

# Alan N. Amin

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## EDUCATION AND POSITIONS

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<b>Faculty Fellow / Assistant Professor</b> Courant Institute, New York University Host: Andrew Gordon Wilson	2023-Now
<b>Postdoctoral scientist</b> Jura Bio	Summer 2023
<b>PhD candidate</b> Harvard University Systems Biology Program Thesis: Nonparametric Methods for Building and Evaluating Models of Biological Sequences Advisor: Debora S. Marks Fellowship: NSERC PGS-D (\$63000 over 3 years)	2019-2023
<b>Undergraduate student</b> University of Toronto Specialist in Biochemistry, Major in Mathematics Advanced coursework: measure theory, operator theory, abstract algebra	2015-2019

## RESEARCH INTERESTS

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I develop mathematically principled machine learning methods for biological sequence modeling, from theoretical infrastructure (kernels, diffusion, testing) to applications that unlock massive datasets in immunology, human genetics, and therapeutic design.

## PUBLICATIONS

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(\*Equal contribution)

### *Peer-reviewed*

1. Weinstein E N\*, Gollub M G\*, Slabodkin A\*, Gardner C L, Dobbs K, Cui X-B, **Amin A N**, Church G M, Wood E B. Manufacturing-Aware Generative Model Architectures Enable Biological Sequence Design and Synthesis at Petascale. *Nature Biotechnology*, 2025.  
→Top 4 paper award at MoML @ MIT 2024
2. **Amin A N**, Marks D S\*, Weinstein E N\*. Kernels with Guaranteed Flexibility for Reliable Machine Learning on Biological Sequences. *JMLR*, 2025.  
→Student Paper Research Award at New England Statistics Symposium 2023
3. **Amin A N**, Gruver N, Wilson A G. Why Masking Diffusion Works: Condition on the Jump Schedule for Improved Discrete Diffusion, *NeurIPS*, 2025.
4. **Amin A N\***, Potapczynski A\*, Wilson A G. Training Flexible Models of Genetic Variant Effects from Functional Annotations using Accelerated Linear Algebra. *ICML*, 2025.

→Oral and 2nd best paper award at AI4NA ICLR 2025 workshop. Oral at Machine Learning in Computational Biology meeting 2025

5. **Amin A N**, Gruver N\*, Kuang Y\*, Li L\*, Elliott H, McCarter C, Raghu A, Greenside P, Wilson A G. Bayesian Optimization of Antibodies Informed by a Generative Model of Evolving Sequences. *ICLR*, 2025.  
→Spotlight at ICLR 2025. Spotlight and outstanding poster award at AIDrugX Neurips 2024 workshop
6. **Amin A N**, Wilson A G. Scalable and Flexible Causal Discovery with an Efficient Test for Adjacency. *ICML*, 2024
7. Glaser P, Paul S, Hummer A M, Deane C M, Marks D S, **Amin A N**. Kernel-Based Evaluation of Conditional Biological Sequence Models. *ICML*, 2024
8. **Amin A N**, Weinstein E N\*, Marks D S\*. A Kernelized Stein Discrepancy for Biological Sequences. *ICML*, 2023
9. Weinstein E N\*, **Amin A N**\*, Frazer J, Marks D S. Non-identifiability and the blessings of misspecification in models of molecular fitness and phylogeny. *NeurIPS*, 2022  
→Oral at NeurIPS 2022
10. Weinstein E N, **Amin A N**, Grathwohl W, Kassler D, Disset J, Marks D S. Optimal design of stochastic DNA synthesis protocols based on generative sequence models, *AISTATS*, 2022
11. **Amin A N**\*, Weinstein E N\*, Marks D S. A generative nonparametric Bayesian model for whole genomes, *NeurIPS*, 2021.
12. **Amin A N**, Lin Y-H, Das S, Chan H S. "Theory for a Sequence-Specific "Fuzzy" Binding Mechanism Between a Pair of Intrinsically Disordered Proteins", *J Phys Chem B*, 2020.
13. Das S, **Amin A N**, Lin Y-H, Chan H S. "Coarse-grained residue-based models of disordered protein condensates: utility and limitations of simple charge pattern parameters." *Phys. Chem. Chem. Phys.* 2018.
14. Delplace V, Ortin-Martinex A, Tsai E L S, **Amin A N**, Wallace V and Shoichet M S. "Controlled Release Strategy Designed for Intravitreal Protein Delivery to the Retina." *J. Control. Release* 2018.

