

# SEMINAR ANOUNCEMENT

## DEPARTMENT OF COMPUTER ENGINEERING

**Analyzing the Present And The Past Of The Networks From Limited Information**

**By Dr. Emre Sefer**

### **Abstract:**

Diffusion through graphs can be used to model many real-world processes, such as the spread of diseases, social network memes, computer viruses, or water contaminants. Often, a real-world diffusion cannot be directly observed while it is occurring — perhaps it is not noticed until some time has passed, continuous monitoring is too costly, or privacy concerns limit data access. This leads to the need to reconstruct how the present state of the diffusion came to be from partial diffusion data. In first part of the talk, I will discuss how we tackled the problem of reconstructing a diffusion history from one or more snapshots of the diffusion state.

In second part of the talk, I will focus on deconvolution problem on Chromosome Conformation Capture (3C) experiments. These experiments provide a window into the spatial packing of a genome in three dimensions within the cell. Due to nature of the experiment, 3C provides mixed measurements on a population of typically thousands of cells, each with a different genome structure mainly due to differing cell states. I will present several algorithms to deconvolve these measured 3C matrices into estimations of the contact matrices for each subpopulation of cells.

### **Short Bio:**

Emre Sefer has received his PhD from Carnegie Mellon University School of Computer Science Computational Biology Department in 2015. Before his PhD, he had his M.S. from University of Maryland College Park Computer Science Department and had his bachelors in Bogazici University Computer Engineering Department finishing in the first rank. After his PhD, he has done his post-doctoral studies with Ziv Bar-Joseph at CMU Machine Learning Department. He has also worked at Goldman Sachs as a Quantitative/ML Researcher. In his thesis, he developed Machine Learning techniques to problems over noisy datasets such as social networks and high-throughput bioinformatics datasets. His main research interests are Bioinformatics, and Machine Learning applications on social and economical networks. He has published in number of journals and conferences during his PhD, receiving best research paper award at Recomb 2016 conference.