Akosua Busia

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Education

University of California, Berkeley — Aug 2018-May 2023
Doctor of Philosophy, Electrical Engineering and Computer Sciences
Advisors: Michael Jordan, Jennifer Listgarten

Stanford University — Sept 2012-Jun 2016
B.S. Mathematical and Computational Science with Honors and with Distinction — 4.16 GPA
Minor in Psychology, Neuroscience Focus

Research Focus

Computational Biology, Machine Learning, Statistics
Designing machine learning methods to accelerate biological design and discovery

Honors and Fellowships

BEARGradS Award, William S. Floyd, Jr. Fellowship in Engineering — 2018
Merit award bestowed upon one EECS doctoral student per year by the Berkeley Graduate Division

National Science Foundation Graduate Research Fellowship — 2018
National award recognizing graduate students with demonstrated potential for significant achievements in science and engineering

Berkeley Fellowship for Graduate Study — 2018
Awarded to outstanding applicants to doctoral programs across all fields at UC Berkeley

Berkeley EECS Excellence Award — 2018
Awarded by EECS faculty in recognition of an outstanding undergraduate academic record

J.E. Wallace Sterling Award for Scholastic Achievement — 2016
Recognizes the top 25 graduating seniors in Stanford's School of Humanities and Sciences

Firestone Medal for Excellence in Undergraduate Research — 2016
Bestowed upon the top 10% of all honors theses in the social sciences, natural sciences, engineering and applied sciences

Goldman Sachs Prize: Valedictorian — 2016
Presented to the male and female student with top GPA from Stanford Black Community's graduating class

Phi Beta Kappa National Honors Society — 2015
Honors the excellence and breadth of undergraduate scholarly accomplishments

President's Award for Academic Excellence 2013
Honors students in the top 3% of Stanford's outgoing freshman class

Presentations and Publications

Busia, A. and Listgarten, J. 2023. MBE: model-based enrichment estimation and prediction for differential sequencing data. Genome Biology, 24(1). DOI: https://doi.org/10.1186/s13059-023-03058-w

Zhu, D.*, Brookes, D. H.*, **Busia, A.***, Carneiro, A., Fannjiang, C., Popova, G., Shin, D., Donohue, K.C., Chang E.F., Nowakowski, T.J., Listgarten, J., and Schaffer, D. V. 2021. Machine learning-based library design improves packaging and diversity of adeno-associated virus (AAV) libraries. bioRxiv 2021.11.02.467003.

Brookes, D.H., **Busia, A.**, Fannjiang, C., Murphy, K., and Listgarten, L. A view of Estimation of Distribution Algorithms through the lens of Expectation-Maximization. Proceedings of the 2020 Genetic and Evolutionary Computation Conference Companion. https://dl.acm.org/doi/10.1145/3377929.3389938

Busia, A., Dahl, G., Fannjiang, C., Alexander, D.H., Dorfman, E., Poplin, R., McLean, C.Y., Chang, P., and DePristo, M. A deep learning approach to pattern recognition for short DNA sequences. bioRxiv 353474

Busia, A. and Jaitly, N. 2017. Next-step conditioned deep convolutional neural networks improve protein secondary structure prediction. 25th Annual Conference on Intelligent Systems for Molecular and Computational Biology and 16th European Conference on Computational Biology. Poster presentation.
DOI: 10.7490/f1000research.1114813.1

Busia, A., Collins, J., and Jaitly, N. 2016. Protein Secondary Structure Prediction Using Deep Multi-scale Convolutional Neural Networks and Next-Step Conditioning. arXiv:1611.01503

Research Experience

Machine Learning Scientist, Dyno Therapeutics Oct 2023-present
Designed machine learning approaches to engineer new therapeutic proteins by combining deep learning and large language models with structure and domain knowledge

Doctoral Researcher, UC Berkeley EECS Aug 2018-May 2023
Developed new machine learning methods for data-driven design of novel therapeutic proteins and efficient, model-based analysis of high-throughput sequencing-based assays
Advisors: Jennifer Listgarten, Mike Jordan

Managed 3 cross-disciplinary collaborations that led to the synthesis of new, functional proteins

Google Brain Research Resident Jun 2016-Jun 2018
Developed deep learning technologies for determining species- and strain-level taxonomy for short DNA reads from amplicon and metagenomic sequencing data
Mentor: Mark DePristo

Designed next-step conditioned convolutional language models for protein
Mentor: Navdeep Jaitly

secondary structure prediction from primary sequence

Undergraduate Researcher, Stanford Biomedical Informatics — Jun 2015-Jun 2016
Developed and evaluated a mathematical model of association between county-level prevalence of Autism Spectrum Disorder and local measures of environmental toxins using unsupervised data analysis and supervised machine learning techniques — Mentor: Russ Altman

Undergraduate Researcher, Stanford Electrical Engineering — Oct 2014-Jun 2015
Developed and maintained scientific computing tools for simulation of theoretical models of spiky, probabilistic communication between layers of neurons — Mentor: Kwabena Boahen

Research Assistant, University of California, Santa Cruz Cognitive Science — Summer 2013 & 2014
Designed and directed experiments probing computer-mediated communication and analyzed human speech and gesture patterns using annotation software — Mentor: Jean E. Fox Tree

Teaching

Graduate Student Instructor, Berkeley Data 102 / Stat 102 — Jan 2023-May 2023
Data, Inference, and Decisions; taught by Professors Ramesh Sridharan and Eaman Jahani

Graduate Student Instructor, Berkeley Data 102 / Stat 102 — Jan 2020-May 2020
Data, Inference, and Decisions; taught by Professors Moritz Hardt and Jacob Steinhardt

Course Assistant, Stanford CS 274 / BIOMEDIN 214 — Sept 2015-Dec 2015
Representations and Algorithms for Computational Molecular Biology; taught by Professor Russ Altman

Mathematics Subject Tutor, Stanford Center for Teaching and Learning — Sept 2014-June 2015
Single-and multivariable calculus, linear algebra, and ordinary differential equations

Service and Outreach

Co-President, Women in Computer Science and Engineering — Aug 2020-Sept 2021
Supporting and advocating for female graduate students; leadership meetings

Secretary, Women in Computer Science and Engineering — June 2019-Aug 2020
Mentoring new female graduate students; organizing and documenting WICSE events; maintaining WICSE website

Mentor, Berkeley AI Research Undergraduate Mentoring Program — Sept 2018-Dec 2019
Mentoring promising Berkeley undergraduates from underrepresented groups

Students Mentored: Tejal Gala, UC Berkeley, Undergraduate

Publicity

Google Brain Residency Program - 7 months in and looking ahead	Jan 2017
Stanford seniors' thesis projects garner university medals	Jul 2016
Congratulations to Sterling Award winners	Jan 2016