

Ben Chugg

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Research Interests

The theory of sequential analysis (anytime-valid inference, game-theoretic statistics, martingales & e-processes) and its applications to algorithm design (statistical learning theory, online learning, bandits).

Education

- 2022– Ph.D. in Machine Learning, Carnegie Mellon University
Advisor: Aaditya Ramdas
- 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

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| 2021–2022 | Lead Research Analyst, RegLab, Stanford Law School | Stanford, USA |
| 2019–2021 | Research Fellow, RegLab, Stanford Law School | Stanford, USA |
| 2018 | Research Intern, RIKEN Center for Advanced Intelligence Project | Tokyo, Japan |
| 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

Refereed Conference Proceedings

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

- (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. *26th 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. *6th International Conference on Control, Decision, and Information Technologies*. 2019.
- (c.1) Ben Chugg, Anne Condon, Hooman Hashemi. Output-Oblivious Stochastic Chemical Reaction Networks. *22nd International Conference on Principles of Distributed Systems*. 2018.

Refereed Journal Papers

- (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.

Workshops & Preprints

Preprints

- (p.1) Ben Chugg, Hongjian Wang, Aaditya Ramdas. A unified recipe for (time-uniform) PAC-Bayes bounds. 2023.

Workshop Papers

N.B. Workshops in CS/ML are peer-reviewed but have much higher acceptance rates than conferences

- (w.3) 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. *ICML Workshop on Adaptive Experimental Design in the Real World*. 2022. **Spotlight**
- (w.2) Ben Chugg, Daniel E. Ho. Reconciling Risk Reduction and Prevalence Estimation in Public Health Using Batched Bandits. *NeurIPS Workshop on Machine Learning in Public Health*. 2021. **Oral**
- (w.1) Peter Henderson*, Ben Chugg*, Brandon Anderson, Daniel E. Ho. Beyond Ads: Sequential Decision-Making Algorithms in Public Policy. *NeurIPS Workshop on Causal Inference Challenges in Sequential Decision Making: Bridging Theory and Practice*. 2021.

Teaching

Teaching Assistant

- 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

- 2023 **Entropy Regularization for Population Estimation**. AAAI 2023, DC, USA.
- 2021 **Reconciling Risk Reduction and Prevalence Estimation in Public Health Using Batched Bandits**. Machine Learning in Public Health, NeurIPS. Online.
- Artificial Intelligence for Clean Water**. Science-Policy Confluence Conference, Online.
- 2020 **Composable Computation in Leaderless, Discrete CRNs**. DNA 26, Online.
- Simultaneous Visibility Representations of Undirected Pairs of Graphs**. CCCG, Online.
- 2019 **The Graph-Simplex Correspondence**. Mathematical Institute, Oxford, UK
- Submodular Stochastic Probing with Prices**. CODIT, Paris, France.
- Output-Oblivious Stochastic Chemical Reaction Networks**. OxCSC, Oxford, UK.
- 2018 **Output-Oblivious Stochastic Chemical Reaction Networks**. OPODIS, Hong Kong, China.
- 2017 **Unconstrained Submodular Maximization in MapReduce**. CUCSC, Toronto, Canada.

Reviewing

Electronic Journal of Statistics (2023-)

Other

<i>Tools</i>	L ^A T _E X, Python, PyTorch, TensorFlow 2, GCP, Azure, Bash, GEE, Matlab, R, C++, Java
<i>Citizenship</i>	Canadian
<i>Linguistics</i>	Fluent in English (Native) and French. Awarded the DELF (Diplôme d'études en langue française) certificate in 2012.
<i>Misc.</i>	Better with a hacky-sack than you'd think.