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SCIENTIFIC SEMINAR

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Defining the Molecular Principles of Ultrafast Computations for Auditory Information Processing

Fundamental to hearing and critical to survival and communication is the ability to accurately identify and interpret sound information received by the ears. To transform sound information into a neural code, synaptic connections in auditory brainstem neurons reliably and accurately transmit signals between neurons at submillisecond timescales. A loss of temporal precision and reliability in these synaptic connections results in a multitude of hearing and cognitive impairments that degrade the quality of life. Although much is known about the molecules that mediate synaptic function, how this molecular machinery in auditory brainstem synapses enables these neurons to perform computations at some of the fastest speeds in the central nervous system remains a mystery. One of our major research goals is to define the molecular principles underlying accurate sound information processing and explore how dysregulation contributes to hearing impairments that impact the quality of life. To do so, we use a multidisciplinary approach to quantitatively study the calyx of Held/ medial nucleus of the trapezoid body (MNTB) synapse, which is critical for encoding the temporal features of sounds and sound localization. In this talk, I will present our latest research about the molecular mechanisms that enable ultrafast computations required for accurate auditory information processing.

Wednesday, 04.02.2026, 11:00 am

Host: Nils Brose

City Campus, Lecture Hall

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