An efficient coding theory for a dynamic trajectory predicts non-uniform allocation of entorhinal grid cells to modules

Authors: Mosheiff et al. (Burak lab)

Published in PLoS Computational Biology, June 2017
Grid cells encode a mammal's estimate of position by firing in multiple locations, arranged on the vertices of a triangular lattice. Recent experiments established that these cells are functionally organized in discrete modules with common grid spacing. Noga Mosheiff (with co-authors Haggai Agmon, Avraham Moriel, and Yoram Burak) proposes that grid cells may encode position while taking into account the spatiotemporal statistics of an animal's movement trajectory. Based on this hypothesis, Mosheiff et al introduce a theory for efficient encoding of trajectories in the brain. One of the main predictions of the theory is that different numbers of grid cells should be allocated to each spatial scale. In addition, the work identifies a simple scheme for readout of the grid cell code by neural circuitry, that can match in accuracy the optimal Bayesian decoder. Within this scheme, grid cell spikes influence the activity of post-synaptic cells, involved in the readout of the grid cells code, over widely varying time scales that increase monotonically with the grid spacing.

Full paper: [http://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1005597](http://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1005597)

Tags: ELSC News Article of the Month

**UPCOMING EVENTS**

Learn more about our exciting upcoming events!

[read more](#)
Our Int'l Ph.D. program provides outstanding students with top-notch courses in computational neuroscience.

read more

The Building

The Jerusalem Brain Sciences Building will provide a state-of-the-art research and teaching facility for the Edmond and Lily Safra Center for Brain Sciences.

read more

ELSC Media Channel

Get into our media channel and investigate ELSC's latest videos: seminars, public lectures, courses and video articles.

read more

Source URL: https://elsc.huji.ac.il/content/article-month-july-2017-buraks-lab