

UNDERGRADUATE MATHEMATICS SEMINAR

Bookmark it! The seminar schedule, abstracts, and (sometimes) slides presented by a speaker can be found <http://www.math.union.edu/activities/seminars/student/welcome.html>.

The next seminar will be:

DATE: TUESDAY, January 19th

Time & 3:45pm – Refreshments in the Math Common Room, **Bailey 204**

Location: 4:00pm – Seminar in **Bailey 201**

In this seminar, Union College's **Professor Hubert Noussi** will deliver the following talk:

TITLE: Competition of Organisms in the Chemostat

ABSTRACT: The chemostat is an ideal laboratory apparatus in which to study the dynamics of microorganisms. It can be thought of as a model for an ecosystem influenced by naturally varying or intentionally designed interactions. This tool is of principal importance in microbiology and population biology in terms of its applications. We will study models describing the competition in the chemostat between two species for a single growth-limiting resource and two species for two resources. The uptake functions are Michaelis-Menten. We will discuss the Competitive Exclusion Principle also referred to as Gause's Law, a central result in the theory of ecological competition. It states that only one competitor survives when two or more species compete for a single growth-limiting resource.

Is an REU for YOU? Research Experiences for Undergraduates (REUs) in Math and More

The National Science Foundation (NSF) sponsors many Research Experience for Undergraduates (REUs) in mathematics at colleges and universities throughout the country. These are summer programs that last 6-8 weeks in which undergraduates are given the opportunity to learn new mathematics and to perform some mathematical research – and get paid for it (~\$3000-4000).

The range of research available to students among the programs is wide and the topics are varied. Some programs focus on applied mathematics, while others study more theoretical math, depending, typically, on the research interest of the mathematician and/or the university leading the summer program. For example, this summer there are REUs in: algebra, algebraic geometry, analysis (real or complex), combinatorics, computational mathematics, differential equations, differential geometry, discrete math, dynamical systems, fractals, geometry and physics on graphs, graph theory, knot theory, mathematical biology, mathematical physics, matrix analysis, number theory, probability, statistics, wavelets, and more! At some REUs, students work on predesigned projects (more common), while at others students design their own project (less common).

Some universities put a twist on their summer program and have students take some specially designed, usually advanced undergraduate, coursework to help prepare students for graduate school. Cornell University does this, as do some others. Additionally, some programs target a specific audience, usually groups that are underrepresented in mathematics (women and certain minorities).

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How can you find out about the different options that are available? The primary source listing REUs is the website for the American Mathematical Society (AMS). The subpage of their main website that is devoted to REUs is <http://www.ams.org/employment/reu.html>, which contains links to current programs. (Ignore the 2009 atop this page; it is for 2010.) Additionally, some programs mail posters or brochures to Union; these get posted on bulletin boards around Bailey Hall or advertised in this newsletter. **Be aware** that some programs start before Union's spring trimester finishes.

Who should apply? Math majors, typically in their junior or sophomore year, though some programs accept applications from current seniors (for the summer after graduation). Most applicants to REUs are considering going to graduate school in math or a related discipline, and would like to see what math research is about. As REUs are generally funded by the US government through the NSF, these programs generally require participants to be US citizens or permanent residents. In terms of coursework, most programs require participants to have had multivariable calculus through Math 117, a course similar to Math 199 and/or a course beyond Math 199, that requires proof-writing (for example, Math 330, 332, 340, 336).

Act soon! Most of the application deadlines to REUs are in February or early March. They typically require a personal statement describing your math background and your interests in math. They also require letters-of-recommendation (!), so you will need to plan NOW so that your letter-writers have time to write on your behalf.

Here is a sampling of this summer's REU programs

Institution	Topics	Dates	Deadline
BYU	Minimal Surface Problems Geometric Optimization Commutative Algebra	June 14 - August 6	March 1
Canisius College	Geometry and Physics and Graphs	June 14 - August 6	February 18
Clarkson-SUNY Potsdam	Analysis Applied Graph Theory Functional Analysis Graph and Knot Theory	June 7 - July 30	February 22
Mount Holyoke College	Partition Regular Matrices Modelling the Swimming of the Sleeping Sickness Organism	June 14 - August 6	February 26
U of Washington	Inverse Problems	June 21 - August 13	April 1
Williams College	Algebraic Number Theory Computational Statistics Diophantine Arithmetic and Analysis Geometry Mathematical Physics	June 14 - August 13	February 10

The Calculus Help Center is Open Sunday - Thursday, 7:30-10:00 pm
in Sorum House

Problem of the Newsletter: January 15, 2010

Sorry fans! Due to spatial constraints, there is no problem this week. The PON will be back next week!