

# Akosua Busia

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## Education

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University of California, Berkeley Aug 2018-present  
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

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Computational Biology, Machine Learning, Statistics  
Designing machine learning methods for biological problems, and finding ways to leverage these methods to gain new biological insights

## Honors and Fellowships

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BEARGradS Award, William S. Floyd, Jr. Fellowship in Engineering 2018  
Awarded based solely on merit by the Berkeley Graduate Division to one EECS doctoral student per year

National Science Foundation Graduate Research Fellowship 2018  
Recognizes graduate students with demonstrated potential for significant achievements in science and engineering at the national level

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 ten percent 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 senior class

Phi Beta Kappa National Honors Society	2015
Honors students for the excellence and breadth of their undergraduate scholarly accomplishments	
President's Award for Academic Excellence	2013
Honors students in the top three percent of Stanford's outgoing freshman class	

## Presentations and Publications

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**Busia, A.** and Listgarten, J. 2023. Model-based differential sequencing analysis. [bioRxiv 2023.03.29.534803](https://doi.org/10.1101/2023.03.29.534803)

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](https://doi.org/10.1101/2021.11.02.467003).

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](https://doi.org/10.1101/2019.03.29.353474)

**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](https://doi.org/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](https://arxiv.org/abs/1611.01503)

## Research Experience

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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 secondary structure prediction from primary sequence	Mentor: Navdeep Jaitly
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  
Designed and directed experiments probing computer-mediated communication and analyzed human speech and gesture patterns using annotation software  
Summer 2013 & 2014  
Mentor: Jean E. Fox Tree

## Teaching

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

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

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

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

## Service and Outreach

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

Secretary, Women in Computer Science and Engineering  
Organizing and documenting WICSE events; mentoring new female graduate students; updating WICSE website  
June 2019-Aug 2020

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

Students Mentored: Tejal Gala, UC Berkeley, Undergraduate

## Publicity

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[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