

Cyrus Cousins

Curriculum Vitae: 2021

Personal Details

Birth December 31, 1992
Home Providence RI, 02903, USA
Phone (401) 487-3104

Mail cyrus_cousins@brown.edu
Web cs.brown.edu/people/ccousins/
Code <https://www.github.com/cyruscousins/>

Education

Doctorate of Philosophy Ph.D. in Computer Science.	BROWN UNIVERSITY	2015-2021
Master's Master of Science in Computer Science.	BROWN UNIVERSITY	2015-2017
Baccalaureate B.S. in Computer Science, Mathematics, and Biology.	TUFTS UNIVERSITY	2011-2015

Research Experience

Visiting Assistant Professor Research in randomized algorithms, statistical data science, and theoretical machine learning.	<i>Brown University Dept. of Computer Science</i>	Fall-Spr. 2021-22
Postdoctoral Scholar Continued research in machine learning and sampling algorithms, with theoretical guarantees.	<i>Professor Eli Upfal (BIGDATA group @ Brown University)</i>	Summer 2021
Research Intern Research in game-theoretic multi-agent neural reinforcement learning.	<i>Doctor Larry Rudolph (Two Sigma Labs)</i>	Summer 2019
Research Intern Research in statistical significance and statistical modeling techniques.	<i>Doctor Matteo Riondato (Two Sigma Labs)</i>	Summer 2018
Research Assistant Research in machine learning and sampling algorithms, with a focus on tail bounds and Rademacher averages.	<i>Professor Eli Upfal (BIGDATA group @ Brown University)</i>	2016-2021
Research Assistant Algorithms for anomaly detection in high-dimensional small-sample biological systems.	<i>Professor Donna Slonim (BCB group @ Tufts University)</i>	2014-2017
Research Assistant Working with single-cell sequencing data and phylogeny reconstruction with cancer data.	<i>Prof. Benjamin Raphael (Raphael Lab @ Brown University)</i>	2015-2016
Research Assistant Design and implementation of inference systems and MCMC sampling algorithms for general-purpose probabilistic programming, with the DARPA Probabilistic Programming for Advanced Machine Learning initiative.	<i>Professors Norman Ramsey and Mitchell Wand (PPAML)</i>	Summer 2015

Teaching Experience

Visiting Assistant Professor Teaching CS1450: Advanced Introduction to Probability for Computing and Data Science.	<i>Brown University Dept. of Computer Science</i>	Fall 2021
Graduate Teaching Assistant Assignments, grading, and lecturing for a graduate-level CS course in probabilistic methods.	<i>Eli Upfal @ Brown University</i>	Spring 2020
Graduate Teaching Assistant Recitations, course, and assignment design for an introductory probability course in computer science.	<i>Eli Upfal @ Brown University</i>	Fall 2018
Graduate Teaching Assistant	<i>Eli Upfal & Dan Potter @ Brown University</i>	Spring 2018

Lecturing, course, and assignment design in machine learning, statistical inference, and data science.

Graduate Teaching Assistant *Sorin Istrail @ Brown University* Fall 2016

Office Hours, lecture notes, assignment creation, and grading for introductory computational biology.

Undergraduate Teaching Assistant *Greg Aloupis @ Tufts University* 2013-2015

Grading and office hours for algorithms and computational geometry courses.

Undergraduate Teaching Assistant *Donna Slonim @ Tufts University* 2013-2015

Lab administration, assignment creation, project development, and office hours for comp. bio. courses.

Mentorship Experience

Undergraduate, Master's, and Pre-Graduate Students *Brown University* 2017-Present

Mentorship and guided and original research projects with undergraduate and master's students in computer science, economics, and applied mathematics. Notable mentorship projects include one undergraduate and one master's thesis, both mentees now pursuing Ph.Ds.

Graduate Student Mentor *Brown CS Ph.D. Mentorship Program* 2019-2020

Mentorship of first-year Brown University CS Ph.D. students.

Academic Service

Coörganizer and Discussion Leader 2020-2021

Coörganizer, speaker, and discussion leader in Brown University's interdisciplinary *Data Science for Social Good* reading group, led by Doctor Shahrzad Haddadan.

Academic Conference Program Committee Member

AutoML 2018, UAI 2019.

Academic Conference Reviewer

ICML 2019, NeurIPS 2019&2021, AISTats 2021.

Academic Conference Sub-Reviewer

CIKM 2019, Latin 2020, TheWebConf 2021, SODA 2022.

Pre-Release Textbook Feedback and Review

Previewed and provided feedback on early drafts of Norman Ramsey's *Programming Languages: Build, Prove, and Compare* (full text), and Eli Upfal's *Probability and Computing: Randomization and Probabilistic Techniques in Algorithms and Data Analysis*, second edition (Chapter 14).

