Who belongs in the Noble lab?

A lab like ours, which does interdisciplinary research, can be daunting because prospective lab members may be unsure how much specific background in genomics and proteomics on the one hand or computer science and statistics on the other hand is required to be successful here. In practice, our lab has included trainees with diverse backgrounds. Here are some vignettes to give an idea of this breadth.

Postdocs

Anupama Jha (she/her) — I started my career as a software engineer; my undergrad degree is in computer science. After working for two years in industry developing navigation systems for cars, I got a master's degree at TU Munich. There I discovered my two passions: machine learning and computational biology. I went on to obtain a Ph.D. degree in these two areas. My research focus during my Ph.D. was the application and development of interpretable machine learning methods for answering core biological questions related to splicing differences between tissues and regulatory networks of RNA-binding proteins. For my postdoctoral studies, I will develop machine learning methods for imputing high-throughput genomic data sets, particularly with respect to 3D genome architecture.

Gang Li (he/him) — I received my undergraduate degree in mathematics and applied mathematics, my masters degree in statistics, and my Ph.D. in statistics and operations research with a machine learning concentration. My Ph.D. research focused on both fundamental statistical inference and method development for bioinformatics applications. My research projects involved batch effect correction for scRNA-seq data, DNA methylation imputation, deep learning methods to enhance GWAS signals, and deep fiducial inference. For my research in the Noble lab, I will develop machine learning methods for interpreting high-throughput genomic data sets with respect to 3D genome architecture, with a particular emphasis on mouse embryonic development.

Xiao Wang (he/him) — I received my undergraduate degree in computer science and my Ph.D. in computer science with a computational biology concentration. My Ph.D. research focused on both macromolecular structure modeling from cryo-EM maps and self-supervised machine learning. My research projects involved protein, DNA/RNA 3D structure automated modeling and evaluation, and deep learning methods applied to various biology and vision problems. For my research in the Noble lab, I am developing deep learning methods for Hi-C data analysis and processing.

Ran Zhang (she/her) — I majored in biological sciences in undergrad, where I did wet lab research in a cell biology lab studying autophagy. I entered graduate school with no coding experience, but I found my interest in computational biology during the first year rotation. My

Ph.D. work focused on context-specific disease gene prediction, and I'm currently working on single cell data integration in the Noble lab.

PhD students

Shengqi Hang (he/him), Computer Science and Engineering — I began my undergrad studies with a major in chemistry, but the COVID pandemic in my freshman year made me rethink my career path. I switched to major in Computer Science, with the goal of becoming a computational biologist. My undergrad research experiences helped me build computational skills and further made up my mind about leveraging computational tools to tackle biology problems. During my PhD, I look forward to further exploring DNA, RNA, and proteins—the language of life.

Lincoln Harris (he/him), Genome Sciences — I attended a small liberal arts college, where I initially intended to study organismal biology and ecology. But after taking a computer science class my sophomore year, I discovered my love for coding and computing, which led me to the world of computational biology and bioinformatics. My undergraduate research involved genome assembly and molecular phylogenetic analysis of an aquatic invertebrate species. After college I worked at a research institute in the Bay Area on a team applying single-cell transcriptomic techniques to study the molecular basis of aging and cancer. My doctoral research in the Noble lab involves developing computational tools for analysis of quantitative proteomics data. I am passionate about open-source code and open-access science.

Justin Sanders (he/him), Computer Science and Engineering — I graduated with an undergraduate degree in Computational Biology, but I went into the program expecting to do just CS with the goal of becoming a software engineer. However, after a few software engineering internships and a couple of fortuitous undergraduate research experiences – working on genomic data analysis and a project applying deep learning to single-cell data – I felt motivated to stay in research and pursue computational biology further. With a background that's much more on the computational side, during my PhD I'm eager to gain a broader knowledge of genomics and proteomics alongside my work in applied machine learning.

