GILLIAN CHU
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EDUCATION

PhD	**Princeton University**	**Aug 2022 - May 2027** *(Expected)*
	Department of Computer Science	
	Advisor: Benjamin J. Raphael	
MS	University of Illinois at Urbana-Champaign	Dec 2020 - August 2022
	Program in Ecology, Evolution and Conservation	
	Thesis: Phylogenetic Placement	
	Advisor: Professor Tandy Warnow	
BS	University of California, Berkeley	Aug 2016 - Dec 2020
	Department of 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 us understand the evolution of complex and heterogeneous biological systems.

ACADEMIC HONORS AND FELLOWSHIPS

- National Cancer Institute: SSACB (2024). *Awarded Best Poster Runner-up.*
- William G. Bowen Merit Fellowship (2023). *Internal Princeton per-department fellowship.*
- RECOMB-CCB Scientific Communications (2022) 1st Place (*Awarded $200*).
- 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): *Five-year fellowship, 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, Princeton University   *Aug 2022 - Present*
Advisor: Benjamin J. Raphael
- Designed new statistic to prioritize drug candidates
- Designed new evolutionary model to describe CRISPR-based lineage tracing data and an efficient algorithm for maximum likelihood phylogeny inference under this model

Research Assistant, University of Illinois at Urbana-Champaign   *Jan 2021 - Present*
Advisor: Tandy Warnow
- Designed fast multiple sequence alignment method capable of aligning ultra-large datasets

- Designed fast and scalable phylogenetic placement methods

Research Assistant, University of Illinois at Urbana-Champaign   *Jan 2021 – Dec 2021*
Advisor: Mohammed El-Kebir
- Designing interactive visual editor for copy number calls in bulk tumor cell data

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

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

Standard Bounties, Consensys   *June 2018 – Aug 2018*
Fullstack Software Engineering Intern
- Built out RESTful API, and smart contract web application

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

- Bioinformatics Bootcamp. Teaching Assistant, Center for Computational Biology. Aug' 20.
- 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

* indicates joint first-author

Conference Papers

2. Mai, U.*, **Chu, G.*,** and Benjamin J. Raphael. "Maximum Likelihood Inference of Time-scaled Cell Lineage Trees with Mixed-type Missing Data." *bioRxiv* (2024) doi: 10.1101/2024.03.05.583638. RECOMB 2024.

1. Lalani, Z.*, **Chu, G.***, Zaccaria, S., El-Kebir, M., "User-guided local and global copy-number segmentation for tumor sequencing data." bioRxiv doi: 10.1101/2022.01.15.476457v1. RECOMB-CCB 2022.

Journal Papers

4. **Chu, G.**, Warnow, T., "SCAMPP+FastTree: Improving Scalability for Likelihood-Based Phylogenetic Placement." *Bioinformatics Advances*, Volume 3, Issue 1, 2023, vbad008, https://doi.org/10.1093/bioadv/vbad008.

3. Park M, Ivanovic S, **Chu G**, Shen C, Warnow T. UPP2: Fast and Accurate Alignment of Datasets with Fragmentary Sequences, *Bioinformatics*, Volume 39, Issue 1, January 2023, btad007, https://doi.org/10.1093/bioinformatics/btad007.

2. Lalani Z*, **Chu G***, Hsu S, Kagawa S, Xiang M, et al. (2022) CNAViz: An interactive webtool for user-guided segmentation of tumor DNA sequencing data. PLOS Computational Biology 18, no. 10 (2022): e1010614. https://doi.org/10.1371/journal.pcbi.1010614

1. Tournebize, R., **Chu, G.**, & Moorjani, P. (2022). Reconstructing the history of founder events using genome-wide patterns of allele sharing across individuals. *PLoS Genetics 18*, no. 6 (2022), e1010243.

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

Poster Presentation, "LAML: Lineage Analysis via Maximum Likelihood." National Cancer Institute (NCI): Spring School on Algorithmic Cancer Biology (SSACB), Apr 2024.

Poster Presentation, "SCAMPP+FastTree: Improving Scalability for Likelihood-Based Phylogenetic Placement." International Society for Computational Biology (ISCB) – Latin America, Oct 2022.

Conference Presentation, "User-guided local and global copy-number segmentation for tumor sequencing data." Research in Computational Molecular Biology (RECOMB) – Computational Cancer Biology (CCB), May 2022.

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

Computer Science Graduate Student Committee
Member, Princeton, Fall 2022 - Present

Shield the Bay
Co-Founder/Finance, Berkeley, March 2020 – June 2021

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. Ben Raphael, Professor
Department of Computer Science
Princeton University
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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
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Dr. Jaspal Sandhu, Professor of Practice
School of Public Health
University of California, Berkley
Email: jaspal@berkeley.edu