Daniel M. Maruyama

CONTACT INFORMATION

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RESEARCH INTERESTS

Signal processing in complex systems, with an emphasis on systems neuroscience. Development of computational measures for assessing functional connectivity and network dynamics.

EDUCATION

University of Michigan, Ann Arbor
Ph.D. Physics (expected May 2015)
Area of Emphasis: Systems Neuroscience and Network Dynamics
Advisor: Michal Zochowski
Thesis Title: Investigating Neuronal Network Dynamics: Two Speed Astrocyte Networks and Tools to Quantify Network Learning

University of California, Berkeley
B.A. Physics and Mathematics, December 2008
Area of Emphasis: Cosmology
Advisor: George Smoot

RESEARCH EXPERIENCE

University of Michigan, Ann Arbor, MI – Zochowski Lab
Graduate Student Researcher – 2010-Present
Collaborators: Michal Zochowski, Sara Aton, Nicolette Ognjanovski, Bill Frost, Evan Hill, Angela Bruno, Joshua Berke
Project: Assessing network functional connectivity from neuron spike times, changes in localized functional network stability as an indicator of learning.

Graduate Student Researcher – 2010-2014
Collaborators: Michal Zochowski , Liz Shtrahman
Project: The role of astrocytic networks in neural function, network activity as a result of the interplay among distinct propagation pathways.

University of California, Berkeley, CA – Smoot Lab
Undergraduate Student Researcher 2008-2009
Collaborators: George Smoot, Reiko Nakajima
Project: Dark matter detection by investigating galaxy shear in optical surveys.

Undergraduate Student Researcher 2006-2008
Collaborators: George Smoot, Mia Ihm, Jodi Christiansen, Eric Albin
Project: Cosmic string detection by searching for pair galaxies in the GOODS survey

PUBLICATION IN PREPARATION

Maruyama, D., Ognjanovski, N., Aton, S. and Zochowski, M. (2015), Global network stability as a predictor of changes in localized network structure, *In preparation.*

PUBLICATIONS IN PRINT OR IN REVIEW

Shtrahman, L., **Maruyama, D.** and Zochowski, M. (2015), Spatial and Temporal Patterning of Astrocyte Calcium Transients Explained by Network Transport and Extracellular Diffusion in a Simple Network Model, *PLoS Comput. Biol., In review.*

Maruyama, D. and Zochowski, M. (2014), Competition and cooperation between active intra-network and passive extra-network transport processes, *Nature Sci. Rep.*, 4, 5269; doi:10.1038/srep05629.

Ognjanovski, N., **Maruyama, D.**, Lashner, N., Zochowski, M. and Aton, S. (2014), CA1 hippocampal network activity changes during sleep-dependent memory consolidation, *Front. Syst. Neruosci.,* 8:61. doi:10.3389/fnsys.2014.00061

Christiansen, J.L., Albin, E., James, K.A., Goldman J., **Maruyama D.** and Smoot, G.F. (2008), Search for cosmic strings in the Great Observatories Origins Deep Survey, *Phys. Rev. D*, 77, 123509; doi:10.103/PhysRevD.77.123509

CONFERENCE PRESENTATIONS

Maruyama, D., Ognjanovski, N., Aton, S. and Zochowski, M. (2014, November), Quantifying dynamics in neuronal networks. Poster presentation at *Neruoscience 2014*, Washington, D.C.

Hill, E.S., Wang, J., **Maruyama, D.**, Zochowski, M. and Frost, W.N. (2013, November), VSD imaging and cluster analysis reveal a novel population of putative multifunctional neurons. Poster presentation at *Neuroscience 2013*, San Diego, CA.

Maruyama, D. and Zochowski, M. (2013, July), Dynamics of two-process astrocyte networks. Poster presentation at *Computational Neuroscience* 2013, Paris, FRA.

Maruyama, D. and Zochowski, M. (2012, October), Dynamics of Coupled Neuron-Astrocyte Networks. Poster presentation at *Neuroscience 2012*, New Orleans, LA.

Berke, J.D., **Maruyama, D.**, Leventhal, K. J., Fensterheim, B., Pettibone, J. R., Gittis, A., Kreitzer, A. and Zochowski, M. (2011, November), Striatal projection neuron and interneuron networks show distinct functional connectivity. Poster presentation at *Neuroscience 2011*, Washington, D.C.

Maruyama, D. and Zochowski, M. (2011, November), Exploring spatial-temporal patterns in networks with a variety of measures. Poster presentation at *Neuroscience 2011*, Washington, D.C.

Bruno, A.M., **Maruyama, D.**, Zochowski, M. and Frost, W.N. (2011, November), Use of large scale optical recording to rapidly identify the structure of the *Aplysia* pedal ganglion locomotion network. Poster presentation at *Neuroscience 2011*, Washington, D.C.

Hill, E.S., Vasireddi, S., Wang, J., **Maruyama, D.**, Zochowski, M. and Frost, W.N. (2011, November), A method for monitoring the temporal structure of neuronal networks. Poster presentation at Society for *Neuroscience 2011*, Washington, D.C.

INTERNSHIP EXPERIENCE

Algae Fuel – Walnut Creek CA, May 2009-August 2009,
Project: Design and construction of a commercial algae bioreactor.

3M Corporation – 3M Center Maplewood MN, Physics Research Division - June-August 2008
Project: Development of sensitive bacteria detectors utilizing surface plasmon resonance.

HONORS AND AWARDS

Nominated by the University of Michigan Physics department for the Rackham Predoctoral Fellowship, January 2014

Rackham Conference Travel Grant , University of Michigan November 2014, July 2013,

Honors in Physics, University of California Berkeley, December 2008

Berkeley Physics Undergraduate Research Scholar, Fall 2008

TEACHING EXPERIENCE	Graduate Student Instructor: Physics For Architects Lab (Phys 121) – Winter 2014 Waves, Heat, and Light Lab (Phys 341) – Fall 2013 Honors Mechanics Lab (Phys 161) – Fall 2012, Fall 2011 Physics for Life Sciences Lab (Phys 136) – Winter 2011 Everyday Physics Lab (Phys 106) – Fall 2010 Mechanics Lab for non-majors (Phys127) –Winter 2010, Fall 2009
OUTREACH	Physics mentor for a high school student via the Michigan Mentorship Program, Summer 2010 Judged an extracurricular physics competition, Physics Olympiads, for high school students, University of Michigan, May 2010.
ACADEMIC SERVICE	Co-organizer of a summer long symposium, Physics Graduate Student Summer Symposium, Summer 2010
COMPUTER LANGUAGES	MATLAB, C++, R, Python, UNIX
REFERENCES	Upon request