You are cordially invited to a Computational Genomics Seminar

Dr. Joachim A. Behar

Faculty of Biomedical Engineering, Technion-IIT, Haifa, Israel

*"*Deep learning and generalization performance for unstructured medical data analysis*"*

Wednesday, March 6 at 11:15

School of Computer Science, Check Point Building, Room 420

**Abstract:** The billions of mobile devices worldwide, along with numerous affordable medical sensors, have simplified the recording and transmission of medical data. However, leveraging this data to improve patient care remains a challenge. Existing algorithms often overlook individual variability and fail to extract actionable clinical insights from vast databases of unstructured data, such as physiological time-series and medical images.

The mission of the Artificial Intelligence in Medicine Laboratory (AIMLab) is to develop artificial intelligence algorithms for basic medical and clinical research that will significantly improve patient care. By understanding the underlying physiology and utilizing techniques in digital signal processing and machine learning, including deep learning, our laboratory aims to identify health-indicative patterns, translate them into actionable clinical information, and create intelligent patient monitoring systems.

In this lecture, I will present a perspective on using pattern recognition algorithms for analyzing physiological time series and medical images in large datasets—up to millions of patients' raw physiological examinations—to match or surpass human expertise. In the second part of the presentation, I will discuss the generalization performance of medical AI, addressing the ongoing debate in the research community about the feasibility of developing generalizable algorithms versus the need for systematic recalibration or even recurrent local validation. I will share recent examples of our work attempting to develop generalizable models and offer my perspective on the issue. Experiments in the medical fields of cardiology, sleep medicine, and ophthalmology will be presented.

Host: Prof. Ron Shamir, School of Computer Science, Tel Aviv University