

Brad Solomon

Curriculum Vitae

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Education

B.A. in Integrated Sciences, Biology, and Computer Science. *cum laude 2013*
Northwestern University

Ph.D. in Computational Biology *2018*
Carnegie Mellon University

Dissertation: Computational methods for enabling sequence search on 100-terabase RNA-seq datasets

Committee: Carl Kingsford (advisor), James Faeder, Jian Ma, C. Titus Brown

Employment

2020–present **Teaching Assistant Professor**, UIUC, Computer Science

2018–2020 **Postdoctoral Fellow**, Johns Hopkins University, Computer Science

Publications

1. **Brad Solomon**, and Carl Kingsford. "Fast search of thousands of short-read sequencing experiments." *Nature biotechnology* 34.3 (2016): 300-302.
2. **Brad Solomon**, and Carl Kingsford. "Improved search of large transcriptomic sequencing databases using split sequence bloom trees." *International Conference on Research in Computational Molecular Biology*. Springer, Cham, (2017).
3. Guillaume Marçais*, **Brad Solomon***, Rob Patro, and Carl Kingsford. "Sketching and sub-linear data structures in genomics." *Annual Review of Biomedical Data Science* (2019).
*Co-first author
4. Nae-Chyun Chen, **Brad Solomon**, Taher Mun, Sheila Iyer, and Ben Langmead. "Reference flow: reducing reference bias using multiple population genomes." *Genome biology* 22, no. 1 (2021): 1-17.
5. Christopher Wilks, Shijie Zheng, Feng Chen, Rone Charles, **Brad Solomon** et al. "recount3: summaries and queries for large-scale RNA-seq expression and splicing." *Genome biology* 22, no. 323: 1-40. (2021)
6. Jeff Erickson, Jason Xia, Eliot Wong Robson, Tue Do, Aidan Tzur Glickman, Zhuofan Jia, Eric Jin, Jiwon Lee, Patrick Lin, Steven Pan, Samuel Ruggerio, Tomoko Sakurayama, Andrew Yin, Yael Gertner, **Brad Solomon**. "Auto-graded scaffolding exercises for theoretical computer science." *ASEE Annual Conference and Exposition* (2023)
7. Yael Gertner, **Brad Solomon**, Hongxuan Chen, Eliot Robson, Carl Evans, Jeff Erickson. "Measuring the Benefits of an Autograded Scaffolding Tool on Students of All Levels in an Upper Level Algorithms Class" Submitted to ACM ITiCSE 2025
8. Santiago Ospina Tabares, Kathleen Isenegger, Daphane Hammer, Yael Gertner and **Brad Solomon**. "Engaging High School Students in Computer Science Through a Low-Cost, Faculty-Mentorship Based Summer Research Program" Submitted to RESPECT 2025

Teaching

Data Structures

CS 225

2020 – 2022, Fall 2023, Fall 2024

Average Enrollment: 1000 students. This course serves as a gateway to advanced programming concepts by building a strong foundation in elementary data structures in C++ as well as algorithmic theory.

Algorithms and Data Structures for Data Science

CS 277

Fall 2021, Spring 2023, Spring 2024, Spring 2025

Average Enrollment: 100 students. This course teaches fundamentals of programming alongside an introduction to elementary concepts in algorithms and classical data structures, focusing on applications in Data Science and interdisciplinary fields.

String Algorithms and Data Structures

CS 199-225

2020-2022, Spring 2023, Fall 2024

Average Enrollment: 100 students. This honors course focuses on advanced and special topics related to concepts seen in CS 225 and provides an additional weekly coding challenge focusing on algorithmic optimization in both space and time. By the end of the course, students will be able to implement and justify a variety of approaches for the storage and analyze of string datasets.

Discrete Structures

CS 173

Summer 2022

Average Enrollment: 250 students. This core CS course is an introduction to mathematics and computational theory topics necessary to read and write proofs or formal mathematical notation. By the end of the course, students will have a strong foundation of knowledge needed for more advanced CS theory courses.

Computational Genomics: Sequences

EN.601.447/647

Fall 2019

Average Enrollment: 90 students. This mixed undergraduate / graduate course is designed to prepare students for research in computational genomics. The emphasis is on current research problems, real-world genomics data, and efficient software implementations for analyzing data. Topics include: string matching, sequence alignment and indexing, assembly, and sequence models.

