Augustine Chemparathy

agchempa@stanford.edu web.stanford.edu/~agchempa

EDUCATION

Stanford University, Stanford, CA Sep 2015-Jun 2020

- B.S. candidate, Computer Science and Bioengineering, **GPA: 4.047/4.00**
- 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 docking ligands to proteins using an original statistical potential. My work evaluates different methods to incorporate a new class of ligands into Combind's statistical potential.

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. Concluded that biological variability between NK donors limits efficient gene editing of NK cells.
- Evaluated a correction strategy to use CRISPR-Cas9 to repair the G32V mutation in human insulin, which was observed in a patient with 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-Present
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.

Tau Beta Pi, Stanford University Oct 2017-Present
Selected as a member of the Stanford Tau Beta Pi honor society. Recognizes students of exemplary character and distinguished scholarship.

Writing Tutor, Stanford Hume Center for Writing And Speaking Sept 2016-Present
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

- 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