Alexander LeNail

PhD Candidate · MIT Computational & Systems Biology

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Education

Massachusetts Institute of Technology *Cambridge, MA*

PhD Computational & Systems Biology *2019 - present*

- Advisors: Myriam Heiman, Jonathan Weissman, Manolis Kellis
- Coursework: Algorithms for Inference, Bayesian Modeling and Inference, Numerical Methods for Stochastic Modeling and Inference, Systems Biology, Chemical Biology, Protein Engineering, Topics in Computational & Systems Biology,

Tufts University *Somerville, MA*

BS Computer Science *2012 - 2016*

- Concentrations: Machine Learning, Web Engineering, Computational Biology.

Professional Experience

2019 **Research Intern**, Google Brain
2016-2019 **Fraenkel Lab at MIT Biological Engineering**, Research Associate
2015 **Software Engineering Intern**, Benchling
2015 **Software Engineering Intern**, Google Search
2014 **KPCB Engineering Fellow**, Coursera
2013 **Software Engineering Intern**, Autodesk

Research

Myriam Heiman & Jonathan Weissman Labs

MIT Computational & Systems Biology – PhD Student *Aug. 2019 - Present*

Thesis: Computational Design of Transcription Factor Gene Therapies to Reverse Age-Associated Neurodegeneration. Integration of single-cell RNA-seq atlases of brain aging. Machine learning prediction of transcriptional effects of TF overexpression and experimental validation by Pooled in vivo AAV-TF overexpression screen.

Google Brain

Research Intern *Summer 2019*

Predicting Transcription Factor Binding and Enhancer-Promoter Contact with ENCODE/Roadmap data & ML.

Ernest Fraenkel Lab

MIT Biological Engineering – Research Associate *2016-2019*

Building computational infrastructure for AnswerALS & NeuroLINCS consortia. ML methods for the integration of 'omics data. Online data visualization / data portals for gene expression datasets.

Fellowships & Awards

2023 **Graduate Research Fellowship**, PhRMA Foundation
2023 **Genewiz Research Award**, Genewiz
2020 **Research Symbiont Award**, Wellcome Trust

Key Publications

Joseph M Replogle, Reuben A Saunders, Angela N Pogson, Jeffrey A Hussmann, **Alexander LeNail**, ..., Jonathan S Weissman. 2022. *Mapping information-rich genotype-phenotype landscapes with genome-scale Perturb-seq*. Cell

Answer ALS Consortium. 2022. *Answer ALS, a large-scale resource for sporadic and familial ALS combining clinical and multi-omics data from induced pluripotent cell lines*. Nature Neuroscience

Maxwell P. Gold, **Alexander LeNail**, Ernest Fraenkel. 2019. *Shallow Sparsely-Connected Autoencoders for Gene Set Projection*. Pacific Symposium of Biocomputing 24 (PSB)

Alexander LeNail, Ludwig Schmidt, Jonathan Li, Tobias Ehrenberger, Karen Sachs, Stefanie Jegelka, Ernest Fraenkel. 2017. *Graph-Sparse Logistic Regression*. Neural Information Processing Systems - Discrete Structures in Machine Learning workshop (NIPS DISCML)

Invited Talks & Posters

Fall 2024. *Charting the Cellular Rejuvenation Landscape in Aging Neurons*. MIT BCS departmental seminar series

Summer 2024. *Charting the Cellular Rejuvenation Landscape in Aging Neurons*. Invited talk: Gordon Research Seminars: Systems Aging

Spring 2024. *Optimizing AAV Dosing for In Vivo Screens in the Mouse Brain*. Poster: American Society for Gene & Cell Therapy Annual Meeting

Fall 2023. *Charting the Cellular Rejuvenation Landscape in Aging Neurons*. Poster: Cutting Edge Approaches to Studying the Aging Brain Symposium

Spring 2022. *ODE Parameter Inference*. Guest Lecture, Harvard CS 282r: Advanced Topics in Machine Learning

Dec 2017. *Graph-Sparse Logistic Regression*. Invited talk: NeurIPS workshop

Spring 2016. *Machine Learning as Function Approximation*. Guest Lecture, Tufts CS 135: Machine Learning

Teaching Experience

spring 2020	**Introduction to Biology**, Teaching Assistant	*MIT*
Fall 2015	**Bioinformatics**, Teaching Assistant	*Tufts*

Mentoring

2021-2024	**Gaurav Arya**, now PhD student in CS at CMU
2022-2024	**Saul A. Vega Sauceda**, now Software Engineer at Flatiron Health
2023	**Jaanak Prashar**, now undergraduate at Stanford
2022-2023	**Stephanie P. Howe**, now MS student in Computational Biology at MIT
2022	**Jorge Lopez-Nava**, now post-bac Research Fellow at the Broad Institute
2022	**Andrew Zhao**, now MS student in Computational Biology at MIT

Outreach & Professional Development

Service and Outreach

2023-Present	**NeuroLunch**, Main Neuroscience PhD/post-doc talk series at MIT. Lead Organizer
2023	**MIT CSB Application Assistance Program**, member

Professional Memberships

American Society for Gene & Cell Therapy (ASGCT)