Cyrus Cousins

Curriculum Vitae: 2021

PERSONAL DETAILS

Birth: December 31, 1992
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Code: https://www.github.com/cyruscousins/

EDUCATION

Doctorate of Philosophy: Brown University 2015-2021
Ph.D. in Computer Science.

Master's: Brown University 2015-2017
Master of Science in Computer Science.

Baccalaureate: Tufts University 2011-2015
B.S. in Computer Science, Mathematics, and Biology.

RESEARCH EXPERIENCE

Research Intern *Dr. Larry Rudolph (Two Sigma Labs)* Summer 2019
Research in game-theoretic multi-agent neural reinforcement learning.

Research Intern *Dr. Matteo Riondato (Two Sigma Labs)* Summer 2018
Research in statistical significance and statistical modeling techniques.

Research Assistant *Professor Eli Upfal (BIGDATA group @ Brown University)* 2016-Present
Research in machine learning, with a focus on statistical significance and Rademacher complexity.

Research Assistant *Professor Donna Slonim (BCB group @ Tufts University)* 2014-2017
Algorithms for anomaly detection in high-dimensional small-sample biological systems.

Research Assistant *Prof. Benjamin Raphael (Raphael Lab @ Brown University)* 2015-2016
Working with single-cell sequencing data and phylogeny reconstruction with cancer data.

Research Assistant *Professors Norman Ramsey and Mitchell Wand (PPAML)* Summer 2015
Design and implementation of inference systems and MCMCsampling algorithms for general-purpose probabilistic programming, with the DARPA *Probabilistic Programming for Advanced Machine Learning* initiative.

TEACHING EXPERIENCE

Graduate Teaching Assistant *Eli Upfal @ Brown University* Spring 2020
Assignments, grading, and lecturing for a graduate-level CS course in probabilistic methods.

Graduate Teaching Assistant *Eli Upfal @ Brown University* Fall 2018
Recitations, course, and assignment design for an introductory probability course in computer science.

Graduate Teaching Assistant *Eli Upfal & Dan Potter @ Brown University* 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.

Teaching Assistant *Greg Aloupis @ Tufts University* 2013-2015
Grading and office hours for algorithms and computational geometry courses.

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 masters students in CS, economics, and applied mathematics. Notable mentorship projects include one undergraduate and one masters 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

Academic Conference Sub-Reviewer

CIKM 2019, Latin 2020, TheWebConf 2021

Academic Conference Reviewer

ICML 2019, NeurIPS 2019

Academic Conference Program Comittee Member

AutoML 2018, UAI 2019

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).

Discussion Leader 2020-2021

Frequent speaker and discussion leader in the Brown University interdisciplinary Data Science for Social Good reading group, organized by Dr. Shahrzad Haddadan.

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

Brown University Dean's Faculty Fellowship 2021

Teaching and research fellowship, with one year appointment as a visiting assistant professor.

Joukowsky Outstanding Dissertation Prize 2021

Doctoral dissertation, *Bounds and Applications of Concentration of Measure in Fair Machine Learning and Data Science*, won the 2021 Joukowski prize for the physical sciences.

Senior Thesis (Tufts University) with Highest Honors 2015
Highest honors for undergraduate thesis on anomaly detection in biological systems.

Computer Science Exchange Officer 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 during cooking of baked confections.

National Honor Society 2011

CONFERENCE AND JOURNAL PUBLICATIONS

1. Cyrus Cousins and Matteo Riondato. "Sharp uniform convergence bounds through empirical centralization". In: *Advances in Neural Information Processing Systems*. 2020
2. Leonardo Pellegrina, Cyrus Cousins, Fabio Vandin, and Matteo Riondato. "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, pp. 2165–2174
3. Enrique Areyan Viqueira, Cyrus Cousins, and Amy Greenwald. "Improved Algorithms for Learning Equilibria in Simulation-Based Games". In: *Proceedings of the 19th International Conference on Autonomous Agents and MultiAgent Systems*. 2020, pp. 79–87
4. Enrique Areyan Viqueira, Cyrus Cousins, Yasser Mohammad, and Amy Greenwald. "Empirical mechanism design: Designing mechanisms from data". In: *Uncertainty in Artificial Intelligence*. PMLR. 2020, pp. 1094–1104
5. Cyrus Cousins and Matteo Riondato. "CaDET: interpretable parametric conditional density estimation with decision trees and forests". In: *Machine Learning* 108.8-9 (2019), pp. 1613–1634
6. Enrique Areyan Viqueira, Cyrus Cousins, and Amy Greenwald. "Learning Simulation-Based Games from Data". In: *Proceedings of the 18th International Conference on Autonomous Agents and MultiAgent Systems*. 2019
7. Cyrus Cousins and Eli Upfal. "The k-Nearest Representatives Classifier: A Distance-Based Classifier with Strong Generalization Bounds". In: *2017 IEEE International Conference on Data Science and Advanced Analytics (DSAA)*. IEEE. 2017, pp. 1–10

WORKSHOP PAPERS, NOTABLE PREPRINTS, & EXTENDED ABSTRACTS

1. Cyrus Cousins. "An Axiomatic Theory of Provably-Fair Welfare-Centric Machine Learning". In: *arXiv preprint arXiv:2104.14504* (2021)
2. Enrique Areyan Viqueira, Cyrus Cousins, and Amy Greenwald. "Learning Competitive Equilibria in Noisy Combinatorial Markets". In: *Proceedings of the 20th International Conference on Autonomous Agents and MultiAgent Systems*. 2021
3. Cyrus Cousins, Shahrzad Haddadan, and Eli Upfal. "Making mean-estimation more efficient using an MCMC trace variance approach: DynaMITE". In: *arXiv preprint arXiv:2011.11129* (2020)

4. Carsten Binnig, Benedetto Buratti, Yeounoh Chung, Cyrus Cousins, Tim Kraska, Zeyuan Shang, Eli Upfal, Robert Zeleznik, and Emanuel Zgraggen. "Towards interactive curation & automatic tuning of ML pipelines". In: *Proceedings of the Second Workshop on Data Management for End-To-End Machine Learning*. 2018, pp. 1–4
5. Clayton Sanford, Cyrus Cousins, and Eli Upfal. "Uniform Convergence Bounds for Codec Selection". In: *arXiv preprint arXiv:1812.07568* (2018)
6. Cyrus Cousins, Chirstopher M Pietras, and Donna K Slonim. "Scalable FRaC Variants: Anomaly Detection for Precision Medicine". In: *2017 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*. IEEE. 2017, pp. 253–262

SKILLS

Natural Languages	*Native*: English, *Proficient*: Spanish, *Basic*: French, Hindi, Japanese.
Programming Languages	**Fluent:** C, C++, Python, C#, Java, Haskell, MetaLanguage. **Familiar:** R, Matlab, Racket, Prolog, Go, F#, SQL, GLSL.
Miscellaneous Artistry	Music performance and composition, various forms of dance and pageantry, digital animation, technical 3D modeling and printing.