GILLIAN CHU

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EDUCATION

MS **University of Illinois at Urbana-Champaign** **Dec 2021 - June 2022** ***(Expected)***
Program in Ecology, Evolution and Conservation
Thesis: Phylogenetic Placement
Advisor: Professor Tandy Warnow

BS University of California, Berkeley Aug 2016 - Dec 2020
Computer Science

HSD Phillips Exeter Academy Aug 2014 - May 2016

RESEARCH INTERESTS

Computational Biology, Computational/Statistical Genetics, Probabilistic Graphical Models.
My interests are at the intersection of computer science, statistics, and biology. I am interested in building tools that help people interpret genetic data.

ACADEMIC HONORS AND FELLOWSHIPS

- Genetics Society of America: Presidential Membership Initiative (2022). *Awarded 1-year membership to GSA, Early Career Leadership Program and GENETICS Peer Review Training Program.*
- NSF GRFP (5 years), 2021: *Three-year annual stipend of $34,000.*
- Excellent Graduate Student Instructor, UIUC. Spring 2021. *Introduction to Programming for Engineers and Scientists (CS101).*

INDUSTRY & RESEARCH EXPERIENCE

Research Assistant, Warnow Lab *Jan 2021 - Present*
Advisor: Tandy Warnow
- Designing fast multiple sequence alignment method capable of aligning ultra-large datasets
- Improving protein multiple sequence alignments with new outlier detection method
- Studying the impact of query alignment methods on microbial abundance profiling
- Designing new metagenomics abundance profiling method

Research Assistant, El-Kebir Lab *Jan 2021 – Dec 2021*
Advisor: Mohammed El-Kebir
- Designing interactive visual editor for copy number calls in bulk tumor cell data

Research Assistant, Lawrence Berkeley National Lab *Sept 2020 – Jan 2021*
Advisor: Jessica Granderson
- Improved prediction of unusual peak energy-use events for smart building technologies

Research Assistant, University of California Berkeley *Sept 2019 – May 2021*
Advisor: Priya Moorjani

- Implemented an efficient method of uncovering founder events in modern populations
- Designed an efficient and accurate local ancestry inference method

Research Assistant, University of California Berkeley *Sept 2019 – Dec 2020*
Advisor: Satish Rao

- Designed a distance-based phylogenetic tree inference algorithm

Research Assistant, University of California Berkeley *Sept 2018 – Dec 2019*
Advisor: John Marshall

- Optimized probabilistic gene drive model by redesigning movement kernel

Databricks, San Francisco *May – Aug 2019*
Software Engineering Intern, Observability Team

- Implemented distributed tracing for performance analysis across microservice architecture

Researcher, Sperax *Apr 2018 – Oct 2021*

- Analyzed consensus protocols for distributed systems and implemented a test net
- Designed Decentralized Autonomous Organization (DAO) voting protocol and modeled token economics

Consensys, San Francisco *June – Aug 2018*
Software Engineering Intern, Standard Bounties

- Built RESTful API, React.js library and smart contract webapp using distributed file storage

Office of Intellectual Property & Industry Research, Berkeley *May 2016 – Feb 2017*
System Administrator

- Implemented and tested Apex web portal used by hundreds of researchers for patent process

TEACHING EXPERIENCE

University of Illinois at Urbana-Champaign

- **Intro to Programming for Engineers and Scientists.** CS101. Graduate Student Instructure, UIUC Department of Computer Science. Spr' 21. **Excellent Graduate Instructor Award.**

University of California Berkeley

- **Operating Systems and System Programming.** CS162. Reader, UC Berkeley EECS. Su'20.
- **Efficient Algorithms and Intractable Problems.** CS170. Undergraduate Student Instructor, UC Berkeley EECS. Fa'18, Spr'19, Fa'19, Spr'20.
- **Discrete Mathematics and Probability.** CS70. Reader, UC Berkeley EECS. Fa'17, Spr'18, Su'18.

