspondence

Abstract: Perhaps the most important feature in Kenneth Arrow's famous "Impossibility Theorem" (which helped him earn a Nobel prize in Economics) is **IIA** – the Independence of Irrelevant Alternatives condition on voting rules, aka social choice. We introduce a related but new social choice property, the S-independence condition. We characterize the "S-correspondences" – those social choice rules that satisfy S-independence along with three more standard axioms: strong Pareto optimality, neutrality and anonymity. This class is closely related to the S-rules of Bossert and Suzumura (2008a, J. Econ. Theory 138, 311-320). S-independence can be justified by a new rationalizability argument that shows it is equivalent to assuming **IIA** in a somewhat different framework. [This is joint work with Conal Duddy, Department of Economics, University College, Cork.]

News from the Math Club, by Emily Rosenlof

On Wednesday, May 15, Math Club and the Association for Women in Mathematics held a dinner and discussion event with **Professor Ravi Ramakrishna** from Cornell University. We had an excellent turnout of both math and physics students. Professor Ramakrishna shared his story of becoming a math professor as well as the areas of math he is most interested in. His passion for mathematics was contagious, making the dinner a very exciting event!

The next math club meeting will be **Wednesday, May 22 at 12:50 pm in the math common room**. We will be holding **elections** for the 2019-2020 academic year. The positions are as follows: President, Vice President, Secretary/PR Chair, and Treasurer. If you are interested in running for one or more positions please email Emily Rosenlof or Kallan Piconi (rosenloe@union.edu or @piconik@union.edu) with a small paragraph of why you would be fit for the role. We will vote at the meeting next Wednesday. Hope to see you all there!

Pieces from Theses, by Niuniu Zhang

Niuniu's thesis was supervised by Professor George Todd

Double majoring in Mathematics, French, and minoring in Art, I always appreciate the liberal arts education that I've received at Union College. I believe that an individual should have the ability to think critically in terms of both art and science. I am inspired to become a "Renaissance man."

I take math as philosophy, as four years of mathematical education has honed my skills of logic and reasoning. I deeply relish the challenge of doing pure mathematics, since it quenches my curiosity of abstract mathematical concepts. Before coming to Union, with limited knowledge of Calculus, I never thought one can interpret numbers in a systematic way through set theory or number theory.

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After taking MTH 199, though, I was determined to pursue this path. Therefore, while going through the list of potential research topics in my junior year, “Category Theory and Universal Property” instantly caught my attention, where the description of the topic stated “Category Theory unifies and abstracts mathematical ideas to create a rich language.” If applied mathematics is at one end of the spectrum, then Category theory is at the other end. Since I had a background of Linear Algebra, Abstract Algebra, and Topology going into my thesis, Category Theory seems to be the perfect choice.

For the first half of the research, I typically meet Professor Todd three times a week to discuss the assigned readings and the questions that I had. At the same time, Professor Todd would propose questions for me to explore with the newly acquired knowledge from Category Theory. Having a flexible meeting schedule as opposed to the traditional class structure, I had a great deal of academic discretion for my topic. Professor Todd was always there to help and to guide me.

I would recommend that underclass students make the choice of their thesis topic wisely, encouraging you to ask: Do you really love this topic? Do you really want to deepen your knowledge in this area of interests? Since one would have a great deal of freedom during research and spend many hours by oneself, it’s vital to ask: would you be able to totally dedicate yourself to your research? If you do, you will have a fantastic experience.

Seen at Steinmetz 2019



Some Math majors presenting at the annual Steinmetz Symposium, Friday, May 10:
from left to right, Julia Greene, Paige Isser, and Niuniu Zhang.

Problem of the Newsletter – May 20, 2019

Last week’s problem: A solution to last week’s problem is posted at the newsletter sites in Bailey Hall.

This week’s problem: The following is from a recent national high school math competition – no googling!

Given $f(z) = z^2 - 19z$, there are complex numbers z with the property that z , $f(z)$, and $f(f(z))$ are the vertices of a right triangle in the complex plane with a right angle at $f(z)$. There are positive integers m and n such that one such value of z is $m + \sqrt{n} + 11i$. Find $m + n$.

Professor Friedman (friedmap@union.edu) will accept solutions until noon on Thursday, May 23.