Dr. Ananthan Nambiar
Data Science Postdoctoral Fellow
Department of Genome Sciences & eScience Institute
University of Washington, Seattle
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Academic Background

Institution	Discipline	Awards	Graduation
University of Illinois at Urbana-Champaign	Ph.D. Bioengineering (CGPA: 4.0) Focusing on computational and systems biology.	Mavis Future Faculty Fellow 2023/24	2025
Reed College, Portland	B.A. Computer Science (CGPA: 3.7) With coursework in deep learning, statistics and numerical analysis.	Commendation for Excellence in Scholarship (2016/17, 2017/18, 2018/19)	2019

Select Research Experience

University of Washington, Data Science Postdoctoral Fellow, July 2025 – present
Conducting research on representation learning methods for integrating, imputing, and interpreting multi-omic data to enable robust disease modeling across heterogeneous biological datasets. Supervised by William Stafford Noble.

Mayo Clinic, Research Fellow, May 2024 – May 2025
Developed machine-learning models that integrate whole-exome sequencing and clinical records to generate personalized risk scores and inform precision treatment strategies for liver disease.

Institute for Genomic Biology, Graduate Research Assistant, August 2019 – July 2025
Led a multi-track research program applying deep learning to protein, genomic, and metagenomic sequences to study representation learning, evolutionary constraints, and biological function. Supervised by Sergei Maslov.

Inari Agriculture, Machine Learning/Protein Design Research Intern, Summer 2021, Summer 2022
Applied zero-shot deep learning models for variant effect prediction in crop genomes and investigated graph neural network approaches for protein generation and design.

Reed College, Research Assistant, May 2018 - August 2019, Summer 2020
Combined natural language processing, economics, time-series analysis, and ecological theory to model technological evolution from patent data and quantify economic diversity and corporate performance from financial text. Supervised by Mark Bedau and Norman Packard.

Delhi University, Research Assistant, Summer 2017
Studied the controllability of bacterial gene regulatory networks, focusing on functional gene classes in E. coli to link network control properties with biological function. Supervised by Sanjay Jain.

Papers

A. Nambiar, C. Melendez and W.S. Noble. Unified imputation of missing data modalities and features in multi-omic data via shared representation learning. (In review, *ISMB 2026/Bioinformatics*)

A. Nambiar, S.B. Littlefield, C. Cuellar, R. Khorana* and S. Maslov. Protein Language Models Capture Structural and Functional Epistasis in a Zero-Shot Setting. (In review, *Genome Biology*)

A. Nambiar, K. Karambelkar*, A. Athreya, A.M. Allen, K.N. Lazaridis, S.M. Donovan and S. Maslov. ML-Guided GWAS Reveals Genetic Architectures for MASLD for Overweight and Lean Individuals in the All of Us Cohort. (In review, PLOS Genetics)

S. Shirguppe, M. Gapinske, D. Swami, A. Miskalis, N. Gosstola, P. Acharya, D. Joulani, M.G. Szkwarek, D.D.B. Siller, I. Guerra, K. Shenouda, **A. Nambiar**, A. Bhattacharjee, G. Elias, M. Stilger, J. Winter, W.S. Woods, D. Anand, A.S. Dangi, N. Odle, G.E. Nathan, C.K.W. Lim, S. Maslov, T. Gaj, P. Perez-Pinera. In vivo CRISPR base editing for treatment of Huntington's disease. (In review, *Nature Biomedical Engineering*)

A. Miskalis, S. Shirguppe, J. Winter, G. Elias, D. Swami, **A. Nambiar**, W. Woods, A. Zeballos, H. Moore, S. Maslov, T. Gaj and P. Perez-Pinera. SPLICER: A Highly Efficient Base Editing Toolbox That Enables *in vivo* Exon Skipping for Targeting Alzheimer's Disease. *Nature Communications*. 2025.

A. Nambiar, J. M. Forsyth*, S. Liu* and S. Maslov. DR-BERT: A Protein Language Model to Annotate Disordered Regions. *Structure* 32(1). 2024.

