

CHRISTOPHER HARSHAW

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<https://www.chrisharshaw.com/>

EDUCATION

Yale University

August 2016 - December 2021

Ph.D. in Computer Science

Dissertation: Algorithmic Advances for the Design and Analysis of Randomized Experiments

Advisors: Daniel Spielman, Amin Karbasi

Rice University

August 2012 - May 2016

B.S. in Electrical and Computer Engineering

B.A. in Computational and Applied Mathematics

ACADEMIC APPOINTMENTS

UC Berkeley and MIT (joint)

Summer 2022 - Summer 2024

Postdoctoral Fellow, Foundations of Data Science (FODSI)

Berkeley, CA and Boston, MA

UC Berkeley, Simons Institute for Theory of Computing

Spring 2022

Postdoctoral Fellow, Causality Program

Berkeley, CA

PUBLICATIONS

Preprints and Working Papers

- *A Design-Based Riesz Representation Framework for Randomized Experiments*
Christopher Harshaw, Yitan Wang, and Fredrik Sävje.
arXiv 2210.08698. 2022.
Best Paper Award at NeurIPS 2022 causal inference workshop, CML4Impact.
- *Optimized Variance Estimation Under Interference and Complex Experimental Designs*
Christopher Harshaw, Joel Middleton, and Fredrik Sävje.
arXiv 2112.01709. 2021.

Academic Publications

- *Balancing Covariates in Randomized Experiments with the Gram-Schmidt Walk Design*
Christopher Harshaw, Fredrik Sävje, Daniel Spielman, and Peng Zhang.
Journal of the American Statistical Association (JASA). 2023.
- *Clip-OGD: An Experimental Design for Adaptive Neyman Allocation in Sequential Experiments*
Jessica Dai, Paula Gradu, and Christopher Harshaw.
NeurIPS 2023. Spotlight Presentation.
- *Design and Analysis of Bipartite Experiments Under a Linear Exposure-Response Model*
Christopher Harshaw, Fredrik Sävje, David Esienstat, Vahab Mirrokni, and Jean Pouget-Abadie.
Electronic Journal of Statistics. 2023.
- *How Do You Want Your Greedy: Simultaneous or Repeated?*
Moran Feldman, Christopher Harshaw, and Amin Karbasi.
Journal of Machine Learning Research. 2023.
- *Algorithmic Advances for the Design and Analysis of Randomized Experiments*
Christopher Harshaw
PhD Dissertation. December 2021.

- *The Power of Subsampling in Submodular Maximization*
Christopher Harshaw, Ehsan Kazemi, Moran Feldman, and Amin Karbasi.
Mathematics of Operations Research. 2021.
- *Submodular Maximization Beyond Non-negativity: Guarantees, Fast Algorithms, and Applications*
Christopher Harshaw, Moran Feldman, Justin Ward, and Amin Karbasi.
ICML 2019.
- *Projection-Free Online Optimization with Stochastic Gradient: From Convexity to Submodularity*
Lin Chen, Christopher Harshaw, Hamed Hassani, and Amin Karbasi.
ICML 2018.
- *Greed is Good: Near-Optimal Submodular Maximization via Greedy Optimization*
Moran Feldman, Christopher Harshaw, and Amin Karbasi.
COLT 2017.
- *Graph Prints: Towards a Graph Analytic Method for Network Anomaly Detection*
Christopher Harshaw, Robert A. Bridges, Michael D. Iannacone, Joel W. Reed, John R. Goodall.
CISRC 2016.
Best Paper Award.

INVITED TALKS

Clip-OGD: An Experimental Design for Adaptive Neyman Allocation in Sequential Experiments

- Fall 2023, MIT, Algorithms and Complexity Seminar
- Fall 2023, Stanford, Online Causal Inference Seminar
- Fall 2023, University of Washington, Statistics Seminar
- Fall 2023, Yale, Statistics and Data Science Seminar
- Summer 2023, TTIC, TRIPODS Postdoc Workshop