Industry Experience

Research Intern *Two Sigma Investments* Summer 2018-19

Academic research projects with relevance to the statistical and machine-learning work performed within the company. As part of my work, I discussed methods and applications with relevant experts in the company, learning how statistical methods are applied in real-world economics, finance, and actuarial analysis problems.

Software Developer Intern *Microsoft Corporation* Summer 2014

Software for personally identifiable information filtration, summary statistic generation, visualization, and characterization of petabyte-scale cloud log streams with proprietary distributed computing technology.

Test Engineer Intern *Microsoft Corporation* Summer 2013

Development of client-server cloud-scale web service to schedule test-execution and virtual machine allocation.

Embedded Systems Test Engineer Intern *BBN Technologies* Summer 2012

Design, creation, and maintenance of a regression test suite for distributed embedded sensor and signal-processing systems. Investigation, documentation, and extermination of various software and hardware bugs.

Honors and Awards

NeurIPS Outstanding Reviewer Award	2021
Award given to the top 8% of reviewers, based on area chair and author feedback.	
Dean's Faculty Fellowship (Brown University)	2021
Teaching and research fellowship, with one year appointment as a visiting assistant professor.	
Joukowsky Outstanding Dissertation Prize (Brown University)	2021
Doctoral dissertation, <i>Bounds and Applications of Concentration of Measure in Fair Machine Learning and Data Science</i> , won the 2021 Joukowsky prize in the physical sciences.	
Senior Thesis, with Highest Honors (Tufts University)	2015
Highest honors for undergraduate thesis on anomaly detection in biological systems.	
Computer Science Exchange Officer (Tufts University)	2012-2015
Officer of Tufts University's only student-run computer science interest group.	
Dean's List (Tufts University)	2011-2015
Dean's list, all full-time undergraduate semesters.	
COMAP Mathematical Contest in Modeling (Honorable Mention)	2014
Paper, computer model, and simplified Poisson model of highway lane usage.	
COMAP Mathematical Contest in Modeling (Successful Participant)	2013
Simulation and paper on modeling heat transfer in the confection baking process.	
National Honor Society	2011

Conference and Journal Publications

1. Cousins, C. *An Axiomatic Theory of Provably-Fair Welfare-Centric Machine Learning* in *Advances in Neural Information Processing Systems* (2021).
2. Haddadan*, S., Zhuang*, Y., Cousins*, C. & Upfal, E. *Fast Doubly-Adaptive MCMC to Estimate the Gibbs Partition Function with Weak Mixing Time Bounds* in *Advances in Neural Information Processing Systems* (2021).
3. Cousins, C., Riondato, M. & Wohlgemuth, C. *BAVARIAN: Betweenness Centrality Approximation with Variance-Aware Rademacher Averages* in *Proceedings of the 27th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining* (2021).
4. Mazzetto*, A., Cousins*, C., Sam, D., Bach, S. H. & Upfal, E. *Adversarial Multiclass Learning under Weak Supervision with Performance Guarantees* in *International Conference on Machine Learning* (2021), 7534–7543.
5. Cousins, C. & Riondato, M. *Sharp uniform convergence bounds through empirical centralization* in *Advances in Neural Information Processing Systems* (2020).
6. Pellegrina, L., Cousins, C., Vandin, F. & Riondato, M. *MCRapper: Monte-Carlo Rademacher Averages for POSET Families and Approximate Pattern Mining* in *Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining* (2020), 2165–2174.
7. Viqueira, E. A., Cousins, C. & Greenwald, A. *Improved Algorithms for Learning Equilibria in Simulation-Based Games* in *Proceedings of the 19th International Conference on Autonomous Agents and MultiAgent Systems* (2020), 79–87.
8. Viqueira, E. A., Cousins, C., Mohammad, Y. & Greenwald, A. *Empirical mechanism design: Designing mechanisms from data* in *Uncertainty in Artificial Intelligence* (2020), 1094–1104.
9. Cousins, C. & Riondato, M. CaDET: interpretable parametric conditional density estimation with decision trees and forests. *Machine Learning* **108**, 1613–1634 (2019).
10. Viqueira, E. A., Cousins, C. & Greenwald, A. *Learning Simulation-Based Games from Data* in *18th International Conference on Autonomous Agents and MultiAgent Systems* (2019).
11. Cousins, C. & Upfal, E. *The k-Nearest Representatives Classifier: A Distance-Based Classifier with Strong Generalization Bounds* in *4th International Conference on Data Science and Advanced Analytics* (2017).