- **Building with Blockchain for Web 3.0.** Guest Lecturer, UC Berkeley IEOR. Spr'20.
- **Blockchain Fundamentals.** CS198. Lecturer, UC Berkeley. Spr'18, Fa'18.
- **Blockchain for Enterprise.** Guest Lecturer, UC Berkeley Haas Business. Spr'19. Fa'19.

- **Blockchain for Lawyers.** Guest Lecturer, UC Berkeley Boalt Law. Spr'18.
- **EdX Blockchain Fundamentals.** Course Advisor, UC Berkeley. Spr'18.

PUBLICATIONS

Journal Papers in Preparation

On scalable alignment algorithms for phylogenetic placement. **Chu, G.**, Warnow, T. *Presents recommendations on the best methods to perform scalable two-step phylogenetic placement.*

On fast, accurate local ancestry inference. **Chu, G.**, Nisonoff, H., Moorjani, P. *KernelMix is a modular method to perform local ancestry inference using discriminative classifiers and a conditional random field.*

On fast ultra-large highly accurate multiple sequence alignments in the presence of sequence length heterogeneity. Park, M., **Chu, G.**, Shen, C., Warnow, T. *UPP2 introduces a new statistically rigorous way of selecting the best profile hidden Markov model in an ensemble for alignment.*

Journal Papers in Submission

On copy number calling inaccuracies. Lalani, Z.*, **Chu, G.***, Zaccaria, S., El-Kebir, M. *CNAViz is a web-based tool to interactively visualize and improve copy number clusters.*

Journal Papers in Review

Tournebize, R., **Chu, G.**, and Moorjani, P., "Inferring the History of Founder Events in Human Populations." bioRxiv 2020.09.07.286450; doi: https://doi.org/10.1101/2020.09.07.286450.

Workshop Papers

Y. Wang, Sun J., Wang, X., Wei, Y., Wu, H., **Chu, G.**, Yu, Z., "Sperax: An Approach to Defeat Long Range Attacks in Blockchains," IEEE INFOCOM 2020 – IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS), Toronto, ON, Canada, 2020, pp. 574-579. doi: 10.1109/INFOCOMWKSHPS50562.2020.9163036.

PRESENTATIONS

Conference Presentation, "MGDrive: Mosquito Gene Drive Explorer: Landscape Clustering," National Conference on Undergraduate Research, March 2020.

Retreat Presentation, "MGDrive: The Original Trilogy," UC Berkeley Computational Biology Retreat, October 2018.

Conference Presentation, "A Technical Overview of Blockchain Development," TiE Inflect Silicon Valley, April 2018.

COMMUNITY SERVICE

Shield the Bay
Co-Founder/Finance, Berkeley, March 2020 – Present

Berkeley ANova
Events Committee Chair, Berkeley, Sept 2016 – June 2018

SKILLS/LANGUAGES

Programming: Python, Java, C, Javascript, R, React, Redux, Solidity, Go, Jsonnet, Scala

Tools/Framework: HTML, Git, Django, Docker, AWS, Remix, CircleCI, Webpack, Jenkins, Kubernetes, Grafana

Genomics: samtools, bwa, GATK

REFERENCES

Dr. Tandy Warnow, Professor
Department of Computer Science
University of Illinois, Urbana-Champaign
Email: warnow@illinois.edu

Dr. Mohammed El-Kebir, Assistant Professor
Department of Computer Science
University of Illinois, Urbana-Champaign
Email: melkebir@illinois.edu

Dr. Priya Moorjani, Assistant Professor
Center for Computational Biology
University of California, Berkeley
Email: moorjani@berkeley.edu

Dr. Satish Rao, Professor
Electrical Engineering and Computer Science
University of California, Berkeley
Email: satishr@berkeley.edu

Dr. John Marshall, Assistant Professor
School of Public Health
University of California, Berkeley
Email: john.marshall@berkeley.edu

Dr. Jaspal Sandhu, Professor of Practice
School of Public Health
University of California, Berkley
Email: jaspal@berkeley.edu