Stanford

Shaul Druckmann
Assistant Professor of Neurobiology and of Psychiatry and Behavioral Sciences

Bio

ACADEMIC APPOINTMENTS

• Assistant Professor, Neurobiology
• Assistant Professor, Psychiatry and Behavioral Sciences
• Member, Bio-X
• Member, Wu Tsai Neurosciences Institute

LINKS

• Druckmann lab website: https://www.druckmannlab.com

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our research goal is to understand how dynamics in neuronal circuits relate and constrain the representation of information and computations upon it. We adopt three synergistic strategies: First, we analyze neural circuit population recordings to better understand the relation between neural dynamics and behavior. Second, we theoretically explore the types of dynamics that could be associated with particular network computations. Third, we analyze the structural properties of neural circuits.

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor
Abbas Kazemipour, Nai-wen Tien

Doctoral Dissertation Co-Advisor (AC)
Min Seung Choi

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

• Neurosciences (Phd Program)

Publications

PUBLICATIONS

• Active dendritic integration and mixed neocortical network representations during an adaptive sensing behavior. Nature neuroscience
  Ranganathan, G. N., Apostolides, P. F., Harnett, M. T., Xu, N., Druckmann, S., Magee, J. C.
  2018

• Schaffer Collateral Inputs to CA1 Excitatory and Inhibitory Neurons Follow Different Connectivity Rules JOURNAL OF NEUROSCIENCE
  Kwon, O., Feng, L., Druckmann, S., Kim, J.
  2018; 38 (22): 5140–52
• central brain. Science (New York, N.Y.)
  Kim, S. S., Rouault, H., Druckmann, S., Jayaraman, V.
  2017; 356 (6340): 849-853

• Angular velocity integration in a fly heading circuit ELIFE
  Turner-Evans, D., Wegener, S., Rouault, H., Franconville, R., Wolff, T., Seelig, J. D., Druckmann, S., Jayaraman, V.
  2017; 6

• Maintenance of persistent activity in a frontal thalamocortical loop NATURE
  2017; 545 (7653): 181-?

• Multiplicative Updates for Optimization Problems with Dynamics
  Kazemipour, A., Babadi, B., Wu, M., Podgorski, K., Druckmann, S., Matthews, M. B.
  IEEE COMPUTER SOC. 2017: 2025–29

• Robust neuronal dynamics in premotor cortex during motor planning NATURE
  Li, N., Daie, K., Svoboda, K., Druckmann, S.
  2016; 532 (7600): 459-?

• Dynamical feature extraction at the sensory periphery guides chemotaxis ELIFE
  2015; 4

• From a meso- to micro-scale connectome: array tomography and mGRASP FRONTIERS IN NEUROANATOMY
  Rah, J., Feng, L., Druckmann, S., Lee, H., Kim, J.
  2015; 9

• Structured Synaptic Connectivity between Hippocampal Regions NEURON
  Druckmann, S., Feng, L., Lee, B., Yook, C., Zhao, T., Magee, J. C., Kim, J.
  2014; 81 (3): 629-640

• Mapping mammalian synaptic connectivity CELLULAR AND MOLECULAR LIFE SCIENCES
  Yook, C., Druckmann, S., Kim, J.
  2013; 70 (24): 4747-4757

• A Hierarchical Structure of Cortical Interneuron Electrical Diversity Revealed by Automated Statistical Analysis CEREBRAL CORTEX
  Druckmann, S., Hill, S., Schuermann, F., Markram, H., Segev, I.
  2013; 23 (12): 2994-3006

• Neuronal Circuits Underlying Persistent Representations Despite Time Varying Activity CURRENT BIOLOGY
  Druckmann, S., Chklovskii, D. B.
  2012; 22 (22): 2095-2103

• Effective Stimuli for Constructing Reliable Neuron Models PLOS COMPUTATIONAL BIOLOGY
  Druckmann, S., Berger, T. K., Schuermann, F., Hill, S., Markram, H., Segev, I.
  2011; 7 (8)

• Evaluating automated parameter constraining procedures of neuron models by experimental and surrogate data BIOLOGICAL CYBERNETICS
  Druckmann, S., Berger, T. K., Hill, S., Schuermann, F., Markram, H., Segev, I.
  2008; 99 (4-5): 371-379