



Colloquium

ISTA PostDoc Award

Lena Schwarz & Jiawei Bao

Host: Jorryt Matthee & Martin Hetzer

Lena Schwarz | Mapping Developmental Dynamics of Autism Spectrum Disorder
Mouse Models at Single-Cell Resolution
Autism spectrum disorder (ASD) is associated with a wide range of risk genes, yet how distinct mutations lead to overlapping clinical features remains poorly understood. ASD is also diagnosed more often in males than females, but the molecular basis of this sex disparity remains unclear. We used single-nucleus multi-omics sequencing to simultaneously examine gene expression and chromatin accessibility in 251 samples from eleven monogenic ASD mouse models. The dataset included both sexes, two brain regions, and three developmental stages. Across models, ASD-associated mutations delayed radial glial cell progression and transiently affected neural lineage specification. The strongest transcriptional alterations occurred during the perinatal period, particularly in excitatory and inhibitory neurons. These changes included reduced expression of synaptic and ion-channel-related genes, potentially reflecting homeostatic adaptations. Although several molecular alterations were shared across models, each mutation also produced a distinct molecular signature. Convergence was most pronounced at the early postnatal stage, a putatively critical period of cortical maturation and refinement. At later developmental stages, the shared molecular processes increasingly diverged, identifying the early postnatal period as a key window of ASD-related molecular vulnerability. We also observed marked sex-specific effects, with females frequently displaying broader transcriptional dysregulation and larger effect sizes than males. Overall, our findings reveal dynamic, developmentally regulated molecular consequences of genetically diverse ASD-associated mutations. They identify both convergent and mutation-specific mechanisms, emphasize the importance of sex-dependent effects, and provide a comprehensive view of developmental cellular and molecular dynamics across models of ASD.

Jiawei Bao | The Pulsing of the Tropical Climate System
Weather forecasts keep us prepared for the week ahead, while climate projections warn us of long-term changes over coming decades. But what about the weeks and months in between? This middle ground, known as the subseasonal-to-seasonal timescale, remains one of the most challenging frontiers in atmospheric science, yet it is precisely the timescale that matters most for managing floods, droughts, and food security. In this talk, I will walk through how scientists predict weather and climate, the tools and models involved, and why the gap in between has proven so difficult to bridge. I will then introduce a newly discovered phenomenon in the tropics — the Tropics-Wide Intraseasonal Oscillation (TWISO) — a coherent pulse that links tropical weather phenomena across the globe, not just within one region or system, on timescales of weeks to months. It looks as if the tropical climate system is pulsing together. By capturing signals that existing frameworks miss, TWISO offers a

promising new avenue for improving predictability in the tropics, with potential benefits for communities most vulnerable to extreme weather.

Monday, September 21, 2026 11:30am - 12:30pm

ISTA | Central Building | Raiffeisen Lecture Hall



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.

www.ista.ac.at | Institute of Science and Technology Austria | Am Campus 1 | 3400 Klosterneuburg