

Introductory Remarks to Symposium 27

From imprecision to robustness in neural circuit assembly

Carsten Duch, Robin Hiesinger, Susanne Schreiber and Marion Silies, Berlin and Mainz

Why imprecision and robustness? The specificity of synaptic connections is of central importance to the study of brain development and function. In contrast, terms like 'imprecision' and 'noise' are more commonly used in association with faulty development and reduced function. In most studies of neuronal circuits, imprecision only features as error bars and in the hope for significance between control and experimental averages. Yet, the development of neural circuits is in many aspects imprecise, and mature circuitry is often highly flexible and error-tolerant, i.e. robust. To understand how genetically encoded imprecisions can render neural circuit development and function robust is the stated goal of the DFG-funded research consortium RobustCircuit (FOR5289, robustcircuit.org). The core hypothesis of this research consortium is that imprecisions of distinct processes at lower scales (from molecules to cells) enable robustness of circuit assembly and function at higher scales (from cells to behavior).

The five speakers in this symposium will cover a wide range of neurobiological systems and questions, yet conceptually all presentations showcase robust systems that are based on noise in neural circuit development or function as an integral and necessary component. The goal is to identify the actual mechanisms and shared principles, across systems and across scales, for the utilization of noise as part of the genetically encoded programs that ensure the robustness of neural circuit development and function.

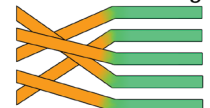
Symposium 27

*Friday, March 24, 2023
08:30 - 10:30, Lecture Hall 9*

Chairs: Carsten Duch, Robin Hiesinger, Susanne Schreiber and Marion Silies, Berlin and Mainz

- 08:30 **Opening Remarks**
- 08:35 Bassem Hassan, Paris, France
ROBUSTNESS FROM NOISE: TEMPORAL REGULATION OF NEURAL CIRCUIT DEVELOPMENT (S27-1)
- 09:00 Carlotta Martelli, Mainz
INTER-INDIVIDUAL WIRING VARIABILITY AND ITS FUNCTION IN THE *DROSOPHILA* OLFACTORY PATHWAY (S27-2)
- 09:25 Mathias Wernet, Berlin
PROCESSING OF NAVIGATIONAL CUES FROM THE FLY OPTIC LOBES TOWARDS THE CENTRAL COMPLEX (S27-3)
- 09:50 Marion Silies, Mainz
A VISUAL PATHWAY WITH VARIABLE RECEPTIVE FIELD PROPERTIES IS A KEY CONSTITUENT OF ROBUST MOTION COMPUTATION (S27-4)
- 10:15 Jonas Elpelt, Frankfurt
UNIVERSALITY OF MODULAR CORRELATED NETWORKS ACROSS THE DEVELOPING NEO-CORTEX (S27-5)

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