Colloquium

The ups and downs of firing rate homeostasis

Gina Turrigiano
Brandeis University

Host: Maximilian A. Jösch

Our brains must generate and maintain stable activity patterns over decades of life, despite the dramatic changes in circuit connectivity and function induced by learning and experience-dependent plasticity. How do our brains balance the opposing need for plasticity and stability? Over the past two decades we and others have discovered a family of “homeostatic” negative feedback mechanisms that are theorized to stabilize overall brain activity while allowing specific connections to be reconfigured by experience. Here I discuss recent work demonstrating that individual neocortical neurons in freely behaving animals indeed have a homeostatic activity set-point, to which they return in the face of perturbations. Intriguingly, this firing rate homeostasis is gated by sleep/wake states in a manner that depends on the direction of homeostatic regulation, and is compromised in an animal model of autism spectrum disorder. Finally, I’ll discuss some unpublished work exploring the possibility that these activity set points are flexible during learning. Together our findings suggest that loss of homeostatic plasticity in some neurological disorders may render central circuits unable to compensate for the normal perturbations induced by development and learning.

Friday, September 23, 2022 11:30am - 12:30pm
Mondi 2 (Special location)

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.