A. Nambiar, C. Pan, V. Rana^, Mahdi Cheraghchi, João Ribeiro, Sergei Maslov and Olgica Milenkovic. Semi-Quantitative Group Testing for Efficient and Accurate qPCR Screening of Pathogens with a Wide Range of Loads. BMC Bioinformatics 25(1). 2024.

S. Bhogale, V. Dubinkina, P-H. Hsieh, P. Dibaeinia, **A. Nambiar**, S. Maslov, Y. Yoshikuni, S. Sinha. A Transcriptomic Atlas of Low pH Stress Response in Multiple I.orientalis Strains. Microbiology Spectrum 12(1). 2024.

A. Nambiar, V. Dubinkina, S. Liu* and S. Maslov. FUN-PROSE: A Deep Learning Approach to Predict Condition Specific Gene Expression in Fungi. *PLoS computational biology*, 19(11), e1011563. 2023.

A. Nambiar, T. Janssen, J. McCaull, M. Bedau. Dropping diversity of products of large US firms: Models and measures. *PLOS ONE* 17(3): e0264330. 2022.

A. Nambiar, M. Heflin*, S. Liu*, S. Maslov, M. Hopkins and A. Ritz. Transforming the Language of Life: Transformer Neural Networks for Protein Prediction Tasks. In Proceedings of *ACM-BCB'20: 11th ACM International Conference on Bioinformatics, Computational Biology and Health Informatics,* September 2020.

M. Bedau, N. Gigliotti, T. Janssen, A. Kosik, **A. Nambiar** and N. Packard^. Open-ended Technological Innovation. *Artificial Life,* 25 (1). 2019.

N. Packard, N. Gigliotti, **A. Nambiar**, T. Janssen and M. Bedau. An Evolving Classification for Forecasting Technology. (Paper in preparation.)

Underline: First authors, *: Mentored student, ^: In alphabetical order

Books

P. K. Koo, C. Dallago, **A. Nambiar**, K. K. Yang (eds.). Machine Learning for Protein Science and Engineering. *Cold Spring Harbor Laboratory Press*. 2025.

Select Conference Presentations

A. Nambiar, M. Forsyth, Z. Wang, V. Dubinkina and S. Maslov. MC-Funcformer: A Foundational Model of Microbial Community Metabolism. Oral presentation at *ISMB '24: 32nd Conference on Intelligent Systems for Molecular Biology*, July 2024.

A. Nambiar, V. Dubinkina, S. Liu and S. Maslov. Transcribing the Language of Life: An Interpretable Deep Neural Network to Predict Condition Specific Gene Regulation. Poster presentation at *ISMB/ECCB'21: 29th Conference on Intelligent Systems for Molecular Biology and the 20th European Conference on Computational Biology*, July 2021.

A. Nambiar, M. Heflin, S. Liu, S. Maslov, M. Hopkins and A. Ritz. Transforming the Language of Life: Transformer Neural Networks for Protein Prediction Tasks. Oral Presentation at *ACM-BCB'20: ACM International Conference on Bioinformatics, Computational Biology and Health Informatics,* September 2020.

A. Nambiar, M. Hopkins and A. Ritz. Computing the Language of Life: NLP Approaches to Feature Extraction for Protein Family Classification. Poster presentation at *ISMB/ECCB'19: 27th Conference on Intelligent Systems for Molecular Biology and the 18th European Conference on Computational Biology*, July 2019.

M. Bedau, N. Gigliotti, T. Janssen, A. Kosik, **A. Nambiar** and N. Packard. Detecting the On-going Emergence of Technological Innovations. Oral presentation at *ALIFE'18: The 2018 Conference of Artificial Life – Workshop on Open-ended Evolution*, July 2018.

A. Nambiar. Controllability of Functional Classes in the Genetic Regulatory Network of *E. coli*. Poster presentation at *SIAMAN'18: 2018 SIAM Annual Meeting*, July 2018.

