

SHARON S. NEWMAN

Naturally at the intersection of CS and protein sciences.

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EXPERIENCE

Postdoc and PhD Student

Department of Radiology, Advisor Tom Soh, Stanford University

September 2017 – April 2024

Stanford, CA

- *Thesis*: Reanalyzed the fundamental limitations and problems for molecular quantification robustness and assay scalability [1].
- Matured a theoretical and experimental tuning mechanism for molecular assays that enables multiplexed measurement of proteins across 7 orders of dynamic range in 100% serum [2, Patent 3].
- Developed mathematical optimization framework to enable accurate and quantitative use of cross-reactive affinity reagents [4].
- Implemented image segmentation and spatial autocorrelation algorithms for spatiotemporal monitoring of cellular molecular signaling [5].
- Created memory-efficient software pipeline for image registration and analysis of ~100 GB of single molecule TIRF images. [6]
- Designed a multiplexed molecular assay that can quantify small molecules using DNA as a signal readout. [7]
- Wrote API to automate OT-2 wet-lab robot for in-house SELEX protocols.

Data Science Intern

BigHat Biosciences

July 2022 – September 2022

San Mateo, CA

- Developed statistical and computational methods that highlighted importance of un-monitored data signal for antibody biophysics.
- Efficiently integrated signal into company-wide data science pipeline and machine learning infrastructure.
- Proposed in-silico antibody designs with expected improvement in specified antibody characteristic.

Research Scientist

Molecular Information Systems Lab (MISL), University of Washington

August 2016 – August 2017

Seattle, WA

- Spearheaded design and development of a Read Only Memory chip for DNA as a storage device [8].
- Designed electronic systems and control software to facilitate electrowetting for microscale fluidics automation and enable microscale automation of standard wet-lab protocols.
- Established a lab branch dedicated to digital microfluidics for DNA data storage.

Fulbright Scholar and Whitaker Fellow

Laboratory for Biomedical Microtechnology (IMTEK), University of Freiburg

August 2015 – July 2016

Freiburg, Germany

- Redesigned thin-film neuroprosthetic electrodes to minimize mechanical stress and increase chronic stability [9].
- Manufactured thin-film electrodes in ISO 4-7 cleanrooms.
- Characterized electrodes via accelerated aging tests, SEM, EIS, pulse tests, and electric field analysis.

OVERVIEW

I develop computational and bio-analytical techniques for early detection of disease, with expertise for protein and small molecule quantification. I am motivated to scale up access to healthcare technologies by combining bioinformatics, algorithms, and (biological) assay development.

EDUCATION

Bioengineering PhD, 2023

Stanford University – Stanford, CA

Electrical Engineering M.S., 2021

Stanford University – Stanford, CA

Bioengineering B.S., 2015

University of Washington – Seattle, WA

SKILLS

Python Linux Git Slurm h5py
Optimization Computer Vision
Scikit-Learn NGS Immunoassays

COURSEWORK

- Linear Dynamical Systems
- Design and Analysis of Algorithms
- Probabilistic Graphical Models
- Representations & Algs. for Comp. Bio.
- Therapeutics at Chem-Bio Interface

TEACHING

- Biological Macromolecules (Stanford)
- Intro. to Systems Biology (Stanford)
- Anal. Methods in Biotech (Stanford)
- AI and Healthcare (Inspirit AI)

AWARDS

- GRC, Bioanal. Sensors, Best Poster '22
- NSF GRFP '19-'22
- Stanford Graduate Fellowship '17-'22
- U.S. Student Fulbright Scholar '15-'16
- Whitaker International Fellow '15-'16

* underline indicates hyperlink