Course Development

- 2024 Added scaffolded exercises (autograded handouts) to all CS 225 labs and upgraded infrastructure for manual grading of theory questions on exams.
- 2023 Improved the accessibility in both CS 277 and CS 199-225 by converting all assignments into online-hosted workspace containers. Students no longer need access to a personal computer to complete both classes.
- 2022 Restructured CS 225 to include more theory content as well as probabilistic data structures as part of broader curriculum adjustments across early core courses.
- 2022 Integrated all CS 225 content into the Prairielearn workspace environment alongside updated VMs to support a broader range of hardware.

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- 2021 Developed a new data structures course in Python (CS 277) which teaches a combination of fundamental programming skills, algorithmic theory, and practical coding of data structures.
 - 2020 Developed a new final project framework to replace final exams in online courses using mentored teams of 3-4 individuals with frequent checkpoints and feedback opportunities.
 - 2020 Developed a new honors course on string algorithms and data structures (CS 199-225) to be taught synchronously with the existing CS 225 curriculum.

Mentorship

CS STARS

- 2024 Andrea Turek, Ranjana Rajagopalan, Sahana Sankar, Vani Ramesh
- 2023 Aashvi Busa, Sherry Long

Course Assistants and Development Work

Students on this list assisted with teaching or development of course-related materials. Each student was interacted with at least once a week.

- 2025 Anitej Chanda, Annie Thomas, Baoyuan Zhou, Jessie Wang, Jia Gill, Meghana Gopannagari, Sean Yousiang Liao, Spandan Uprit, Suvinay Goyal, Vedaant Vinodkumar Jain, James Cho
- 2024 Aryan Arora, Aashvi Busa, Alex Brohier, Anoushka Khajanchi, Akash Arunabharathi, Akshat Gupta, Anisha Rao, Anushri Mittal, Arthur Wang, Aryan Gupta, Fatih Atlamaz, Aditya Patel, Ayush Tarachandani, Benjamin Chang, Bill Zhang, Bwohan Wang, Saurav Chittal, Christopher Suarez, Colsen Stiles, Dev Goyal, Numair Hajyani, Hasan Al Saeedi, Jize (Jeff) Zou, Jasmine Liu, Katherine Sick, Kavin Mohan, Anirudh Kumar, Kyler Yu, Michael Yang, Navid Tajkhorshid, Neil Kozlowski, Neil Teje, Philip Li, Porter Shawver, Qiyang Liu, Sherry Long, Sonika Tamilarasan, Tanish Khadse, Trisha Choudhary, Tyler Cushing, Rohan Navin, Ved Kommalapati, Aditya Patel, Bill Zhang, Chris Suarez, Hasan Al Saeedi
- 2023 Hamza Husain, Tony Chang, Ahmed Hasan, Ayah Jaber, Aman Gupta, Anuj Sesha, Benjamin Nguyen, Saurav Chittal, Justin Hu, Deniz Caglar, Dev Goyal, Daniel Hettinger, Dhruv Mehta, Diwaker Sinha, Drshika Asher, Daniel Feng, Ellie Chang, Garrett Credi, John Li, Jessica Singh, Alex Tanthiptam, Khoa Pham, Kshitij Sinha, Labdhi Jain, Mateo Campoverde-Fordon, Max Fan, Rishi Sekhar, Zora Zhang, Riya Verma, Sambhav Gupta, Shriyan Gosavi, Shreya Singh, Sana Madhavan, Sumin Cho, Taige Zhang, Serena Trika, Yirian (Erin) Wang, Yucheng Jiang, Lou Zeh
- 2022 Adam Naboulsi, Anirudh Eswara, Ananya Subramanian, Alexander Marcozzi, Benjamin Nguyen, Michael Ma, Justin Hu, Deniz Caglar, Daniel Hettinger, Drshika Asher, Garrett Credi, Harsh Deep, John Li, Kanin Tangchartsiri, Kshitij Sinha, Lisa Liu, Mateo Campoverde-Fordon, Rachael Wei, Shriyan Gosavi, Shreya Singh, Sana Madhavan, Soham Kulkarni, Sumin Cho, Taige Zhang, Sabah Ibrahim, Thailer Lietz, Ahmed Hasan, Ayah Jaber, Aman Gupta, Anuj Sesha, Saurav Chittal, Dev Goyal, Dhruv Mehta, Diwaker Sinha, Daniel Feng, Ellie Chang, Jessica Singh, Alex Tanthiptam, Khoa Pham, Labdhi Jain, Max Fan, Rishi Sekhar, Zora Zhang, Riya Verma, Sambhav Gupta, Serena Trika, Yirian (Erin) Wang, Yucheng Jiang, Lou Zeh
- 2021 Adam Naboulsi, Adith Narayanan, Anirudh Eswara, Ameya Gharpure, Alexander Marcozzi, Ashank Kumar, Benjamin Nguyen, Michael Ma, Deniz Caglar, Daniel Hettinger, Edward Guo, Emmanuel Noufele, Gabriela Xue, Garrett Credi, John Li, John Pohovey, Kanin Tangchartsiri, Jackson Kennel, Kenneth Koepcke, Kshitij Sinha, Lahari Pisupati, Nakul Iyer, Rishub Podar, Rachael Wei, Sabah Ibrahim, Soham Kulkarni, Taige Zhang, Tony Ruan, Thailer Lietz, Varun Sarabudla, Vien Vuong, Xiaobo Huang, Yueqi Jiang, Ananya Subramanian, Justin Hu, Drshika Asher, Harsh Deep, Lisa Liu, Mateo Campoverde-Fordon, Shriyan Gosavi, Shreya Singh, Sana Madhavan, Sumin Cho

