



COMPLEXITY  
SCIENCE  
HUB  
VIENNA

# CSH WORKSHOP AGENDA

## TOWARDS A THEORY OF HEALTH TRAJECTORIES FROM LONGITUDINAL DATA

May 23-24, 2019

COMPLEXITY SCIENCE HUB VIENNA  
SALON  
PALAIS STROZZI  
JOSEFSTAEDTER STRASSE 39  
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## **Abstract**

Patient health is typically characterized by a combination of clinical conditions and diseases. Often these diseases do not occur independently from each other but in specific temporal patterns. The increasing availability of large-scale observational healthcare data, e.g. electronic health records and claims data, triggered increasing interest into the problem of how to mine such data for temporal patterns and how to use this information to build predictive models for disease trajectories. With this workshop we aim to bring together the world's leading researchers working on these and related questions in order to discuss open problems and recent advances in an informal atmosphere.

## **Workshop Organizers**

Peter Klimek, Complexity Science Hub Vienna, Medical University of Vienna

Stefan Thurner, Complexity Science Hub Vienna, Medical University of Vienna

Nils Haug, Complexity Science Hub Vienna, Medical University of Vienna

## **Invited Participants**

David Gomez-Cabrero, King's College London

Jörg Menche, Medical University of Vienna

Alexia Giannoula, Universitat Pompeu Fabra

Narsis A. Kiani, Karolinska Institutet

Diether Kramer, KAGES

Werner Leodolter, KAGES

Srebrenka Letina, Central European University

Markus Strauss, Complexity Science Hub Vienna

## **ABOUT THE COMPLEXITY SCIENCE HUB VIENNA**

The objective of CSH is to host, educate, and inspire complex systems scientists who are dedicated to collect, handle, aggregate, and make sense of big data in ways that are directly valuable for science and society. Focus areas include smart cities, innovation dynamics, medical, social, ecological, and economic systems. CSH is a joint initiative of AIT Austrian Institute of Technology, IIASA International Institute for Applied Systems Analysis, Medical University of Vienna, Vienna University of Technology, Graz University of Technology, and Vienna University of Economics and Business.

# AGENDA

May 23, 2019

- 09:45 Welcome and Introduction  
- Peter Klimek, Complexity Science Hub Vienna, Medical University of Vienna
- 10:00 "A temporal system-level analysis of patient disease trajectories using clinical, genetic and phenotypic similarities"  
- Alexia Giannoula, Universitat Pompeu Fabra
- 11:00 "Multi-omic data-integration for the analysis of disease trajectories"  
- David Gomez-Cabrero, King's College London
- 12:00 Lunch break
- 13:00 "History-dependent Modeling of Patient Health Trajectories"  
- Nils Haug, Complexity Science Hub Vienna, Medical University of Vienna
- 14:00 Break
- 14:30 Smart Data and Clinical decision support:  
- Werner Leodolter, KAGES: Strategic aspects of a big healthcare provider  
- Diether Kramer, KAGES: Implementation and clinical use of patient-centered prediction based on "longitudinal Big Data"
- 16:00 Using comorbidity networks to understand psychopathology  
- Srebrenka Letina, Central European University
- 17:00 Wrap Up
- 18:00 CSH "**Art at the Hub**" Vernissage including Get Together & Buffett

**May 24, 2019**

- 09:30            “From Observation to Causal Models for investigating Complex Diseases.”  
- Narsis A. Kiani, Karolinska Institutet
- 10:30            “Exploring Disease Trajectories in Virtual Reality”  
- Jörg Menche, Medical University of Vienna
- 11:30            Break
- 11.45            Data-driven identification of disease phenotypes using higher-order correlations  
- Markus Strauss, Complexity Science Hub Vienna
- 12:45            Wrap Up Day 2
- 13:15            Lunch & Adjourn

This workshop is supported by