Bo Wen (he/him), Genome Sciences — My undergraduate degree was in bioinformatics. I worked in the field of bioinformatics for several years before I joined the Genome Sciences department. My previous research focused on method development for proteomics, including methods for protein quantification, protein identification based on multiple search engines, targeted peptide searching, novel peptide identification, neoantigen discovery, omics dataset evaluation as well as deep learning-based prediction for peptide properties. I also have some experience in metabolomics data analysis.

Melih Yilmaz (he/him), Computer Science and Engineering — I majored in electrical engineering as an undergrad, but the better part of my studies were devoted to applied machine learning and data science through coursework and internships. A research internship at

Stanford Biomedical Data Science motivated me to pursue machine learning applications in biomedicine, and I'm looking forward to diving deeper into computational biology.

Masters students, postbacs, undergraduates

Isha Gokhale (she/her), Statistics and Data Science — While completing my BS in statistics and data science, I explored the various applications of my major through research in anomaly detection, an internship for a conversational AI startup, and refining my technical skills through tutoring other students. I am excited to learn more about the applications of data science in biology, particularly through the Genome Sciences program.

Catherine Rasgaitis (she/her), Computer Science — I am currently working on my undergraduate degree in computer science. Outside of classwork, I have enjoyed research and internship experiences in several academic labs and at the NASA Jet Propulsion Laboratory. In these roles, I developed machine learning applications to solve interesting problems, such as predicting motor performance in non-human primates and optimizing complex schedules using reinforcement learning. I was drawn to the Noble Lab after participating in the Genome Sciences hackathon, where I learned some basic genomics and worked on improving m6a methylation calling from Oxford Nanopore data.

Elliott Sanger (he/him), Data Science — I graduated with a BS in chemistry and minor in mathematics. Following graduation, I found an administrative position in the UW Department of Medicine. Concurrently, I discovered an interest in data science and visualization and completed a certificate program in the field. I hope to combine my interest in science and medicine with the technical skills I'll develop in the Data Science program at UW to work on a long-term project in the Department of Genome Sciences.

Annie Staker (she/they), Data Science — I completed my BS in applied mathematics and did minors in computer science and music. My undergrad research was in a computer science lab working on approximation algorithms for sparse dominating sets. After graduation I worked for three years as a mathematician and data scientist at a biotech company, where I built algorithms for detecting the presence of pathogens in a PCR sample. Now I'm pursuing an MS degree in data science and hope to continue honing my machine learning skills.

Gwenneth Straub (they/them), Computer systems analyst — I majored in computer engineering with a focus in machine learning. In the first half of my undergraduate studies I mainly focused on autonomous vehicles, and I was deeply involved in a student-led autonomous vehicles team. However, I also developed a passion for using machine learning to solve problems in the life sciences, particularly genomics. This passion grew when I had the opportunity to complete a genomic informatics course, and after doing some more research about the field I soon decided this is where I wanted to focus my career. My ultimate goal is to gain hands-on research experience and pursue a PhD program specializing in the application of machine learning to genomics.

Xumeng Zhang (he/him), Statistics — I received my Bachelor's degree in Applied Mathematics. During my undergraduate studies, I primarily focused on machine learning, especially applying deep learning to science areas. After joining the UW, I gained great interest in biostatistics and computational biology, driven by a passion for understanding genetics and human health. Looking ahead, I am eager to leverage my expertise in statistics and machine learning to make a difference on human health. I plan to further my studies by applying for a PhD program in biostatistics or computational biology after completing my master's degree.

Research Scientists

Eugene Lin (he/him) — My journey started in Electrical Engineering as an undergrad, followed by a Ph.D. in Electrical and Computer Engineering where I specialized in computer vision and medical imaging. During my postdoc, I immersed myself in fields like single-cell sequencing, machine learning, and computational biology. Since completing my postdoc, I've been working as a research scientist analyzing human genetic data from major biobanks and applying machine learning to retinal imaging studies. What really gets me excited is exploring how we can use machine learning to unlock new insights in genomics.