A Design-Based Framework for Randomized Experiments with Riesz Estimation

- Fall 2023, Stanford, Econometrics Seminar
- Spring 2023, Simons Institute, Causality Reunion
- Spring 2023, Stanford, RAIN Seminar
- Spring 2023, Columbia, Causal Inference Seminar (Mailman School of Public Health)
- Spring 2023, Yale, Human Nature Lab
- Spring 2023, UC Berkeley, Methods Workshop (Political Science Department)

Balancing Covariates in Randomized Experiments with the Gram–Schmidt Walk Design

- Spring 2022, Simons Institute, Causality Program
- Fall 2020, ETH Zurich, Computer Science Theory Group

Optimized Variance Estimation Under Interference and Complex Designs

- Spring 2022, UC Berkeley, Causal Inference Group

Interference in Randomized Experiments: Survey and Challenges

- Summer 2022, INRIA, Social Data Team

AWARDS

2018 Theres and Dennis M. Rohan Fellowship Fund
2016 NSF Graduate Research Fellowship
2016 Excellence in Capstone Engineering Design
2015 Chevron Scholarship, awarded by Rice CAAM Department
2014 Chevron Scholarship, awarded by Rice ECE Department
2012 Rice University Trustee Distinguished Scholarship

TEACHING EXPERIENCE

6.S896, <i>Algorithmic Statistics</i> , Guest Lecturer, MIT	Fall 2023
Directed Reading Program, <i>Algorithmic Discrepancy Theory</i> , Yale Math Department	Fall 2020
Directed Reading Program, <i>Submodular Optimization</i> , Yale Math Department	Fall 2019
CPSC 561, <i>Spectral Graph Theory</i> , Teaching Assistant, Yale University	Fall 2018
CPSC 366, <i>Intensive Algorithms</i> , Teaching Assistant, Yale University	Spring 2018
CBB 555, <i>Machine Learning for Biology</i> , Teaching Assistant, Yale University	Fall 2017
ELEC 301 <i>Introduction to Signals and Systems</i> , Rice University	Fall 2015
ELEC 241 <i>Fundamentals of Electrical Engineering I</i> , Rice University	Fall 2014

OPEN SOURCE SOFTWARE

GSWDesign.jl: A Julia package containing fast implementation to sample from the Gram–Schmidt Walk Design. Features an accompanying R package. <https://github.com/crharshaw/GSWDesign.jl>.

SubmodularGreedy.jl: A Julia package containing fast implementations of greedy-based methods for constrained submodular optimization. <https://github.com/crharshaw/SubmodularGreedy.jl>.

SERVICE

Academic Organizing

2023 Joint Statistical Meetings, Invited Program “New Directions in Causal Inference”
2023 INFORMS, Invited Session “Algorithm Design for Causal Inference”

Reviewing

Conference Reviewer: NeurIPS (2023-2019), ICML (2023-2019), UAI (2023-2022), AISTATS (2021-2019) AAAI (2021-2020) ICLR 2021, SODA 2020, ESA 2021, WAOA 2020.

Journal Reviewer: Annals of Statistics, Journal of American Statistical Association, Journal of Causal Inference, Journal of Computational and Graphical Statistics

Campus Involvement

Head Graduate Affiliate at Silliman College, Yale University	Fall 2017 - Spring 2021
President, Stuttering at Yale (SAY)	Fall 2020 - Fall 2021

WORK EXPERIENCE

Google Research*Student Researcher*

Summer 2020 - Fall 2021

New York City, NY

- Developed new estimators and experimental designs for bipartite experiments. Hosted by Jean Pouget-Abadie in the Omega Group.

Nokia Bell Laboratories*Summer Intern*

Summer 2017

Holmdel, NJ

- Studied graph-based active learning algorithms. Hosted by Dan Kushnir.

OpenDNS (now Cisco)*Research Intern*

Summer 2016

San Francisco, CA

- Used clustering and other graph analysis techniques to reveal previously unidentified malicious activity and identified known trends. Hosted by Dhia Mahjoub in the Cyber Security Research Group.

Oak Ridge National Laboratory*DHS-Stem Intern*

Summer 2015

Knoxville, TN

- Developed and implemented a contextual, model-free, multi-scale anomaly detection method for evolving network data. Hosted by Robert Bridges in the Cyber and Information Research Sciences Group.