Math Freshmen and Sophomore Advising
February 2017
Chris Davis, daviscj@uci.edu
Goals of this meeting

- Math major advice
- Tracks in the math major
- Career advice
- Resources for math majors
- Questions!
- Survey

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Questions

• Do you talk to your math professors?
• What math class marks the transition from lower-division to upper-division?
• What’s the difference?
6 tracks in the math major

- Pure Mathematics Major
- 2 Concentrations
- 3 Specializations

- **Concentrations** involve interdisciplinary study with other departments
- **Specializations** involve focused study within the math major
Pure Math Major

• Most flexibility with electives
• No specialization, no concentration
• “Designed for students seeking both breadth and depth in their mathematics education”
• Leaves the widest range of career options
Aspects of all specializations and concentrations

- Require an **application** and an **interview**
  (unlike the pure math major)
- Are recognized on the transcript but not on the diploma
- Get more info on the math homepage and in the course catalogue
The Concentration in Mathematical Finance

• This is the most popular of the specializations/concentrations.
• Not everyone who wants to join is able to.
• Take Econ 20A and 20B during your sophomore year.
• Apply between spring quarter of your sophomore year and the end of your junior year.
• A new track may be introduced as an alternative and complement to this concentration
Specialization in Mathematics for Education

• Designed for prospective middle school and high school Mathematics Teachers
• Apply by the end of your junior year
• Advisors: Alessandra Pantano and Zhiqin Lu
The concentration in mathematics for education/secondary teaching certification

• Earn both a math degree and a teaching credential in 4 years!
• Apply: By the end of your sophomore year
• Advisors: Alessandra Pantano and Zhiqin Lu
Specialization in Mathematical Biology

- Preparation for careers involving mathematical and physical modeling of biological systems
- Apply by the end of your junior year
- Advisor: German Enciso Ruiz
The Specialization in Applied and Computational Mathematics

- Preparation for a career in a variety of engineering and computing areas
- Apply by the end of your junior year
- Advisor: Long Chen
Math Honors Program

• Designed for students contemplating math grad school
• Apply by fall of your senior year, and after taking some upper-division courses
• GPA requirements
• Math 199
• Course requirements: for example H120ABC or H140ABC or 140C+133AB or ...
Preparing for a Career in Data Analysis

• Pursue a Statistics Minor: Stats 7, Stats 120A, Stats 110-111
• Stats 110-111: Statistical Methods for Data Analysis
• Math 130ABC-Probability and Stochastic Processes
• Linear Algebra, Multi-variable Calculus
Preparing for a Career in Actuarial Science

- Popular among students in the Math Finance Concentration
- Preliminary exams are the foundation for becoming an actuary
- Math 130ABC prepares for the first exam
- Take that exam as soon as you finish Math 130!
- There is an Actuarial Society at UCI!
Preparing for a Career in **Mathematical Biology**

- BioSci classes: 97 (Genetics), 98 (Bio-Chemistry), 99 (Molecular Biology)
- Math classes: 113AB (Mathematical Modeling in Biology), 115, 105AB, 107, 112ABC, 119, 130AB
- Places to work: universities, FDA, National Research Labs, NASA Ames, medical device companies...
Preparing for a Career in Finance

- Math 176, Math 133AB, Math 130AB
- Linear algebra is important. Lots of high-dimensional vector spaces and matrices with sparse data.
- Computer programming
- Bayesian inference and how it can be misapplied
- Probability theory and stochastic processes, statistics, econometrics, stochastic differential equations
- Consider a double major in Quantitative Economics
Preparing for Math Grad School

• Grad school can mean a Masters program, a PhD program, or both. Masters programs are often 2 years, PhD programs are often 6 years.
• The H120 and H140 sequences are introductory grad courses.
• Math 199 is a chance to work individually with a faculty member.
• Grad school admissions is based largely on GPA, letters of recommendation, courses taken, GRE math subject scores.
• Summer research, especially between junior and senior year
Some opportunities for Math undergrads

• Check out the Anteaters Mathematics Club! It meets Mondays, 5-6pm, in NS2 1201 (mathclub.uci@gmail.com)
• Volunteer with MathCounts (Feb 26 or March 12). Email Mike Vo for details.
• Volunteer with Math CEO. Outreach program for middle school students Wednesdays 2-4pm. http://www.math.uci.edu/mathceo/
More opportunities for Math undergrads

• Enroll in Math 194 in the fall, a fun, Pass/No Pass prep course for the Putnam Exam.

• Come to a 12pm pizza talk Thursday by Rick Schoen, who just won the Wolf prize.

• Meet Jean Bourgain, a Fields Medal winner visiting our department during spring quarter.

• Earn $6000: apply to Google’s “Summer of Code”. UCI math grad student Chris Rackauckas is a mentor.
An introduction to Minkowski space

Minkowski space is $\mathbb{R}^n$ with the dot product replaced by a different scalar product called the Lorentz product. This talk will give an introduction to the geometry of Minkowski space including the light cones, spacelike and timelike vectors, Lorentz transformations, and the geometry of the unit spheres. In physics the space $\mathbb{R}^3$ with the dot product is the space of Newtonian mechanics while the Minkowski space $\mathbb{R}^4$ is the spacetime of special relativity.

What: A great Math Talk for undergrads by UCI Professor Rick Schoen

Pizza served!!

Where: Rowland Hall 306

When: Thursday, Feb 23 12:00-12:50 pm

The talk is hosted by the UCI Math Department with the support of NSF grant DMS-1044150

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Some Machine Learning — Building AlphaGo

AlphaGo is a computer program developed by Google’s DeepMind branch to play the board game Go. In October 2015, it became the first Computer Go program to beat a human professional Go player without handicaps on a full-sized 19x19 board. In March 2016, it beat Lee Sedol in a five-game match, the first time a computer Go program has beaten a 9-dan professional without handicaps. A result predicted to be 10 years off.

In this talk we will discuss some introductory machine learning ideas and how they brought together to build AlphaGo. Perhaps unsurprisingly many of the high level ideas used are inspired from biological systems. Perhaps surprisingly much of the low-level mathematics used are taken from Multivariable calculus.

Rowland Hall 340N
Friday, Feb 24th, 12:00pm
Pizza Served

Hosted by UCI Math, supported by NSF grant DMS-1044150

Vincent Graziano
Department of Mathematics
Case Western Reserve University
Where to send questions

The Math Department:

• Undergraduate program coordinator, Mike Vo, myv@uci.edu
• 340B Rowland Hall
• Questions about enrollment, ...

Physical Sciences Student Affairs Office:

• Academic counseling services
• Help with course planning, degree requirements, ...
• pssazot@uci.edu
• 134 Rowland Hall
Thank you!!

Questions?

Please fill out the short survey:
https://eee.uci.edu/survey/math17