Former lab members

Postdocs

Borislav (Bobby) Hristov (he/him) — I started my undergrad firmly expecting to pursue a pure math major all the way to and through graduate school but I ended up getting a degree in computer science as I liked developing algorithms and building software. My fascination with biological problems and the immense joy I experience of applying the abstract math, machine learning, and computer science techniques to solving these problems further bent my academic trajectory towards computational biology. I did my Ph.D in computer science at Princeton working mostly on cancer genomics algorithms and now, at the Noble lab, my research is focused on studying the *Plasmodium* parasite genome.

Kris Alavattam, Genome Sciences / Institute for Stem Cell and Regenerative Medicine — Like many other members of the Noble lab, I've experienced different kinds of work and disciplines before landing in my current role, where I am co-mentored by Drs. Bill Noble and Chuck Murry. I started my undergraduate work as a music composition major and, after a twisting journey, I finished with a degree in human biology. In my graduate work, I studied germ cell biology and molecular mechanisms that ensure the perpetuity of life. I did benchwork for the first half of my time in grad school; in the second half, my research led me to focus on computational biology (starting as a complete beginner). Now, I divide my time between the lab bench, where I work with human stem cell-derived cardiac cells, and the Genome Sciences research computing environment. I feel fortunate to learn from so many people with different experiences, areas of expertise, and perspectives.

Giancarlo Bonora — With degrees in computer science and electrical engineering, I initially worked in the exhilarating world of financial information systems, but found myself increasingly drawn to the field of biology. I entered the newly established UCLA Bioinformatics Ph.D. program hoping to combine my computational background with my more recently acquired interest in molecular biology. I was particularly excited about the possibility of applying computational approaches to gain a better understanding of the factors that regulate genes and in turn govern cell identity.

Will Fondrie — I started undergrad as a political science major, but fortunately I ended up studying chemistry instead. As an undergraduate, I performed research in a physical chemistry lab. Although it was a great experience, I wanted to shift to a field related to biology and medicine for graduate school. I did my Ph.D. in molecular medicine, where I trained in mass spectrometry and proteomics. During my Ph.D., I also developed an interest in machine learning. It was the opportunity to combine these interests—machine learning, mass spectrometry, and proteomics—that led me to the Noble lab for my postdoc. I now work on developing machine learning methods to analyze proteomics data and I love it.

Dejun Lin — I worked on protein crystallography as an undergrad, and I got my bachelor's degree in biological sciences. I did computational chemistry and biophysics research on protein membrane interactions and antimicrobial lipopeptides for my PhD work. I also developed algorithms for high performance computing in chemical physics. I am currently working on applying biophysical principles and computation to genome architecture 3D modeling.

Yang Lu — My background has been quite mixed. My undergraduate degree was in software engineering, and I received training targeted towards a full-stack software engineer, from low-level embedded system to high-level UI development. My masters degree was in computer science, and I specialized in network sciences. My Ph.D. degree was in computational biology and bioinformatics, and I worked on the combination of machine learning and metagenomics. In addition, I also interned at Microsoft Research, Microsoft Bing, Tencent Research, and Ericsson. In the Noble lab, I am working partially on computational mass spectrometry and partially on general purpose machine learning interpretation techniques.

Gurkan Yardimci — Despite my early ambitions to study genetics, I majored in computer science for my undergraduate studies. After graduation, I pursued a master's degree in bioengineering, studying both molecular biology and machine learning for a computational biology specialization. Having combined my "computer skills" with my love of biology, I continued my graduate studies to obtain a PhD degree in computational genomics and gene regulation. For my postdoctoral studies in Noble lab, I built on top of my PhD studies by further focusing on the 3D chromatin organization and its impact on cell biology.

Graduate students

Gesine Cauer, Genome Sciences — I went to a small liberal arts college, where I majored in biology with a concentration in scientific computing and minor in psychology. While in college, and for two years afterwards, I primarily did benchwork, and my projects ranged from protein biochemistry to cancer cell signaling. However, because I like developing algorithms and dislike pipetting, I switched to computational biology. I spent another year working on a computational cancer genomics project before starting in GS. There was and still is a learning curve associated with making such a switch, but I'm fortunate to be surrounded by helpful and patient people and it has been well worth the effort.

