Seminar/Talk

How do Neurons Compute the Direction of Motion?

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Detecting the direction of image motion is important for visual navigation as well as predator, prey and mate detection, and thus essential for the survival of all animals that have eyes. However, the direction of motion is not explicitly represented at the level of the photoreceptors: it rather needs to be computed by subsequent neural circuits, involving a comparison of the signals from neighboring photoreceptors over time. The exact nature of this process represents a classic example of neural computation and has been a longstanding question in the field. Only recently, much progress has been made in the fruit fly Drosophila by genetically targeting individual neuron types to block, activate or record from them. Our results obtained this way indicate that the local direction of motion is computed in two parallel ON and OFF pathways. Within each pathway, a retinotopic array of four direction-selective T4 (ON) and T5 (OFF) cells represents the four Cartesian components of local motion vectors. Since none of their presynaptic neurons turned out to be directionally selective, direction selectivity first emerges within T4 and T5 cells. Our present research focuses on the cellular and biophysical mechanisms by which this important visual cue is computed in these neurons.

Thursday, June 7, 2018 11:00am - 12:00pm
Mondi Seminar Room 2, Central Building

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