



Ben-Gurion University of the Negev  
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The Swiss Institute for Dryland Environmental and Energy Research  
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## Uncovering Organismal Memory Phenomena: From Cellular Chemotaxis to Plant Tropisms

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### Abstract

Statistical physics relates macroscopic dynamics of a system to the underlying microscopic physics through a probabilistic examination - we adopt this approach in the investigation of organismal memory phenomena. We study motor responses of biological organisms to external stimuli, with the aim of uncovering dominant physical mechanisms at the microscopic level. In this talk we will give two examples of memory phenomena in very different systems.

We will first discuss the phenomenon of directional memory in cellular chemotaxis, the orientation of a biological cell in the direction of a chemical gradient. The cell seems to remember the direction it was sensing before, making it robust to fluctuations of the signal in time. We show that a probabilistic minimal model of cellular response dynamics, where the inherent stochasticity of underlying signaling processes is taken into account, gives an understanding of the underlying principles of directional memory. A second example concerns the ability of plants to integrate over a history of stimuli over time. Our approach allows to compare these two very different systems, unveiling common principles across scale and complexity.

**Date & Location:**

**Tuesday, May 15, 2018, 11:00**

**Lecture room, Physics Building (ground floor)**

**YDSEEP WEEKLY SEMINAR**