Ayse Dincer, Computer Science and Engineering — My undergraduate major was in computer science and engineering, where I became interested in bioinformatics and computational biology. I am currently pursuing a Ph.D. in computer science and doing research in computational biology. I am fascinated by the complexity of genomic data and how challenging yet satisfying it is to apply computational approaches for solving biological problems. I am expanding my knowledge of genomics and proteomics while developing and applying machine learning techniques for solving biological problems.

Kianna Hales, Genome Sciences — I did my undergrad in molecular, cellular and developmental biology and informatics. I have previously worked as a therapy assistant for kids with autism spectrum disorder, as a junior computational biology intern at the Center for Infectious Disease Research, and as an undergraduate computational biology intern at Microsoft Research.

Andy Lin, Genome Sciences — My background is in molecular biology and computational biology and my interests lie in the development of statistically rigorous protocols for use in forensics. My undergraduate degree was in Cell Molecular Biology and Life Sciences Informatics. Following my undergrad degree I went to work at Pacific Northwest National Laboratory for two years prior to joining the GS department. Outside the lab I enjoy volunteering at the zoo and various outdoor activities.

Alan Min, Statistics — I did my undergraduate degree in statistics, where I did some research analyzing images of fluorescent probes for detection of epigenetic markers. I'm currently

working with Bill on research in applying Bayesian topic modeling algorithms to single cell sequencing data, where I'm drawing on a wide range of different experiences.

Robin Aguilar, Genome Sciences — I started my undergraduate degree majoring in Spanish but ended up completing my studies with a major in biochemistry with dual minors in computer science and Spanish. I became interested in computational biology much later during undergrad, and completed internships at Stanford, University of Geneva, and the Genome Sciences Summer Research Program. My previous internships have drawn from a number of interdisciplinary areas including molecular biology and genomics.

Rowan Nelson, PREP Program Fellow — I graduated with a BS in Biochemistry and Molecular Biology with a concentration in Computational Molecular Biology, with minors in Biological Data Science and Computer Science (as well as Japanese for fun). My research so far has been in the wet lab, doing a project on identifying methane-cycling microbes present in the Copper River Delta, AK, a high-latitude wetland. This project mostly involved doing DNA extraction and quantification, as well as PCR, but during my time in that lab I helped graduate students with some simple bioinformatic tasks. I love solving problems using code but have had limited experience in my undergraduate studies in applying my coding skills to biological problems.

Jacob Schreiber, Computer Science and Engineering — I started my undergraduate program as a psychology major and ended up getting a degree in biomolecular engineering. Likewise, I started my graduate studies in the computer science department and the eScience institute but, by the end, my research was almost entirely on genomics. Despite my best efforts, I keep being drawn back to computational research in biology, potentially because it allows me to tackle important problems without the challenges of having to talk to other people.

Mu Yang, Biomedical Informatics and Medical Education — My undergraduate major was in public health, and specifically was in the environmental health track. Up until the end of my undergraduate years, my lab experiences were limited to experimental labs, mostly related to the microbiology field. I joined a computational biology lab in my graduate program and went on to obtain a masters degree in bioinformatics.

Masters students, postdocs, undergraduates

Abel Tesfaye (he/him) — I am a second year undergraduate studying computer science and data science. Last summer, I did an internship in a hospital, where I conducted research on the association between neuropsychiatric diseases and lupus nephritis. As an intern in a biostatistics division, I learned the process of data collecting, data extraction, data cleaning, and data analysis. After I graduate, I plan to pursue a PhD, although I am unsure what I will specialize in.

Carlo Melendez (he/him), PREP Program Fellow — I received my BS in biology and mathematics. Most of my undergraduate experiences were limited to lab and classic mathematics courses, and it wasn't until the end of my undergraduate studies that I began

developing a strong interest in computational biology. I picked up the basics of programming and machine learning in my senior year and in the year between graduating and starting my postbac. I am interested in gaining hard research skills and learning from computational biologists from all backgrounds. My goal is to matriculate into a computational biology Ph.D. program and to work on problems in biophysics and mathematical biology.