Maxym V. Myroshnychenko

Contact Information

E-mail:
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Education

Indiana University
Ph.D. candidate, Program in Neuroscience — August 2011 to present

University of Nevada, Las Vegas
B.S., Biology, Biomathematics — August 2011

Laboratory affiliations

Lapish laboratory

PI: Christopher Lapish — August 2014 to present

- Tetrode and shank recordings from anesthetized and awake rats
- Data analysis: state space, spectral decomposition, machine learning
- Development of automatic behavior collection and analysis tools
- Contribution to VTA/mPFC computational modeling (collaboration with A. Kuznetsov, IUPUI Math)
- TH-Cre optogenetics with anesthetized electrophysiology

Beggs neuronal dynamics laboratory

PI: John Beggs — August 2011 to to August 2014

- Statistical analyses of in vitro 512-electrode array data from mouse/rat hippocampus (collaboration with Litke lab, UC Santa Cruz),in vivo Utah array primate data (collaboration with Hatsopulous lab, U. of Chicago)
- Transfer entropy, mutual information, community detection.

Research projects

Cortico-hippocampal interactions in the radial arm maze
Characterizing the process of planning in delayed spatial win-shift task using optogenetic inhibition of HC; shank and wire mPFC recordings

Effects of ethanol on interactions beetween VTA GABA and DA neurons and mPFC
Dissecting local and distal dynamic connectivity of ventral tegmental area using dual-site single-unit recordings, optogenetic stimulation, and pharmacological manipulations as a part of France-USA computational modeling collaboration

Publications

Myroshnychenko M, Lapish CC. Contributions of hippocampal input to dynamics of medial prefrontal cortex during and after delay of a spatial working memory task. In preparation

Myroshnychenko M, Seamans JK, Philips AG, Lapish CC. Temporal dynamics of hippocampal and medial prefrontal cortex interactions during the delay period of a spatial working memory task. Cerebral cortex, in print

Morozova E O, Myroshnychenko M, Zakharov D, di Volo M, Gutkin B, Lapish C, Kuznetsov A (2016). Contribution of synchronized GABAergic neurons to dopaminergic neuron firing and bursting. Journal of Neurophysiology, 116(4), 1900-1923.

Timme NM, Ito S, Myroshnychenko M, Nigam S, Shimono M, Yeh FC, Hottowy P, Litke AM, Beggs JM. (2016) High-Degree Neurons Feed Cortical Computations. PLoS Comput Biol. May 9;12(5):e1004858.

Nigam S, Shimono M, Ito S, Yeh F, Timme N, Myroshnychenko M, Lapish C, Tosi Z, Hottowy P, Smith W, Masmanidis S, Litke A, Sporns O, Beggs JM. (2016) Rich-club organization in the functional micro-connectome. *Jounral in Neuroscience* Jan 20;36(3):670-84.

Timme N, Ito S, Myroshnychenko M, Yeh F, Hiolski E, Hottowy P, Beggs JM. (2014) Multiplex networks of cortical and hippocampal neurons revealed at different timescales. *PLoS ONE* 9(12): e115764..

Presentations

Myroshnychenko M, Lapish CC. Prefrontal-hippocampal theta coherence, sharp wave ripples, and bursts of cortical unit activity underlie choices and encoding in the radial arm maze. Poster presentation, Society for Neuroscience meeting, Chicago, IL, 2015

Myroshnychenko M, Lapish CC. Prefrontal-hippocampal theta coherence, sharp wave ripples, and bursts of cortical unit activity underlie choices and encoding in the radial arm maze. Poster presentation, Society for Computational Neuroscience meeting, Prague, Czech Republic, 2015

Myroshnychenko M, Morozova E, Kuznetsov A, Lapish CC. Dissecting reward circuitry with simultaneous single-unit recording in PFC and VTA. Poster presentation, Research society for alcohol, San Antonio, TX, 2015

