

UNDERGRADUATE MATH SEMINAR

The next seminar of the term will be

DATE: THURSDAY, September 27

Time & 12:30pm – Pizza in Bailey 204

Location: 1:00pm – Seminar in Bailey 207



Julie Bergner
University of Virginia and
Cornell University

In this seminar, **Professor Julie Bergner**, of the University of Virginia and Cornell University will deliver the following talk:

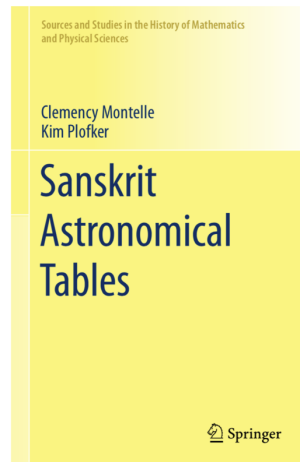
Title: Action Graphs and Catalan Numbers

Abstract: The Catalan numbers are given by a recursively defined sequence and arise from over 200 different kinds of combinatorial objects. In 2013, two of my undergraduate research students, Gerardo Alvarez and Ruben Lopez, showed that a family of directed graphs called action graphs gives a new way to obtain this sequence. Since these graphs are defined inductively, one might ask what sequences we can get by using a different initial graph but the same induction process. Last year, three more students, Cedric Harper, Ryan Keller, and Mathilde Rosi-Marshall, looked into this question. They found new families, called k -initial action graphs, which produce self-convolutions of the Catalan sequence. In this talk we'll introduce the sequences and graphs involved and talk about how these comparisons were made.

What We Did this Summer

Continuing the series from last week's newsletter, here are a few bullet point highlights of some of the activities of some of the math faculty this past summer.

- **Professor Kim Plofker** spent a few weeks of the southern hemisphere winter in the Department of Mathematics and Statistics at the University of Canterbury in New Zealand to work with colleagues and grad students, especially on finishing up a couple of forthcoming books. Here's a book proofs cover image to prove that she was really getting some work done, and here's Prof. Plofker being pestered by a kea (very inquisitive New Zealand parrot) that was trying to steal her woolly headband in the nearby Willowbank Wildlife Reserve in Christchurch.
- **Professor Jue Wang** was one of 20 participants selected nationwide and beyond for an NSF-funded faculty development supporting STEM effort in the undergraduate curriculum. She developed a project in modeling cancer growth, drawn from her own research interests in medical fields. It guides students use several effective differential equation models to investigate, analyze, and predict cancer growth with real cancer data. It engages students in preclinical studies to evaluate how cancer treatments (such as chemotherapy, immunotherapy, or drug treatment) affect tumor growth.



Resources for Students

- Check out the math website: <https://muse.union.edu/mathematics/> From there, you can find information about the courses the department offers, seminar announcements, links to the Math Newsletter, and more! Explore!
- **Putnam Exam Preparation:** Do you enjoy working on challenging math problems and think doing so is fun? If so, consider participating in the William Lowell Putnam Mathematical Competition, the preeminent math contest for college students. And even if you do not have the competitive bug, but you just enjoy doing problems and learning math with like-minded folks, feel free to come to some practice problem solving sessions.



Math club meeting to discuss activities for the Fall term

Professor George Todd will be holding practice problem/learning sessions this week on **Monday, September 24** and also on **Friday, September 28** during **common lunch** in **Bailey 106**. If you are unable to attend practice session but would like to be informed about and engaged in Putnam activities, send Professor Todd an email: toddg@union.edu.

- The next meeting of the Math Club will be **Wednesday, September 26** in **Bailey 204** (the Math Common Room) during common lunch. Come to help plan some fun math-related events. If you are interested in joining the math club but cannot attend this meeting, email Kallan Piconi (piconik@union.edu).
- **The Calculus Help Center (CHC)** is open and ready for business. The CHC offers **free tutoring** in calculus courses through Math 117. It is open Sunday through Thursday nights 7:30-10:00pm and is located in the SORUM HOUSE seminar room.

Problem of the Newsletter – September 24, 2018

Last week's problem: Congratulations to **Professor Jetjaroen Klangwang** for solving last week's Problem of the Newsletter. A copy of his solution has been posted at the newsletter sites around Bailey Hall.

This week's problem: Continuing playing with polynomials from last week, try the following:

Find the sum of the squares of the roots of the polynomial $p(x)=2x^4-8x^3+6x^2-3$.

Professor Friedman (friedmap@union.edu) will accept solutions until midnight on Friday, September 28.

Class of 2018: Stay in Touch

Union College email accounts of recent graduates expire at the end of September. To continue receiving the Math Newsletter, please update your email address with **Joanne Higgins** (higginsj@union.edu) or **Professor Paul Friedman** (friedmap@union.edu).