Dear Faculty, Students & Alums,

Welcome to the Spring semester. We hope you had a restful winter break and are ready for a prosperous new year. Below, we have compiled a review of the last events of 2019, a look at our upcoming events, and a list of the first faculty seminars of 2020. In addition, we have also spotlighted some exciting new opportunities for you to pursue. We appreciate you taking the time to read our newsletter. Please notify us if you wish to include your work in our next issue.

PAST EVENT HIGHLIGHTS

December 5, 2019 : Talk by Prof. Yde Venema - Professor Yde Venema from the University of Amsterdam talked about Bi simulation In variance : An Approach via Tree Automata.

December 6, 2019 : Google Information Session - At our Google information session event, alumni Brendan Collins gave our students a crash course on what to expect from a software engineer interview at Google.

December 16, 2019 : Alum Networking Event - Our former Computer Science students reconnected with a vital part of their educational journeys and shared stories of their successes.

RECENT NEWS

Prof. Yingli Tian promoted to Distinguished Professor at the City College of New York - Congratulations to Professor Yingli Tian on this accomplishment. Recently, she was the recipient of the FG’19 Test of Time Award for her paper “Comprehensive Database for Facial Expression Analysis.”

Thesis Proposal: “ON THE DENIABILITY OF IMPLICITY AUTHENTICATED KEY EXCHANGE PROTOCOLS, WITH APPLICATION TO THE DENIABILITY OF SIGNAL” by Nihal Vatandas, January 15, 2020. Abstract: Although offline deniability (the ability to a posteriori deny having participated in a particular communication session) has been widely claimed for the Signal messaging application, no formal proof has ever appeared in the literature. In this study we discuss the reasons why a meaningful deniability proof may be difficult to construct.
**Thesis Proposal: “PROGRESS IN QUANTUM HYBRID CRYPTOGRAPHY: ONE-SHOT SIGNATURES AND THEIR PREDECESSORS” by Mario Georgiou, January 15, 2020.**

**Abstract:** We hypothesize the existence of several unclonable public key cryptographic schemes whose sole difference from their classical counterpart is that the secret key is quantum and unclonable. Toward this, we define the notion of \textit{one-shot signatures}, which are signatures where any secret key can be used to sign only a single message, and then self-destructs. While such signatures are of course impossible classically, we construct one-shot signatures using \textit{quantum no-cloning}. In particular, we show that such signatures exist relative to a classical oracle, which we can then heuristically obfuscate using known indistinguishability obfuscation schemes.

**WEEKLY SEMINARS**

**DATA SCIENCE & APPLIED TOPOLOGY SEMINARS:**

**December 6, 2019:** \textit{Planning: High Dimensional Probability: an Introduction with Application to Data Analysis} - Azita Mayeli - In the coming spring, the seminar will be reading \textit{High Dimensional Probability: an Introduction with Application to Data Analysis} together. The book will be introduced, and chapters assigned to anyone interested in speaking in that reading group.

**December 13, 2019:** \textit{Tensor Networks and Language Models} - Tai-Danae Bradley - Tai-Danae Bradley shared ideas on how unsupervised machine learning algorithms based on tensor networks can provide an excellent inductive bias for generative language models. A training algorithm based on the density matrix renormalization group (DMRG) procedure was utilized to help demonstrate the performance of these models.

**CATEGORY THEORY SEMINARS:**

**December 4, 2019:** \textit{Martsinkovsky-Russell Torsion Done Definably} - Philipp Rothmaler - Philipp Rothmaler showed the torsion radical in question is, in every module, a (usually infinite) sum of first-order definable subgroups (of the additive group) of the module.


**January 8, 2020:** \textit{Higher-Order Categorical Logic: Sections 1.1 and 1.2.} - Gershom Bazerman - This seminar looked at deductive systems and the deduction theorem from the book \textit{Introduction to Higher-Order Categorical Logic} by J. Lambek and P.J. Scott.

**January 13, 2020:** \textit{Four New Partition-related Theories} - David Ellerman, University of California at Riverside - Four new partition-related theories were sketched in the talk.
January 22, 2020: *Higher-Order Categorical Logic: From Section 1.5 and on* - Nosen S. Yanofsky, Brooklyn College, CUNY - This seminar discussed Polynomial Categories and Functional Completeness of Cartesian Closed Categories from the book *Introduction to Higher-Order Categorical Logic* by J. Lambek and P.J. Scott.

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Upcoming Deadlines for New Opportunities

**March 10th:** IBII is holding conferences for multiple disciplines on March 30th. This includes The 2020 International Conference of Advanced Research in Science, Engineering and Technology, which features Artificial Intelligence, Computer Vision and Machine Learning, Deep Learning, Big Data, Data Mining, Information Technology, and Computer Engineering as subjects.

[http://ibii-us.org/Conferences/ICMLBI20.html#Submission](http://ibii-us.org/Conferences/ICMLBI20.html#Submission)

**March 30th:** The Computer Science Teaching Association is holding a conference for CS educators to network and share their pedagogical experiences. There are scholarships available to help educators attend the conference as well.

[https://www.cvent.com/events/2020-csta-annual-conference/event-summary-236d288a403041f8a7a935b0bd74131c.aspx](https://www.cvent.com/events/2020-csta-annual-conference/event-summary-236d288a403041f8a7a935b0bd74131c.aspx)

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**Photo Album**
We look forward to sharing more monthly highlights of developments at the department with more exciting seminars, events, and important announcements. For more updates, check us out on Facebook, Twitter, and the department website!