2020 Aarya Chandhok, Alexander Magana, Ameya Gharpure, Angeeras Ramanath, Ananda Sangli, Ashank Kumar, Atharva Sehgal, Nishant Bhushan, Braeden Smith, Daniel Chiu, Emmanuel Noufele, Gabriella Xue, Himanshi Sharma, Jonathan Chung, James Wang, Kang Jihoon, Zach Kensik, Jeffrey Zhang, Kanin Tangchartsiri, Akash Pardeshi, Rishub Podar, Rem Yang, Rittika Adhikari, Ruohao Guo, Sabah Ibrahim, Prateek Tenkale, Tony Ruan, Jenny Chen, Eunice Zhou, Yingan Wang, Wall Sun, Chris Yao, Alexander Marcozzi, Edward Guo, John Pohovey, Lahari Pisupati, Mat Farley, Urvi Awasthi, Yueqi Jiang

Service Activities

Departmental Service

2024-present K12 Outreach Committee (Co-Chair)
2024-present Academic Appeals Committee (Member)
2022 Broadening Participation in Computing (K12 Outreach Subcommittee Member)
2022-present Undergraduate Research Coordinator
2021 Broadening Participation in Computing (Policy Subcommittee Member)
2020-2023 Teaching Faculty Hiring Committee (Member)

College and University Service

2024-2025 Undergraduate Research in Scientific Advancement (Faculty Advisor)
2023-2025 Faculty Senator
2022-2023 Promoting Undergraduate Research in Engineering (Faculty Advisor)
2022-present CS Summer Research Program (Faculty Lead)
2022 Specialized Faculty Professional Development Committee (Member)
2021-present Academy for Excellence in Engineering Education Classroom Observer

External Service Activities

2025 Paper Reviewer (SIGCSE TS 2025)
2023 Served on advisory panel (NSF Bioinformatics)
2022 Program Committee Member (ACM-BCB)
2022 Paper Reviewer (Nucleic Acids Research)
2022-present High School CS Summer Research Program (Co-founder)
2022 Paper Reviewer (BIOINF Bioinformatics)
2021 Paper Reviewer (ASEE 2021)
2021, 2023 Future Illinois Faculty Workshop (Panelist)
2021-present CS Summer Teaching Workshop (Co-founder, committee member, co-chair)
2020 Mentor (Berkeley Rising Stars program)

Honors

Spring 2023 List of Teachers Ranked as Excellent By Their Students (CS 199-225)
Fall 2022 List of Teachers Ranked as Excellent By Their Students (CS 199-225)
Summer 2022 List of Teachers Ranked as Excellent By Their Students (CS 173)
Spring 2022 List of Teachers Ranked as Excellent By Their Students (CS 225)
Fall 2021 List of Teachers Ranked as Excellent By Their Students (CS 277)
Spring 2021 List of Teachers Ranked as Excellent By Their Students (CS 199-225)
Fall 2020 List of Teachers Ranked as Excellent By Their Students (CS 199-225)

Grants

TheorieLearn: Autograded Resources for Theoretical Computer Science
2022-2025

AE3 / SIIP

PI: Jeff Erickson, **CO-PIs:** Brad Solomon, Carl Kingsford, Yael Gertner

Funding awarded to develop resources on the PrairieLearn platform to support the teaching of algorithms, data structures, and other theoretical aspects of computer science, at several different levels of the CS curriculum.

Professional Development

2024, 2025 Attended SIGCSE Conference
2021 Attended ASEE Conference
2020 Collins Scholar Teacher Training Program