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LECTURE SERIES

FALL/WINTER 2018/19

Max Planck Institute for Ornithology

MAX-PLANCK-GESELLSCHAFT

THURSDAY | April 4th, 2019 | 13.00 | HOUSE 4 LECTURE ROOM

JOHN TUTHILL

University of Washington | Host: Baldwin Research Group

Neural mechanisms of proprioception and motor control in Drosophila

Animals rely on an internal sense of body position and movement to effectively control motor behavior. This sense of proprioception is mediated by diverse populations of internal mechanosensory neurons distributed throughout the body. My lab is trying to understand how proprioceptive stimuli are detected by sensory neurons, integrated and transformed in the brain, and used to guide motor output. We approach these questions using genetic tools, in vivo two-photon imaging, and patch-clamp electrophysiology in the fruit fly, Drosophila. We recently found that fly leg proprioceptors are organized into distinct functional projections that contain topographic representations of specific kinematic features: one group of axons encodes tibia position, another encodes movement direction, and a third encodes bidirectional movement and vibration frequency. Overall, our findings reveal how a low-dimensional stimulus – the angle of a single leg joint – is encoded by a diverse population of mechanosensory neurons. This architecture may help to maximize information transmission, processing speed, and robustness, which are critical for feedback control of the limbs during adaptive locomotion.

WHO IS JOHN TUTHILL?

2016-	Assistant Professor, University of Washington, Department of Physiology & Biophysics
2012-15	Postdoctoral Fellow, Harvard Medical School; Advisor: Dr. Rachel I. Wilson
2008-12	Ph.D. Biology, Janelia/University of Chicago; Advisor: Dr. Michael Reiser

SELECTED PUBLICATIONS

- Mamiya A, Gurung P, Tuthill JC. (2018) Neural coding of leg proprioception in Drosophila. Neuron 100(3): 636-650.
- Tuthill JC and Azim EA. (2018) Proprioception. Current Biology 28(5):194-203
- Tuthill JC and Wilson RI. (2016) Parallel transformation of tactile signals in central circuits of Drosophila. Cell 164(5):1046-1059.

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