UNDERGRADUATE MATH SEMINAR

The next seminar is a joint seminar with the Computer Science Department. To accommodate the anticipated larger audience, it will NOT BE IN BAILEY HALL, but in the Visual Arts building, VART 204!

DATE: Thursday, October 17

Time &   **12:30 pm** – Pizza and drinks

Location: **1:00 pm** – Seminar in **VART 204**

In this week's seminar, **Professor Siwei Lyu** from the Department of Computer Science at the **University of Albany** will deliver the following talk:

Title: DeepFake the Menace?

Abstract: The advancements of AI technology, in particular, deep generative models, have enabled the creation of fake images, audios and videos in ways that have not been possible before. Such fake videos, commonly known as the DeepFakes, are eroding our trust to digital media and causing serious ethical, legal, social, and financial consequences. In this talk, I will briefly review the technologies behind the creation of DeepFakes, and then introduce current detection methods of such fake videos and measures that can obstruct the generation of DeepFakes, as well as general technical aspects to combat DeepFakes.

Bio: Siwei Lyu is a Professor at the Department of Computer Science and the Director of Computer Vision and Machine Learning Lab (CVML) of University at Albany, State University of New York. Dr. Lyu received his Ph.D. degree in Computer Science from Dartmouth College in 2005, and his M.S. degree in Computer Science in 2000 and B.S. degree in Information Science in 1997, both from Peking University, China. Dr. Lyu's research interests include digital media forensics, computer vision, and machine learning. Dr. Lyu has published over 120 refereed journal and conference papers. Dr. Lyu's research projects are funded by NSF, DARPA, ARO and NIJ. He is the recipient of the IEEE Signal Processing Society Best Paper Award (2011), the National Science Foundation CAREER Award (2010), SUNY Chancellor's Award for Excellence in Research and Creative Activities (2018) and Google Faculty Research Award (2019).

Problem of the Newsletter – October 14, 2019

Last week's problem: Congratulations to **Son Nguyen '23** for submitting a wonderful solution to last week's problem and an extension of the problem! You may see the solution at the newsletter sites around Bailey Hall.

This week's problem: Here's a fun property-of-polynomial problem.

For distinct complex numbers $z_1, z_2, \ldots, z_{673}$, the polynomial
$$(x - z_1)^3 (x - z_2)^3 \cdots (x - z_{673})^3$$
can be expressed as $x^{2019} + 20x^{2018} + 19x^{2017} + g(x)$, where $g(x)$ is a polynomial with complex coefficients and with degree at most 2016. The value of
$$\left| \sum_{1 \le j < k \le 673} z_j z_k \right|$$
can be expressed in the form $\frac{m}{n}$, where m and n are relatively prime positive integers. Find $m + n$.

Professor Friedman (friedmap@union.edu) will accept solutions until noon on Friday, October 18.

Winter Term Preregistration Process Begins this Weekend:
Remember to Petition

The petitioning process for winter term classes begins this weekend, Saturday, October 19, and runs through Tuesday, October 22. If you are interested in taking any petition courses, make sure to submit a petition through WebAdvisor during this period. After faculty have reviewed the petitions, students then need to accept or decline the petitions that they were offered; this is to be done between Tuesday, October 29 and Thursday, October 31.

The Petition Math Courses

- *IMP 120*
- Math 110
- Math 117
- Math 199

- Math 221
- Math 340
- Math 487
- *Stats 104*

REMEMBER TO MEET WITH YOUR ADVISOR, WHO MUST RELEASE A "HOLD" IN WEB-ADVISING BEFORE YOU WILL BE ABLE TO PREREGISTER AT YOUR SCHEDULED TIME DURING WEEK 9.

The Courses: This winter, the Math Department is offering several interesting courses beyond the calculus sequence that are suitable for math majors and minors.

Math/Stats 128 is a calculus-based introduction to probability. Students who might be interested in a career as an actuary or in financial mathematics should consider this course. This course is also helpful for economics majors, statistics minors, and prospective teachers.

Math 130 is a course in Ordinary Differential Equations. This course is a more computational version of Math 234, which is also offered this term. (Students may only take one of these two courses.)

Math 199 is the department's "bridge course," intended to help students make the transition from computationally oriented courses to more theoretical proof-writing courses. It is a **required** course for all math majors and minors that is *usually* taken *after* a student has taken Math 115.

Beyond Math 199: There are three courses being offered in the winter that have a Math 199 prerequisite:

- **Math 234** (Differential Equations). This course takes a somewhat more theoretical approach to the study of differential equations than its 100-level counterpart, Math 130. Note that students may only take one of these two courses.

- **Math 221** (Mathematical Cryptology). This course offers an in-depth look at the mathematical theory underlying modern methods to accomplish the secret transmission of messages, as well as other tasks related to data security, privacy, and authentication. As much of this is based in number theory, MTH-221 normally is closed to students who have passed MTH-235.

- **Math 340** (Linear Algebra). This is a foundational course in math that is **required** for math majors. The primary objects of study in this course are vector spaces and the linear maps between them.

Statistics 264 (Regression Analysis). In this course, both the theory and application of regression analysis to develop regression models to fit real-world data sets are studied. Prerequisite(s): MTH 115 and one of STA 104, ECO 243, STA 164, PSY 200, ECO 243, MER 301 or permission from Chair.

Math Club Meeting: Monday, October 14,
1:00 in Bailey 204, the Math Common Room.