



## Life Sciences Seminar

# Leveraging empirical dynamics to discover new regulatory networks

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Harvard University

Host: Gasper Tkacik

Empirical-dynamical techniques are a novel class of non-parametric methods for causal inference, stability assessment, and forecasting based on exciting results in the theory of dynamical systems. These methods may promise huge advancement in our understanding of large biological systems (as found in ecology, immunology, genetic regulatory networks and beyond), where designing explicit models and fitting them to observational data is nigh impossible. In particular, the ability to infer networks of interactions in these systems is extremely promising, as it drastically reduces the overall dimension of the system under consideration. Here I will discuss some results arising from the application of these techniques to immunological time series, consisting of measurements of roughly 70 signalling proteins taken from multiple patients with a rare blood disease (cyclic thrombocytopenia, or CTP) over several week. Empirical-dynamical techniques here actually reveal distinct subclasses of this disease that were previously unknown, as well as offering novel therapeutic targets. Time permitting, I will also discuss applications of these techniques to gene-regulatory data from dermal cells in an effort to uncover upstream dysfunctionalities that lead to markers of disease and symptoms of aging in skin.

**Wednesday, December 11, 2019 03:00pm - 04:00pm**

Mondi Seminar Room 3, Central Building



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

Please find a schedule of the ISTA Shuttle on our webpage:

<https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.