2019 FALL PRIMES CONFERENCE

COMPUTER SCIENCE & COMPUTATIONAL BIOLOGY

Program for Research In Mathematics, Engineering, and Science
for High School Students

Sunday, October 20

Computer Science Section

9:00 am Welcoming remarks
Dr. Slava Gerovitch, PRIMES Program Director
Prof. Srini Devadas, MIT EECS Department

9:15 am Session 1
Ezra Gordon, Improving round complexity of Byzantine Broadcast under dishonest majority (mentor Jun Wan)
Linda Chen, Random graphs and all-to-all communication (mentor Jun Wan)
Sanath Govindarajan and Walden Yan, Achieving fast fully homomorphic encryption with graph reductions (mentor William Moses)

10:20 am Session 2
Patrick Zhang, Privacy-preserving similarity search using learned indexes (mentor Kyle Hogan)
Ethan Mendes, Towards a certified defense for audio adversarial examples (mentor Kyle Hogan)
Andrew Shen, Towards verifying application isolation for cryptocurrency hardware wallets (mentor Anish Athalye)

11:15 am Session 3
Michael Gerovitch, Environment-aware pedestrian trajectory prediction for autonomous driving (mentor Dr. Igor Gilitschenski)
Yuxuan Chen, A deep learning approach to end-to-end autonomous driving using event-based vision (mentors Dr. Igor Gilitschenski and Alexander Amini)
Aditya Saligrama, Can robust ensembling schemes improve defenses against adversarial inputs? (mentor Guillaume Leclerc)

12:10 pm Session 4
Alek Westover, Cache-efficient parallel partition algorithms (mentor William Kuszmaul)
Alex Ding, An evaluation of UPC++ using distributed parallel graph algorithms (mentor Dr. Yan Gu)
Neel Bhalla, Constructing workflow-centric traces in real time for the Hadoop File System (mentor Prof. Raja Sambasivan, Tufts University)
Jerry Xu, Time – What happens if the world spins backwards? (mentor Prof. Ari Trachtenberg, Boston University)

Computational Biology Section

2:00 pm Welcoming remarks
Prof. Leonid Mirny, MIT Physics Department

2:05 pm Session 5
Neil Chowdhury, A method to recognize universal patterns in genome structure using Hi-C (mentor Sameer Abraham)
Shiv Khandelwal, Genome-wide flame feature detection pipeline for Hi-C chromatin conformation maps (mentor Sameer Abraham)
Jason Yang, The relationship between gene expression correlation and 3D genome organization (mentors Sameer Abraham and Martin Falk)
Vishnu Emani and Kevin Zhao, The role of protein occupancies in DNA compartmentalization (mentors Sameer Abraham and Martin Falk)

3:20 pm Session 6
Andrew Zhang, An explainable machine learning platform for antimicrobial resistance prediction and resistance gene identification (mentor Prof. Gil Alterovitz)
Ailan Qi and Powell Zhang, Using feature selection to identify gene significance in drug-resistant tuberculosis (mentor Prof. Gil Alterovitz)
Benjamin Chen, Neil Malur, and Hari Narayanan, A novel framework to improve the structure of clinical trials eligibility criteria (mentor Prof. Gil Alterovitz)
Ian Balaguera, Implementing a patient-clinician interface for biomedical templates (mentor Prof. Gil Alterovitz)

4:40 pm Session 7
Jonathan Yin, Latent representations of chemical ligands to predict combinatorial receptor-ligand interactions (mentor Dr. Hattie Chung, Broad Institute)
Sarah Chen, Retained introns are translated and contribute antigens to the MHC I immunopeptidome (mentors Dr. Tamara Ouspenskaia and Dr. Travis Law, Broad Institute)
Mikhail Alperovich, Data driven quality control for single-cell RNA sequencing analysis (mentor Dr. Ayshwarya Subramanian, Broad Institute)