

## Department of Industrial and Systems Engineering

### Dr. Barak Fishbain

On *Enviromatics* - Mathematical Programming Methods for  
Multi-dimensional Environmental data  
Environmental, Water and Agricultural Engineering Division, Faculty of  
Civil & Environmental Engineering in the Technion  
- Israel Institute of Technology Haifa, Israel”



Monday, February 11, 1:50 – 2:40  
4002 Emerging Technologies Building

#### Abstract:

As digital environments become increasingly complex, and the tools for managing information become increasingly advanced, it is essential to assist users in selecting their short term and long term attentional focus. To this end, many problems studied in the field of machine learning, try to emulate cognitive capabilities of a human. However, this anthropocentric and somewhat limited paradigm may no longer be the only source for inspiration. The variety and availability of sensors have made the accessible data much greater in quantity than the data that can be gathered and interpreted by a human being. In this talk novel mathematical programming approaches for multi-dimensional data analysis are presented. These methods are highly robust and most efficient which allows for the analysis of significantly large data sets. The described method has been utilized in many fields: environmental monitoring, illicit nuclear material detection, fatal accident analysis as well as image segmentation and video tracking. In this talk I will present the theoretical foundations of the method and will focus on two and a half applications: Analysis of air quality control, radiation source identification, and fatal traffic accidents analysis.

#### Bio:

Barak Fishbain is an Assistant Professor at the Environmental, Water and Agricultural Engineering Division, Faculty of Civil & Environmental Engineering in the Technion - Israel Institute of Technology Haifa, Israel. Prior to his arrival to the Technion Dr. Fishbain served as an associate director at the Integrated Media Systems Center (IMSC), Viterbi School of engineering, University of Southern California (USC) and did his post-doctoral studies at the department of Industrial Engineering and Operations Research (IEOR) in University of California at Berkeley.

Prof. Fishbain's research focuses on Enviromatics, a new research field which aims at devising mathematical programming methods for machine understanding of trends and behaviors of built and natural environments. This includes Environmental Distributed Sensing (i.e., distributed air and water quality monitoring), Safety and Traffic Data Realization and Structural Sensory Networks.