Myroshnychenko M, Morozova EO, Kuznetsov A, Lapish CC. Dissecting reward circuitry with simultaneous single-unit recording in PFC and VTA. Poster presentation, Indianapolis chapter of Society for Neuroscience meeting, 2014

Myroshnychenko M, Nicholson B, Yeh F, Brickman B, Dahmen K, Litke A, Beggs J. Critical features of massively parallel cortical single-unit recordings. Poster presentation, Gill symposium, Indiana University, 2013

Sarine S. Janetsian, Maxym Myroshnychenko, Christopher C. Lapish. Changes in neuronal firing and oscillatory activity in the PFC following Methamphetamine sensitization. Poster presentation, Society for Neuroscience meeting, 2013

Myroshnychenko MV, Heaney CF, Bolton MM, Sabbagh JJ, Kinney JW "Acute Administration of Ketamine Impairs Learning in Trace Cued Fear Conditioning: Validation of an Animal Model of Schizophrenia." 21th Annual McNair Research Conference. Oklahoma State University. February 24, 2011

Myroshnychenko MV, Heaney CF, Bolton MM, Sabbagh JJ, Kinney JW. "Acute Administration of Ketamine Impairs Learning in Trace Cued Fear Conditioning: Validation of an Animal Model of Schizophrenia."The 2010 McNair Scholars Institute poster presentation. University of Nevada, Las Vegas, NV. October 21, 2010.

Myroshnychenko MV, Estevez J, Harbour D. "*Krameria erecta* and *Oenotheria biennis* extracts increase density of *Staphylococcus epidermidis* biofilm." The 2010 McNair Scholars Institute poster presentation. University of Nevada, Las Vegas, NV. October 21, 2010.

Zarrabi K, Nitrosesatien N, Koh J, Naserddin S, Abanyan E, Myroshnychenko M, Esteves J, Harbour D, Porter H. Antibacterial Potential and GC-MS Studies of Select Medicinal Plants of Mojave Desert. Presented at the 2009 Northwest Regional Meeting of the American Chemical Society, Pacific Lutheran University, Tacoma, WA.

Skills

Experimental techniques
- Stereotaxic surgery
- Awake behaving/anesthetized extracellular electrophysiology (tetrodes, Neuronexus, Harris, Masmanidis shanks, gold and PEDOT coating)
- Spikesorting shank data (spyking circus, phy packages)
- Optogenetics (programming PulsePal driver)

Programming
- Matlab, Python, mex/C, github, Linux, clusters

Real-time processing
- Linux OS, Open Ephys, Arduino, simple GUIs, computer vision

Summer school attendance

CoSMo — June 2013
- Computational Sensory-Motor Neuroscience, organizer K. Kording
- Machine learning, Bayesian and neural net approaches to decoding

CRCNS — July 2014
- Berkeley summer course in mining and modeling of neuroscience data, organizers Jeff Teeters and Fritz Sommer
- STC, model fitting, ICA, GLM

Awards

Fellowships
- National Science Foundation Biomathematics Scholar — May 2010 - May 2011
- University of Nevada, Las Vegas McNair Summer Institute Fellowship — May 2010

Scholarships and grants
- University of Nevada, Las Vegas Scholarship — November 2009
- College of Southern Nevada Scholarship — November 2008
- Federal SMART grant — 2009 - 2011

Teaching Experience

Indiana University,

Teaching assistant — Fall 2014

Addiction neuroscience lecture and lab. Responsible for grading, lab preparation

The Lovaas Center of Las Vegas, Las Vegas, Nevada

Tutor — June 2009 to August 2009

Applied Behavioral Analysis for children with autism.

College of Southern Nevada, Las Vegas, Nevada

Tutor — September 2009 to May 2009

Responsible for coaching students on various subjects including biology, writing, and mathematics.

References

- Dr. Christopher Lapish lapishc@gmail.com, Indiana University Purdue University Indianapolis
- Dr. Alexey Kuznetsov askuznet@gmail.com, Indiana University Purdue University Indianapolis
- Dr. John Beggs jmbeggs@indiana.edu, Indiana University