

Leo Kozachkov

leokoz8@gmail.com
Cambridge, MA

CURRENT AFFILIATION	<i>PhD Candidate</i> Sept 2017 – Present (Expected End of 2022) Massachusetts Institute of Technology Department of Brain and Cognitive Sciences Research Adviser(s): Prof. Earl K. Miller, Prof. Jean-Jacques Slotine
EDUCATION	<i>Bachelor of Science, Physics</i> Sept 2012 – May 2016 Rutgers University, New Brunswick, NJ ◦ Minor in Mathematics
TECHNICAL SKILLS	Languages: Python, MATLAB Packages: PyTorch, PyTorch Lightning, scikit-learn, NumPy, SciPy, L ^A T _E X Developer Tools: Git, Windows Subsystem for Linux (WSL) Mathematics (Selected Topics): Nonlinear Control Theory, Dynamical Systems Theory, Linear Algebra, Calculus, ODEs, PDEs, Mathematical Theory of Statistics & Probability, Statistical Learning Theory
PAPERS	Kozachkov, L.* , Ennis, M*, Slotine, J-J. (2021) “Recursive Construction of Stable Assemblies of Recurrent Neural Networks” arXiv [Link] Kozachkov, L.* , Lundqvist, M*, Slotine, J-J. & Miller, E.K. (2020) “Achieving stable dynamics in neural circuits” PLoS Computational Biology [Link] Kozachkov, L. , Michmizos, K. (2020) “Sequence learning in Associative Neuronal-Astrocytic Networks” 13th International Conference on Brain Informatics [Link] Kozachkov, L. , Michmizos, K. (2017) “The causal role of astrocytes in slow-wave rhythmogenesis: A computational modelling study” arXiv [Link]
CONFERENCES	Kozachkov, L. , et al. “Dynamic stability underlies cortical computations during working memory” Society for Neuroscience 2021, Chicago, IL. Eisen, A., Kozachkov, L. , et al. “Propofol anesthesia changes dynamic stability in cortex” Society for Neuroscience 2021, Chicago, IL. Kozachkov, L. , Michmizos, K. “Sequence learning in Associative Neuronal-Astrocytic Network” 13th International Conference on Brain Informatics, 2020. Kozachkov, L. , et al. “Achieving and using stability in neural circuits” Society for Neuroscience 2019, Chicago, IL. Kozachkov, L. , et al. “Combination and Stability Properties of Echo-State Networks” Society for Neuroscience 2018, San Diego, CA.

Kozachkov, L., Michmizos, K. “A Biomimetic Neural-Astrocytic Network: Adding a Slow Layer for Fast Information Processing” NICE 2017, Dayton, Ohio.

Shinbrot T, **Kozachkov, L.**, Siu T. “A nonlinear feedback model for granular and surface charging.” Applied Physics Society Meeting, 2015, San Antonio, TX.

TEACHING & EXPERIENCE

Teaching Assistant Spring 2019, 2020
MIT 9.53
Emergent Computations in Distributed Neural Circuits

Part-Time Lecturer Sept 2015 – Dec 2015
Rutgers Physics 206
General Physics Lab

HONORS & AWARDS

Best Paper Award, 1st Runner Up, 13th International Conference on Brain Informatics 2020

Paul Robeson Scholar, School of Arts and Sciences 2016

Dean’s List 2013 – 2014 – 2015 – 2016

Bronze Medal, University Physics Competition 2014

Research Assistant Award, Aresty Research Center 2013 – 2014
◦ 29% acceptance rate.

Writers Foundation Award 2012
◦ For “excellence in creative writing.”

RESEARCH & EXPERIENCE

Miller Lab + Nonlinear Systems Lab Sept 2018 – Present
Department of Brain and Cognitive Sciences
Graduate Student
Research Advisor(s): Prof. Earl K. Miller & Jean-Jacques Slotine
◦ Developing theoretical framework using tools from control theory to understand the role of dynamic stability in neural computations.
◦ Helping conduct/analyze electrophysiological experiments with non-human primates to understand the role of stability in cortical computations underlying working memory.

Laboratory for Computational Brain April 2016 – August 2017
Department of Computer Science
Research Assistant
Research Advisor: Prof. Konstantinos Michmizos
◦ Designed simulations to elucidate the role of low-frequency glial calcium waves in modulating large neural populations.
◦ Developed minimal, neurophysiologically plausible models of glia-neuron and glia-synapse interactions.

Sengupta Lab Sept 2015 – May 2016
Department of Physics and Astronomy
Senior Honors Thesis Student
Thesis Advisor: Prof. Anirvan Sengupta

- Modeled and analyzed the effects of epigenetic chromatin silencing on *Neurospora Crassa* circadian rhythm.

Computational Vision and Psychophysics Lab Sept 2015 – Feb 2016

Department of Psychology, Center for Cognitive Science

Research Assistant

Research Advisor: Prof. Melchi Michel

- Studied the effects of intrinsic position uncertainty on search times in object identification tasks for natural, cluttered images.

Shinbrot Lab Summer 2014

Department of Biomedical Engineering

Research Assistant

Research Advisor: Prof. Troy Shinbrot

- Developed an Ising-like model to simulate spontaneous tribocharging of similar materials. Research was presented at American Physical Society, 2015.

Laboratory of Vision Research Sept 2013 – May 2014

Rutgers Center for Cognitive Science

Aresty Research Assistant

Research Advisor: Prof. Thomas V. Papathomas

- Studied the 3-D perception of faces and scenes. Research presented at the Aresty Undergraduate Research Symposium. [Poster](#).

EXTRA-CURRICULAR ACTIVITIES

Staff Writer 2013 – 2015

Applied Sentience

Rutgers University

- Published monthly [articles](#) on science, philosophy, mathematics, and literature.

Lifeguard 2012 – 2013 – 2014 – 2015

Candlewood Management Service Inc

Custodian Jan 2011 – June 2011

Raritan Valley YMCA East Brunswick, NJ