Alexander B. Kunin · Curriculum Vitae

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Education and Employment

Employment

Creighton University Department of Mathematics — Omaha, NE
Assistant Professor — Jan 2023 –

Baylor College of Medicine, University of Houston — Houston, TX
Postdoctoral Fellow — Sep 2019 – Dec 2022
Mentors: Xaq Pitkow (BCM), Krešimir Josić (UH)

Education

Pennsylvania State University — State College, PA
Ph.D. in Mathematics — Aug 2014 – Aug 2019
Thesis: Properites and Applications of Convex Neural Codes
Adviser: Vladimir Itskov

University of Nebraska – Lincoln — Lincoln, NE
M.S. in Mathematics — Aug 2012 – May 2014

University of Alabama in Huntsville — Huntsville, AL
M.S. in Computer Science — Aug 2010 – Dec 2012
Thesis: Self-Stabilizing Algorithms for Independence, Domination, and Coloring
Adviser: Pete Slater

Stony Brook University — Stony Brook, NY
B.S. in Mathematics, minor in Computer Science — Sep 2006 – May 2010

Additional

Allen Institute for Brain Science — Friday Harbor, WA
Summer Workshop on the Dynamic Brain — Aug 2016 – Sep 2016

Center for Brains, Minds, and Machines — Woods Hole, MA
Summer Course 2017 — Aug 2017 – Sep 2017

Neuromatch Academy
Online Course 2020 — Jul 2020 – Jul 2020

Publications

Preprints

The Oviposition Inhibitory Neuron is a potential hub of multi-circuit integration in the Drosophila brain. 2024
R.W. Langstaff, P. Srivastava, A.B. Kunin, G.J. Gutierrez
In Revision
Paper: https://doi.org/10.1101/2024.10.25.620362

Published

Functional connectomics reveals general wiring rule in mouse visual cortex. 2025
Z. Ding, P.G. Fahey, S. Papadopoulos, E. Wang, B. Celii, C. Papadopoulos, A.B. Kunin, . . . , X. Pitkow, J. Reimer, A.S. Tolias
Nature 640, 459–469 (2025).
Paper: `https://doi.org/10.1038/s41586-025-08840-3`

NEURD: automated proofreading and feature extraction for connectomics. 2025
B. Celii, S. Papadopoulos, Z. Ding, P.G. Fahey, E. Wang, C. Papadopoulos, A.B. Kunin, . . . , X. Pitkow, A.S. Tolias, J. Reimer
Nature 640, 487–496 (2025).
Paper: `https://doi.org/10.1038/s41586-025-08660-5`

Hierarchical Modular Structure of the Drosophila Connectome. 2023
A.B. Kunin, J. Guo, K. Josić, X. Pitkow, K.E. Bassler
Journal of Neuroscience, Vol. 43, Issue 37
Paper: `https://doi.org/10.1523/JNEUROSCI.0134-23.2023`
Code: `https://github.com/josiclab/flybrain-clustering`

Oriented Matroids and Combinatorial Neural Codes. 2023
A.B. Kunin, C. Lienkaemper, Z. Rosen
Combinatorial Theory, Vol. 3, Issue 1
Paper: `https://doi.org/10.5070/C63160427`

Hyperplane neural codes and the polar complex. 2020
V. Itskov, A.B. Kunin, Z. Rosen
Appears in Topological Data Analysis: Abel Symposia, vol 15
Paper: `https://doi.org/10.1007/978-3-030-43408-3_13`

Funding

NIH T15LM007093: NLM Training Program in Biomedical Informatics and Data Science — Jan 2021 – Dec 2022
Funding for proposed project and curriculum of graduate courses and professional training in biomedical informatics and data science. Funded.

Service

Professional	Organizer, AMS Special Session on Discrete, Algebraic, and Topological Methods in Mathematical Biology	Fall 2023
	UNL Preparing Future Faculty Mentor	Fall 2023
Reviewer	PNAS	2024
	Cell Reports	2024
	Heliyon	2022
	Discrete and Computational Geometry	2022
	SIAM Journal on Applied Dynamical Systems	2020
	SIAM Journal on Applied Algebra and Geometry	2020

Presentations

Conference	AMS Spring Sectional Meeting – Special Session on Discrete and Algebraic Methods in Mathematical Biology. *Algebraic aspects of Boolean Matrix Factorization*	May 2025
	Nebraska-SE South Dakota MAA Section Meeting. *Neuroscience to Math and Back*	Apr 2025
	AMS Spring Sectional Meeting – Special Session on Applied Commutative Algebra. *Combinatorial Codes, Oriented Matroids, and Commutative Algebra*	Apr 2024
	SIAM Conference on Applied Algebraic Geometry – Minisymposium on Algebraic & Geometric Methods in Neural Coding. *Oriented Matroids and Combinatorial Neural Codes*	Aug 2021
	Neuromatch Conference 3.0. *Receptive field geometry shapes information content of the neural code*	Oct 2020
	SIAM Texas-Louisiana Section Meeting. *Low dimensional geometry of stimuli shapes the information content of a neural code*	Nov 2019
	SIAM Conference on Applied Algebraic Geometry – Minisymposium on Algebraic & Geometric Methods in Neural Coding. *Hyperplane Neural Codes and the Polar Complex*	Jul 2019
	AMS Spring Sectional Meeting – Special Session on Algebraic and Discrete Methods in Mathematical Biology. *Hyperplane Neural Codes and the Polar Complex*	Mar 2019
	AMS Fall Sectional Meeting – Special Session on Applied Algebraic Topology. *Hyperplane Neural Codes and the Polar Complex*	Sep 2018
	Joint Mathematics Meetings. *Hyperplane neural codes and the polar complex*	Jan 2018
	International Conference on Mathematical Neuroscience. *Low dimensional geometry of stimuli shapes the information content of a neural code*	May 2017
Poster	COSYNE Main Meeting. *Hierarchical Modular Structure of the Drosophila Connectome*	Mar 2023
	COSYNE Main Meeting. *Low dimensional geometry of stimuli shapes the information content of a neural code*	Feb 2017
Seminar	UNL Biological Sciences Seminar. *Identifying network structure and connectivity rules in connectomes*	May 2025
	UNL Discrete Math Seminar. *The Convex Code Decision Problem (is probably not solvable)*	Nov 2023
	UNL Math Bio Seminar. *Mathematics and Neuroscience Sampler Platter*	Mar 2023
	Boston College Mathematics and Machine Learning Seminar. *Oriented Matroids and Combinatorial Neural Codes*	Oct 2021
Student	Joint Mathematics Meetings – AMS-PME Undergraduate Student Poster Session. *How Complex can Convex Codes be?* with Parker Abed*	Jan 2025

Joint Mathematics Meetings – PME Contributed Session on Research by Undergraduates. *Improving Exponential Random Graph Models (ERGMs) Using Scaffolding for Enhanced Scalability and Reduced Degeneracy* — Jan 2025
with Nick Forbes*

MAA Mathfest 2024 Undergraduate Poster Session. *Complexity of Convex Codes (working title)* — Aug 2024
with Parker Abed*

MAA Mathfest 2024 Undergraduate Poster Session. *Scaffolded ERGMs (working title)* — Aug 2024
with Nick Forbes*

* Undergraduate student presenting