Augustine Chemparathy

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EDUCATION

Stanford University, Stanford, CA   Sep 2015-Jun 2020

- B.S. with Distinction, Computer Science and Bioengineering, **GPA: 4.067/4.00**
- M.S. candidate, Management Science & Engineering, Expected Graduation: June 2020
- Relevant coursework: Machine Learning (*CS 229*), Linear Dynamical Systems (*EE 263*), Artificial Intelligence (*CS 221*), Computational Structural Biology (*CS 279*)

RESEARCH

Software Experience: Python, Matlab, C++, Pandas, Keras

Dror Lab, Stanford Department of Computer Science   June 2017-Present
- Developing a data analysis and machine learning tool to summarize and gather insights from non-covalent interaction data from molecular dynamics (MD) simulations (See getcontacts.github.io). A publication is in preparation.
- Optimizing ComBind, a software package for ranking ligand docking poses. My work incorporates nonbinding ligands into Combind's docking score.

Porteus Lab, Stanford Institute for Stem Cell Biology   June 2016-August 2018
- Received a research grant from Stanford Undergraduate Advising and Research (UAR) to evaluate methods for genome editing of NK cells using CRISPR-Cas9 to produce chimeric antigen receptor (CAR)-natural killer (NK) cells for cancer immunotherapy against glioblastomas.
- Evaluated a strategy to use CRISPR-Cas9 to repair a mutation causing monogenic Type 1 Diabetes.

Jonikas Lab, Princeton Department of Molecular Biology   June 2013-August 2014
- Characterized the relationship between synthesis of the biodiesel precursor triacylglycerol (TAG) and cellular redox stress in a model microalgae. Presented research as a finalist at Intel STS 2015.

COURSE PROJECTS

CLABSI Data Analysis Team, MS&E 463: Healthcare Systems Design   Spring 2018
Worked as part of a team to investigate the high rate of central line-associated bloodstream infections (CLABSIs) at Stanford's Lucille Packard Children's Hospital (LPCH). Met with doctors, nurses, and administrators to understand problem. The team's recommendations have been implemented at LPCH. A presentation of this work has also been accepted to the Stanford Lean Healthcare Conference and a publication is in preparation.

Predicting protein structure from sequence, CS 279: Structural Biology   Fall 2017
Used random forest and support vector machine regression to predict protein 3D structure entirely from sequence. Used sequence-derived features from online dataset to predict protein contact maps, folded the predicted maps using an online service, and validated against ground-truth protein structures.

Deep learning to forecast a structural interaction network, CS 229: Machine Learning   Fall 2017
Developed a long short-term memory (LSTM) neural network using Keras to predict the evolution of a protein's noncovalent interaction network over successive frames of a protein simulation. Found that the network state could be accurately predicted over as many as forty frames.

Reinforcement learning to create purchasing strategy, CS 221: Artificial Intelligence   Fall 2016
Developed a Markov Decision Process (MDP) to automatically generate optimal hour-by-hour strategies for Stanford University to purchase electricity to heat and cool campus buildings. The model purchased electricity during non-peak hours and emergencies. The model was validated against Stanford's existing electricity purchasing strategy and performed comparably.

ACTIVITIES

Co-President, Stanford Students in Biodesign (SSB)   May 2017-June 2019

Coordinate recruitment, activities, and club organization for Stanford's largest undergraduate organization for interdisciplinary biosciences.

Volunteer Organizer   July 2018-Present
I organize undergraduates to cook and serve breakfast at the Palo Alto Opportunity Center, a transitional shelter for the homeless in the Palo Alto community.

Writing Tutor, Stanford Hume Center for Writing And Speaking   Sept 2016-June 2019
Assist undergraduate and graduate students at Stanford with all stages of the writing process for conference publications, theses, term papers, applications, and other academic writing pieces.

Team member, Stanford ChEM-H Entrepreneurship Club   Sept 2016-Dec 2016
Developed a scientific plan and business plan to find small molecule agonists for a metabolic regulator protein implicated in cellular energetic dysfunction in Parkinson's Disease; worked with a team of undergraduates to develop the pitch and present it to a panel of medicinal chemists and VC's.

Teaching Assistant, Linear Dynamical Systems (EE 263), Stanford University   Sept 2017-Dec 2017
Held office hours, wrote midterm problems, and graded exams for 135 students in Stanford's highest-enrollment electrical engineering course.

HONORS AND AWARDS

- Phi Beta Kappa   2019
- Frederick E. Terman Award, Top 5% of Stanford Engineering seniors   2019
- President's Award for Academic Excellence, Top 5% of Stanford Class of 2019 by GPA 2017
- Intel Science Talent Search Finalist   2015
- Davidson Fellow for Science   2015
- US National Chemistry Olympiad High Honors (Top 50)   2015
- USA Biology Olympiad National Certificate of Achievement (Top 56)   2014
- USA Junior Mathematics Olympiad Qualifier   2013