### Preprints

15. Baron E\*, **Amin A N**\*, Weitzman R, Marks D S, Wilson A G. A Diffusion Model to Shrink Proteins While Maintaining their Function. *GenBio ICML*, 2025.  
→Spotlight at GenBio ICML 2025 workshop, Best paper at ExAIT ICML 2025 Workshop, Pitch award at GenBio ICLR 2025 workshop. Best paper award at MoML @ MIT 2025
16. Chandra N A\*, **Amin A N**\*, Wilson A G. A Unification of Discrete, Gaussian, and Simplicial Diffusion. *Frontiers of Probabilistic Inference workshop at Neurips*, 2025.

### Workshop papers

17. Ober S W, McCarter C, Raghu A, Li Y L, **Amin A N**, Wilson A G, Elliott H. Is Sequence Information All You Need for Bayesian Optimization of Antibodies? *NeurIPS AI4Science workshop*, 2025

18. Berenberg D, Gruver N, **Amin A N**, Groth P M, Chen L, Srivastava H R, Notin P, Marks D S, Wilson A G, Cho K, Bonneau R. Residue-level text conditioning for protein language model mutation effect prediction. *ICLR GEM workshop*, 2025.
19. Shaw A, Shin J-E, Thadani N N, **Amin A N**, Marks D S. Designing Proteins using Sparse Data. *Learning Meaningful Representations of life workshop at NeurIPS*, 2022.

## ACADEMIC AWARDS

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MoML @ MIT best paper award	\$1526	2025
ICML Exploration in AI today best paper	\$500	2025
ICLR AI for Nucleic acids 2nd best paper	\$1200	2025
ICLR Generative biology workshop pitch	\$1000	2025
Student Paper Research Award at New England Statistics Symposium	\$300	2023
NSERC Postgraduate Scholarships Doctoral program	\$63'000	2022
Princeton International Internship	\$Lodging	2018
NSERC Undergraduate Student Research Award	\$4500	2017
Various undergraduate scholarships	\$4890	2015-2019

## PRESENTATIONS

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### *Invited talks*

Broad Institute, ATGU statistical genetics methods meeting	2025
ML for Protein engineering early career seminar	2025
Gatsby Institute, Machine Learning seminar	2025
Fable Therapeutics, seminar	2025
Oxford university, Deane lab meeting	2025
NYU Institute for Systems Genetics, nanoseminar	2025
ML for Protein engineering seminar	2025
Columbia University, AlQuraishi lab meeting	2024
NYU AI school	2024
NYU Centre for Data Science, seminar	2024
New York Genome Center, lab meeting	2023
Cold Spring Harbour, seminar	2023
Gatsby Institute, Machine Learning seminar	2023
Harvard QBio institute, lab meeting	2023
Harvard Systems Biology department, pizza talk	2023
MIT Readstat reading group	2023
Harvard Systems biology program, mini symposium	2023
Harvard Statistics Department, Stat 300 Seminar series	2023
Broad institute, Models, Inference and Algorithms Talks	2021

### *Conference talks*

MoML @ MIT best paper talk	2025
ICML Exploration in AI workshop oral	2025

ICLR AI for Nucleic Acids workshop oral	2025
NeurIPS oral	2022
NeurIPS Learning Meaningful Representations of Life Workshop oral	2021

## TEACHING

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### *Sole Instructor*

CSC102 Data Structures New York University	Four semesters 2024-2025
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### *Teaching Assistant*

CSC102 Data Structures New York University	Fall 2023
BCMP230 Principles and practice of drug development Harvard University	Spring 2022
MAT224 Linear Algebra University of Toronto	Spring 2019
MAT135-136 Calculus University of Toronto	Academic year 2018
MAT137 Calculus University of Toronto	Academic year 2017

## SERVICE

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Reviewer at ICLR, ICML, NeurIPS, AAAI, Workshops	2022-Now
Reviewer at eLife	2024
Harvard Graduate Student Union steward	2020-2023
Top reviewer at NeurIPS — moderated deep-dive session	2022
Area chair at LMRL workshop at NeurIPS	2022
Top reviewer at ICML — chaired session	2022
Systems Biology PhD applicant mentor	2021
Systems Biology Department Equitable mentorship working group	2020

## UNDERGRADUATE RESEARCH

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Predicting interactions from sequences of disordered proteins using physics models University of Toronto Advisor: Hue Sun Chan	2017-2019
Measuring mechanics of nuclear membrane-less organelles using microfluidics Princeton University Advisor: Clifford Brangwynne	Summer 2018
Designing new hydrogels with desired mechanical properties for drug delivery University of Toronto Advisor: Molly Shoichet	Summer 2017

Loading tRNAs with alternative amino acids for synthetic biology  
University of Toronto  
Advisor: Ronald Kluger

2016-2017