

Ben Chugg

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Research Interests

- Sequential analysis and anytime-valid inference (game-theoretic statistics, supermartingales, e-values, hypothesis testing)
- Concentration of random processes
- Applications to algorithm and experimental design (online learning, learning theory)

Education

2022–	Ph.D. in Machine Learning and Statistics, Carnegie Mellon University Advisor: Aaditya Ramdas.
2022-24	MS in Machine Learning, Carnegie Mellon University
2018–19	M.Sc. in Mathematics (MFoCS), University of Oxford Advisor: Renaud Lambiotte. Distinction. Thesis: The Graph-Simplex Correspondence and its Algorithmic Foundations.
2014–18	B.Sc. in Mathematics and Computer Science. University of British Columbia Thesis advisor: William Evans. Combined Honours with Distinction. Thesis: A Model for Computing in Dynamic, Resource-Limited Environments.

Selected Experience

Sum' 2024	Research Intern, Centrum Wiskunde & Informatica (CWI)	Amsterdam, Netherlands
2021–2022	Lead Research Analyst, RegLab, Stanford Law School	Stanford, USA
2019–2021	Research Fellow, RegLab, Stanford Law School	Stanford, USA
Sum' 2018	Research Intern, RIKEN Center for Advanced Intelligence Project	Tokyo, Japan
Fall' 2018	Visiting Researcher, AUB Center for Advanced Mathematical Sciences	Beirut, Lebanon
2016–2017	NSERC Research Assistant, UBC Algorithms Lab	Vancouver, Canada

Selected Awards

2022-2024	NSERC Postgraduate Scholarship–Doctoral (PGS D)
2022-2024	NSERC Graduate Scholarship–Doctoral (CGS D) (Declined)
2018	Mona Leith Memorial Scholarship
2018	Percy Walter Perris Scholarship
2018	Undergraduate Teaching Assistant Award (Computer Science)
2017	Shirley Snelgrove and John Yule Scholarship
2017	NSERC USRA for research in stochastic reaction networks
2016	NSERC USRA for research in graph theory
2014-2018	University of British Columbia Dean's list
2014	University of British Columbia Chancellor Scholar

Publications

Journal Papers

- (j.5) Ben Chugg, Hongjian Wang, Aaditya Ramdas. A unified recipe for (time-uniform) PAC-Bayes bounds. *Journal of Machine Learning Research*, 2023.
- (j.4) Caleb Robinson, Ben Chugg, Brandon Anderson, Juan M. Lavista Ferres, Daniel E. Ho. Mapping Industrial Poultry Operations at Scale with Deep Learning and Aerial Imagery. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*. 2022.
- (j.3) Ben Chugg*, Brandon Anderson*, Seiji Eicher, Sandy Lee, Daniel E. Ho. Enhancing Environmental Enforcement with Near Real-Time Monitoring: Likelihood-Based Detection of Structural Expansion of Intensive Livestock Farms. *Journal of Applied Earth Observation and Geoinformation*. 2021
- (j.2) Ben Chugg*, Lisa Lu*, Derek Ouyang*, Benjamin Anderson, Raymond Ha, Alexis D’Agostino, Anandi Sujeer, Sarah L. Rudman, Analilia Garcia, Daniel E. Ho. Evaluation of Allocation Schemes of COVID-19 Testing Resources in a Community-Based Door-to-Door Testing Program. *Journals of the American Medical Association, Health Forum*. 2021.
- (j.1) Ben Chugg, William Evans, Kelvin Wong. Simultaneous Visibility Representations of Undirected Pairs of Graphs. *Journal of Computational Geometry*. 2021.

Conference Proceedings

N.B. Full-length, peer-reviewed conference papers are the norm in CS/ML. Workshop papers are omitted

- (c.9) Ben Chugg, Santiago Cortes-Gomez, Bryan Wilder, Aaditya Ramdas. Auditing Fairness by Betting. *Neural Information Processing Systems*. 2023. **Spotlight**
- (c.8) Ben Chugg, Peter Henderson, Jacob Goldin, Daniel E. Ho. Entropy Regularization for Population Estimation. *AAAI Conference on Artificial Intelligence*. 2023. **Oral**
- (c.7) Peter Henderson, Ben Chugg, Brandon Anderson, Kristen Altenburger, Alex Turk, John Guyton, Jacob Goldin, Daniel E. Ho. Integrating Reward Maximization and Population Estimation: Sequential Decision-Making for Internal Revenue Service Audit Selection. *AAAI Conference on Artificial Intelligence*. 2023. **Oral**
- (c.6) Ben Chugg*, Nicolas Rothbacher*, Alex Feng, Xiaoqi Long, Daniel E. Ho. Detecting Environmental Violations with Satellite Imagery in Near Real Time: Land Application Under the Clean Water Act. *Conference on Information and Knowledge Management*. 2022.
- (c.5) Peter Henderson*, Ben Chugg*, Brandon Anderson, Daniel E. Ho. Beyond Ads: Sequential Decision-Making Algorithms in Law and Public Policy. *ACM Symposium on Computer Science and Law*. 2022.
- (c.4) Hooman Hashemi, Ben Chugg, Anne Condon. Composable Computation in Leaderless, Discrete Chemical Reaction Networks. *International Conference on DNA Computing and Molecular Programming*. 2020. **Journal invite**
- (c.3) Ben Chugg, William Evans, Kelvin Wong. Simultaneous Visibility Representations of Undirected Pairs of Graphs. *Canadian Conference on Computational Geometry*. 2020. **Journal invite**
- (c.2) Ben Chugg, Takanori Maehara. Submodular Stochastic Probing with Prices. *International Conference on Control, Decision, and Information Technologies*. 2019.

- (c.1) Ben Chugg, Anne Condon, Hooman Hashemi. Output-Oblivious Stochastic Chemical Reaction Networks. *International Conference on Principles of Distributed Systems*. 2018.

Preprints & Working Papers

- (p.1) Ben Chugg, Hongjian Wang, Aaditya Ramdas. Time-uniform confidence spheres for means of random vectors. 2023.

Teaching

Teaching Assistant

- 2024 10-800: Game-theoretic probability, statistics and learning, CMU
 2017, 2018 CPSC 420/500: Advanced algorithm design and analysis, UBC
 2017 CPSC 320: Intermediate algorithm design and analysis, UBC
 2017 CPSC 221: Basic algorithms and data structures, UBC

Talks

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| 2023 | Entropy Regularization for Population Estimation. | AAAI |
| 2021 | Batched Bandits for Public Health | NeurIPS ML4PH |
| | Artificial Intelligence for Clean Water | Sci-Pol Conf |
| 2020 | Composable Computation in Leaderless, Discrete CRNs. | DNA |
| | Simultaneous Visibility Representations of Undirected Pairs of Graphs. | CCCG |
| 2019 | The Graph-Simplex Correspondence. | Oxford Maths Inst. |
| | Submodular Stochastic Probing with Prices. | CODIT |
| | Output-Oblivious Stochastic Chemical Reaction Networks. | OxCSC |
| 2018 | Output-Oblivious Stochastic Chemical Reaction Networks. | OPODIS |
| 2017 | Unconstrained Submodular Maximization in MapReduce. | CUCSC |

Reviewing

Electronic Journal of Statistics (2023-)

Other

- Tools* \LaTeX , Python, PyTorch, TensorFlow 2, GCP, Azure, Bash, GEE, Matlab, R, C++, Java
Citizenship Canadian
Linguistics Fluent in English (Native) and French. Awarded the DELF (Diplôme d'études en langue française) certificate in 2012.
Misc. Better with a hacky-sack than you'd think.