Presented by

THE KAVLI Institute for Brain and Mind at UCSD

University of California, San Diego

Edvard Moser

Professor and Director
The Centre for the Biology of Memory
Norwegian University of Science and Technology

"Spatial Maps in the Hippocampus and Entorhinal Cortex"

The ability to find one's way depends on the brain's ability to integrate information about location, direction and distance. This integration depends on a widespread brain network interfaced by the medial entorhinal cortex (MEC). I will show that layer II of the MEC contains a two-dimensional metric map of relative spatial location. A key component of this map is the 'grid' cell, which fires whenever the animal's position coincides with the vertices of a periodic triangular grid spanning the complete surface of the environment. In layers III-VI of the MEC, grid cells intermingle with cells that are sensitive to head orientation or have conjunctive grid and head-direction properties. Co-localized grid cells operate as coherent ensembles, exhibiting synchronous shifts in firing location when rats move from one environment to another. These and a number of other properties point to the MEC network as part of a universal, path-integration-based spatial metric that is independent of the specific environment. As the animal moves through its environment, activity is translated across the sheet of grid cells in layer II by convergence of direction and velocity information in an afferent population of integrator cells in the deeper layers of the MEC.

Wednesday, February 22nd
4:00 p.m.
Leichtag Auditorium
School of Medicine

Located in the Leichtag Family Biomedical Building, 804 on UCSD map
Map can be found at http://maps.ucsd.edu/Acrobat/MainCampus.pdf