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Life Sciences Seminar

The neural circuit basis of behavioral individuality

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Host: Maximilian Jösch

Individuals animals vary in their behaviors even when their genetics and environment are held constant. The mechanisms underlying this variation is still largely uncharacterized, though we have made some progress in understanding genetic and circuit variants that lead a population of animals to exhibit high or low variability in behavior. These are key insights, but fall short of predicting the specific behavioral biases of individual animals. We term the causal biological features that determine individual behavioral biases "loci of individuality," and we have begun to search for them in the circuits that mediate sensory-evoked and spontaneous behaviors. We have found neural circuit elements, whose morphological properties predict behavioral biases. Specifically, the volume of axonal output arbors of central complex neurons that project to the Lateral Accessory Lobe correlates with changes in locomotor behavior in specific sensory contexts. We hypothesize that individual wiring variation in these neurons has a large effect on behavior because they lie at a bottleneck in the sensorimotor circuit, where stochastic fluctuations have an outsized effect on circuit outputs. Thus, we have found that individual variation in the structure of small numbers of neurons, in topologically critical circuit positions, predict individual behavioral biases in a sensory-context specific fashion.

Wednesday, March 27, 2019 03:00pm - 04:00pm

IST Austria Campus Seminar Room, Lab Building East

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