

MSCS Mess

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Department of Mathematics, Statistics, and Computer Science
St. Olaf College, Northfield, MN 55057

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This Week's Seminar

Title:	Matching Method for Nodal Solutions of Boundary Value Problems with Integral Boundary Conditions
Speaker:	Thomas St. George
Date:	Friday, April 17
Time:	3:35 pm
Location:	RNS 204

About the talk: In this talk, Professor St. George will be discussing a result on the existence of solutions, with certain zero counting properties, to boundary value problems involving double Riemann-Stieltjes integral boundary conditions. The proof of this result relies on the matching method. A result on the nonexistence of solutions with certain zero counting properties will also be discussed.

Attention Senior MSCS Majors

It's almost graduation time, way to go! The MSCS department would like to honor your accomplishments with a showcase. In order to do so, we need your help! Please send Zach Greimann, (greimann@stolaf.edu) a digital photo of yourself along with any other information you would like to share, such as:

- Your name
- Your major(s)
- Your plans for after graduation (this can include grad school, jobs, traveling, future goals, etc.)

Thanks!

Come Work for MSCS!

The MSCS department has lots of jobs for those of you with work-study awards, and those without. You can be a grader, a tutor in the math & stats help sessions (aka "clinics"), a teaching assistant, a cluster manager, and more. Most jobs are taken for this semester, but we'd like to line up as many of you as possible for next fall. Stop by Patty Martinez's office in RMS 307 for an application before you miss your chance and the only job left is one you don't want.

April is Math Awareness Month!

As more and more industries become increasingly complex, Math has become an even more important part of our world and a valuable asset for any employee. But how does one figure out where they can apply their knowledge of Mathematics in the real world? In order to increase awareness of the myriad ways to use math in your career, the American Mathematical Society has declared April the Math Awareness Month, and has created profiles of professionals who use math outside of the world of academia. Check out this resource at www.mathaware.org/mam/2015/ to see where your Mathematics major could take you!

CarlHacks

Carleton College is pleased to announce CarlHacks: the first large-scale hackathon at a small liberal arts college, bringing the inclusive liberal arts perspective to the world of hackathons. CarlHacks is a 36-hour overnight event where teams work together to build interesting apps, websites, games, and other technology-based projects.

Any student who is or was enrolled in an undergraduate collegiate institution during the 2014-2015

academic year is eligible to participate in teams of 2-5. You don't need past coding experience to participate, hackathons are a great opportunity to learn new skills or hone old ones, and whether you're a graphic designer or a dedicated Python enthusiast (or both!), you can make an important contribution to a CarlHacks project.

CarlHacks will take place April 24-26 and is completely free to attend. Carleton College will provide meals, showers, and air beds for napping. Participants need only bring a laptop, charger, student ID card, and any hardware they intend to use in their hack. Even an idea for a hack is not necessary, some of the best hack ideas are born in the heat of the hackathon!

For more information visit carlhacks.io/

Upcoming Course Descriptions

Still not sure what courses to take next Fall? Here are a few of the MSCS-related options being offered. Note that this is *not* an exhaustive list. More courses can be found online.

Fall 2015

- Educ 290: Educational Psychology
- Math 344: Real Analysis II
- Math 382: Module Theory
- Math 384: Algorithms for Decision Making
- Math 396: Directed Undergraduate Research

Education 290: Educational Psychology

Are you interested in becoming a math teacher? Have you thought about it, but are unsure if it's the right career path for you? Or are you looking for a fun class to take and satisfy a GE at the same time? If you've answered "yes" to any of these questions, this may be the course for you. It offers a nice introduction to the Education Department and to the world of education in general. Participants will also get some "field experience," where they'll spend some time in actual schools. What's more, the course fulfills a GE too (HBS) – so you really can't go wrong.

The course will focus on theories of, and research into, human behavior, growth, and development. Through lectures, discussions, case studies and field experiences, students analyze the impact of applied psychology upon schools, teachers, and students. Students also examine the interaction between individual characteristics and needs and political, economic and philosophical issues confronting contemporary American students.

20 hours of field experience are required, sophomores and above only.

If you have any questions, contact Professor Matsuura (matsuura@stolaf.edu).

Math 344: Real Analysis II

This course is about the theory of Lebesgue measure and integration. The course begins by examining some defects of the Riemann integral and then developing Lebesgue's ideas of how to circumvent these defects. Although Lebesgue did not complete the task, his theory forms the basis for the modern theory of integration and an inherent measure theory.

But this "measure theory" is not just probabilistic in nature, it IS the language of modern probability theory as it is understood and practiced. Often during the semester, Professor Humke will use probability as motivation for definitions and proofs.

There will also be several evening sessions for those who are particularly interested in statistics. Statisticians and probabilists use slightly different terminology and have a slightly different viewpoint than the measure theory folks. During those evening sessions, Professor Humke will "drop the gloves and go probabilistic on you."

Capinski and Kopp follow an historical line of thought which, although not the most direct route, reveals much about how the theory of integration is closely tied to the geometry of functions and the foundations of probability. Topics covered include:

Definition of measure and set examples Measurable Sets Sigma fields Forever Definition of the Lebesgue Integral and Basic Results Measurable Functions Convergence Theorems.

Only 6 items you say? It'll be enough for the first 2/3 of the course. During the last 1/3 the class will break into project groups and do some theme based research.

For more information, contact Professor Humke (humkep@stolaf.edu).

Math 382: Module Theory

The goal of this course is to have fun using modern tools, such as exact sequences, to study algebra from a new point of view. Participants will visit the familiar concepts of a vector space and a group by joining them under the same umbrella- a module. Participants will then turn to what are called projective modules to understand all modules in the world- be the algebra tame or wild (official math terms!). Throughout the course, hand drawn path algebras will provide a simple way to think about modules and act as a source of many examples.

Notes: Math 382: Module Theory will form a sequence with Math 252 that you can count towards the math major requirements. Prerequisite: Math 252.

For more information, contact Professor Purin (purin@stolaf.edu).

Math 384: Algorithms for Decision Making

This course is an overview of the field of machine learning, an essential toolset for making sense of the vast and complex data sets that have emerged in the past twenty years in fields ranging from biology to finance to marketing to astrophysics. In this class students will learn about some of the most important modeling and prediction techniques, along with relevant applications. Topics include linear regression, classification, resampling methods, shrinkage approaches, tree-based methods, support vector machines, clustering, and more. Advanced use of R and graphical visualizations will be introduced in this course.

Prerequisites for this course are one of the following courses: Math 220, CS 121/125 I, or STAT 272. Some prior knowledge of the R programming language would be helpful but not required.

For more information, contact Professor Richey (richeym@stolaf.edu).

Math 396: Directed Undergraduate Research

Topics this fall will be related to enumerative and algebraic combinatorics. Potential projects include investigations of properties of certain classes of integer partitions or young tableaux. This course provides a comprehensive research opportunity, including an introduction to relevant background material. Students will work in small groups on one of several problems presented during the first week of class. Each group will have the opportunity to develop original results and present those findings to the class and eventually to a wider mathematical audience.

Prerequisite: a passion for mathematics and successful completion of Abstract Algebra.

For more information, contact Prof. Tina Garrett (garrettk@stolaf.edu)

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If you would like to submit an article or event to be published in the MSCS Mess, e-mail greimann@stolaf.edu