Computer Networks:

10:00-11:00 – Shan Muthukrishnan (Rutgers University):

Heavy Hitters on Data Streams and Recent Variants

Abstract:

The data stream model focused on processing data with sublinear storage, and one of the traditional tasks in this model is identifying the heavy hitters (items that appear with overwhelming frequency, HHs). In this talk, I will provide an overview of HH algorithms, and focus on some of the recent variants: HHs seen from modern software defined networking (SDNs), HHs with very high dimensional data motivated by web analytics, HHs with pan-private guarantees, and other notions of heavy hitters including H-Index variants and multigraph versions. This problem continues to represent what we can do efficiently under many computing, space, communication, and other constraints.

11:30-12:00 – Rotem Oshman (TAU)

12:00-12:30 – Michael Schapira (HUJI)

Beyond Today's Datacenters without Antennae, Mirrors, and Disco-Balls

12:30-13:00 – David Hay (HUJI)

14:30-15:00 – Idid Keidar (Technion)

15:00-15:30 – Ofer Shayevitz (TAU):

Feedback in Information Theory

Abstract:

In this expository talk, we will overview the role of feedback in various information theoretic problems. In particular, we will discuss the effect of feedback on channel

capacity and communication reliability, introduce the posterior matching framework and its relation to noisy search problems, and address the issue of noisy feedback.

15:00-15:30 – Ittay Eyal (Technion):

Teechain: Scalable Blockchain Payments using Trusted Execution Environments

Abstract:

Blockchain protocols such as Bitcoin are gaining traction for exchanging payments in a secure and decentralized manner. Their need to achieve consensus across a large number of participants, however, fundamentally limits their performance. We describe Teechain, a new off-chain payment protocol that utilizes trusted execution environments (TEEs) to perform secure, efficient and scalable fund transfers on top of a blockchain, with asynchronous blockchain access. Teechain introduces secure payment chains to route payments across multiple payment channels. Teechain mitigates failures of TEEs with two strategies: (i) backups to persistent storage and (ii) a novel variant of chain-replication. We evaluate an implementation of Teechain using Intel SGX as the TEE and the operational Bitcoin blockchain. Our prototype achieves orders of magnitude improvement in most metrics compared to existing implementations of payment channels: with replicated Teechain nodes in a trans-atlantic deployment, we measure a throughput of over 33,000 transactions per second with 0.1 second latency.

16:30-17:30 – Bernhard Haeupler (Carnegie Mellon University):

Distributed Optimization Algorithms via Low-Congestion Shortcuts

Abstract:

How fast a non-local distributed optimization problem can be solved in a given network depends in a highly non-trivial manner on the topology of the network. This talk will introduce a simple graph structure, called low-congestion shortcuts, which often tightly characterize and capture this dependency. Low-congestion shortcuts furthermore make it easy to design near optimal distributed algorithms for a wide variety of problems. For example, this leads to MST and approximate min-cut and shortest-path algorithms which require only a near linear number of messages and have the optimal O~(sqrt{n} + D) running times on worst-case network topologies

while also achieving a near instance-optimal O~(D) running times on planar, low-genus, low-treewidth and other non-pathological network topologies.