

## Einladung zum Biometrischen Kolloquium

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## A NETWORK MEDICINE APPROACH TO UNDERSTAND AND PREDICT COMPLEX DISEASE PHENOTYPES

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Seminarraum (88.03.513) des Zentrum für Medizinische Statistik,  
Informatik und Intelligente Systeme (CeMSIIS) der Medizinischen  
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<https://cemsis.meduniwien.ac.at/allgemeines/anschrift/>

### ABSTRACT:

Most disorders are caused by a combination of multiple genetic and environmental factors. If two diseases are caused by the same mechanism, they often co-occur in patients. Using a unique dataset comprising pseudonymised claims data for all Austrians receiving out- or inpatient care over several years, we develop a quantitative, network-based framework to test for all possible comorbidity relations between each pair of human diseases. We show that this network undergoes dramatic structural changes across the lifetime of patients as a function of their sex. Furthermore, we give examples for how this comorbidity framework can be used to accurately predict future disease risks in the population, to model drug-disease interactions, to identify medical precursors for events such as serious suicide attempts, as well as to disentangle how much genetic or environmental risk factors contribute to the pathogenesis of individual diseases.