Students Supervised		
Kylie Trousil (MS DataSci)	Deep learning for gene expression prediction	2025-present
Kaushik Karambelkar (PhD Bioe)	Machine learning guided GWAS	2025-present
Lydia Longfritz (BA CompSci & Bio)	Deep learning informed protein design	2024-present
Rohit Khorana (BS CompSci)	Zero-shot protein evolution	2024-2025
Nisha Janamanchi (BS Bioe)	Neural networks for microbial genomics	2023-2024
Malcolm Forsyth (BS CompSci)	Predicting systems level properties of proteins	2021-2024
Simon Liu (BS CompSci)	Transformer networks for embedding amino acid sequences	2019-2022
Maeve Heflin (BS CompSci)	Unsupervised learning to on protein vector embeddings	2019-2020

Chaired Conferences
The Special Session on **Representation Learning in Biology** at ISMB/ECCB '21. Co-chaired with Christian Dallago (TUM), Peter Koo (CSHL) and Ali Madani (Salesforce). **Sponsored by Microsoft Research, Inari Agriculture and Dyno Therapeutics.**

Invited Talks	
Department of Philosophy, Reed College **Deep Learning for Complex Biological Systems**	2024
Institute for New Economic Thinking, University of Oxford **Using NLP to Obtain Vector Representations of Financial Entities**.	2020
Google Developer Group Kuala Lumpur **Linking the Language of Life: Transformer Neural Networks for Protein Interaction Prediction**	2020
Pacific Northwest Quantitative Biology Symposium **The Controllability of the Genetic Regulatory Network of *E. coli***.	2018
St. Stephen's College, University of Delhi **Analysing the Presence of Terrorist Organisations on Social Media**.	2017

Grants	
Grant	Year
Precision Nutrition Initiative External Partners Program - $28,000 Discovery of Gene–Exposome Interactions in MASLD and Translation to Exposure-Informed Dietary Interventions.	2025-present

Mayo-Illinois Alliance Technology-Based Healthcare Award - $40,000 2024-2025
Deep Learning–Driven Personalized Treatment Strategies for MASLD Using Whole-Exome Sequencing and Clinical Records.

Google Cloud Research Credits Program - $5,000 2020-2021
Transfer Learning for Protein Representation Learning and Feature Embedding in Protein Language Models.

Reed Opportunity Grant - $1,000 2019
Machine Learning Models for Protein Function Prediction from Sequence-Derived Representations.

Reed Student Opportunity Subsidy - $500 2017
Network Biology of Genetic Regulation in Bacterial Cells.

Outreach

Program	Details(s)	Year
Multicultural Engineering Recruitment for Graduate Education	I hosted prospective graduate students in the program during their visit to the UIUC campus. During this period, I **mentored them on their graduate school applications and on how to navigate the early stages of a PhD**.	2023
Reed College Science Outreach	As a **Lead Instructor**, I led several teams of Reed students whose duties include in-class teaching at Portland public schools, guiding the students through science projects and teaching them safety in the lab.	2015 - 2017
Wangsa Melawati After School Science	I taught **Biology, Chemistry, Physics, Additional Mathematics and ICT** to students from underprivileged backgrounds and were unable to afford tutoring.	2013 - 2014

Courses Taught/TA-ed/Tutored

BIOE 310 (UIUC): Computational Tools for Biological Data	2021-2024
PHYS 467 (Reed): Computational Methods for Physics	2019
MATH 201 (Reed): Linear Algebra	2017-2019

Sample Course Comments

"Ananthan was very responsive to student questions. He cared about teaching."
"Ananthan was always so willing to help and created slides that were logical. He was happy to help outside of class and was very approachable."
"[Ananthan] was very helpful. He understood what concepts confused students and always explained things thoroughly. He helped guide students in their studying and did extra office hours."
"I think you're a great instructor and I would suggest you give more lectures in biostats."

Skills

Programming Languages	Proficient: Python, Wolfram
	Familiar with: Standard ML, C, Go, R, x86 assembly
Select Frameworks	PyTorch, Gephi, NetworkX, PyOpenGL, SQLite, Scikit-Learn, Gensim, Google Cloud Platform, Amazon Web Service, Docker

Other Activities

Founding Organizer, AI + Genomics @ The Carl R. Woese Institute for Genomic Biology
President, UIUC Graduate Biomedical Engineering Society (BMES).