



## Graduate School Event

# Thesis Defense: Adaptive Processes in Biology and Culture: Models of Evolving Vaccine Resistance and the Record Statistics of Innovation

**Simon Rella (Tkacik Group)**

Tkacik Group

Host: Tim Browning

Athletic performance offers a uniquely quantifiable setting for studying cultural evolution, linking record statistics and evolutionary theory. Analyzing Olympic records and endurance sports, we find broadly universal patterns: linear progress in record values and counts across much of the 20th century. Population growth explains part of this trend but cannot alone account for sport evolution. Instead, progress reflects both expanding participation and evolutionary dynamics of innovation, inheritance, and selection. Applying concepts from population genetics, we find that variance predicts response, consistent with a heritability-like signal in performance. At the level of extremes, world records occur in clustered bursts and we propose a record process with restart reproducing this burstiness.

**Friday, September 19, 2025 11:00am - 12:00pm**

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.