

Graduate School Event

Thesis Defense: The genetic architecture of complex human traits across ancestries and disease onset

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Complex human traits and diseases are influenced by thousands of genetic variants, which are correlated through linkage disequilibrium (LD), may differ in frequency and effect across genetic ancestries, and shape both disease risk and age at onset. Describing this genetic architecture, and using it for accurate risk prediction, requires models that estimate all variant effects jointly and learn the architecture directly from the data. This thesis develops and applies such joint Bayesian multiple regression models across genetic ancestries and for age at disease onset. The first part presents a Bayesian multi-ancestry method that moves beyond a single global parameter to annotation-aware parameter learning, capturing how genetic parameters vary across populations and along the allele frequency and LD spectrum, while achieving strong predictive performance. The second part applies Bayesian time-to-event modelling to the age at diagnosis of 11 common cancers. By treating individuals without a diagnosis as right-censored rather than as controls, it improves both discovery, with novel regions replicating across biobanks, and prediction, identifying individuals at high genetic risk for targeted screening. Together, this work shows that joint Bayesian regression models serve both genomic prediction and the description of how genetic effects are distributed across the genome, across populations, and in the timing of disease onset. As biobanks grow larger, older, and more diverse, such models will become increasingly important for accurate genetic risk stratification.

Friday, November 20, 2026 12:00pm - 01:00pm

Central Bldg / O1 / Mondi 3 (I01.O1.010) and Zoom

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.