Madison Coots

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EDUCATION

Harvard Kennedy School of Government — Cambridge, MA
Doctor of Philosophy - Public Policy — *August 2022 - Present*
Track: *Judgment and Decision Making*

Stanford University — Stanford, CA
Master of Science - Computer Science — *September 2019 - June 2021*
Specialization: *Artificial Intelligence*

Stanford University — Stanford, CA
Bachelor of Science - Management Science and Engineering — *September 2015 - June 2019*
Minor: *English*

PROFESSIONAL EXPERIENCE

Systems & Technology Research — Woburn, MA
Senior Data Scientist (Part-time) — *February 2023 - Present*

Stanford Computational Policy Lab — Stanford, CA
Data Scientist — *September 2020 - August 2022*

- Coordinating development efforts for an application aimed at helping individuals faced with criminal charges appear in court. Facilitating communication between the lab and external stakeholders involved in the initiative, including those from nonprofits and government agencies. Separately, helping to coordinate the lab's search for new partnerships with external agencies and writing project proposals for new opportunities for collaboration.

Aerospace Technical Services — Remote
Senior Data Scientist (Part-time) — *September 2020 - Present*

- Refining the risk management and mitigation practices employed by California investor-owned public utilities. Work involves analyzing component failure and maintenance data, engaging with the client to understand the motivations for their current methods and using this information to enhance their risk management practices with appropriate application of methods from probabilistic risk analysis. Helped teach a foundational course in decision and risk analysis for employees of a utility company.

U.S. Federal Government — Washington D.C.
Data Science Fellow — *June 2017 - January 2021*

- Engaged in a variety of data science initiatives across the organization. Developed and released a complete Python package to enable data scientists to more quickly, and intuitively conduct network analyses and generate clear and informative visualizations. Served as lead data scientist in developing a system to analyze and reveal new mission targets, allowing stakeholders to better direct future data collections. Designed customized object-oriented model for grouping and structuring data records, allowing for the exploitation of unseen connections between entities of interest.

PUBLICATIONS

- **Reevaluating the Role of Race and Ethnicity in Estimating Disease Risk**: **Madison Coots**, Soroush Saghafian, David Kent, and Sharad Goel. *Working paper.* 2024.

- **Automated Court Date Reminders Reduce Warrants for Arrest: Evidence from a Text Messaging Experiment**: Alex Chohlas-Wood, **Madison Coots**, Joe Nudell, Julian Nyarko, Emma Brunskill, Todd Rogers, and Sharad Goel. *Working paper.* 2023.

- **Designing Equitable Algorithms**: Alex Chohlas-Wood, **Madison Coots**, Julian Nyarko, and Sharad Goel. *Nature Computational Science, Vol. 3.* 2023.

- **Constrained Multi-objective Optimization with Contextual Multi-Armed Bandits**: Henry Zhu, Alex Chohlas-Wood, **Madison Coots**, Sharad Goel, and Emma Brunskill. *Working paper.* 2022.

- **Learning to be Fair: A Consequentialist Approach to Equitable Decision-Making**: Alex Chohlas-Wood, **Madison Coots**, Henry Zhu, Sharad Goel, and Emma Brunskill. *Management Science (forthcoming).*

- **Generative Grading: Near Human-level Accuracy for Automated Feedback on Richly Structured Problems**: Ali Malik, Mike Wu, Vrinda Vasavada, Jinpeng Song, **Madison Coots**, John Mitchell, Noah Goodman, Chris Piech. *Proceedings of the 14th International Conference on Educational Data Mining, Paris, France.* 2021.

Conference Presentations and Invited Talks

- **International Conference on Computational Social Science:** Poster presentation on "Reevaluating the Role of Race and Ethnicity in Estimating Disease Risk." 2024.

- **Computational and Methodological Statistics Conference:** Oral presentation on "Reevaluating the Role of Race and Ethnicity in Estimating Disease Risk." 2023.

- **APPAM Conference:** Oral presentation on "Automated Court Date Reminders Reduce Warrants for Arrest: Evidence from a Text Messaging Experiment." 2023.

- **INFORMS General Meeting:** Oral presentation on "Reevaluating the Role of Race and Ethnicity in Diabetes Screening." 2023.

- **INFORMS Healthcare Conference:** Oral presentation on "Reevaluating the Role of Race and Ethnicity in Diabetes Screening." 2023.

- **ACM Conference on Equity and Access in Algorithms, Mechanisms, and Optimization:** Oral presentation, given jointly with Alex Chohlas-Wood. 2022.

- **American Causal Inference Conference:** Poster presentation. 2022.

- **Oxford University, Internet Institute Speaker Series:** Presentation on computational approaches to equitable decision-making, given jointly with Alex Chohlas-Wood. 2021.

Teaching

- **DPI 681M: The Science and Implications of Generative AI (Spring 2024); Teaching Fellow**: Designed and taught the technical compliment to the course on language models, deep learning models, and transformers.

- **MS&E 252: Foundations of Decision Analysis (Fall 2019); Course Assistant**: Graduate course in quantitative decision analysis covering: utility theory, decision framing, sensitivity analysis, value of information, assessing and using decision maker risk attitude. *Recognized by Stanford Center for Professional Development for excellence in teaching.*

- **MS&E 125: Applied Statistics (Winter 2020); Course Assistant**: Undergraduate course in applied statistics: exploring and summarizing data, methods for statistical inference, linear and logistic regression models.

- **Stanford Code in Place (Spring 2020); Section Leader**: Part of a teaching team for Code in Place, offered by Stanford during COVID-19 pandemic, with 10,000 global students and 900 volunteer teachers participating from around the world. Prepared and taught a weekly discussion section of 10-12 students to supplement professors' lectures in a 5-week introductory online Python programming course.

Honors and Awards

- James M. and Cathleen D. Stone PhD Scholar in Inequality and Wealth Concentration, Stone Program in Wealth Distribution, Inequality, and Social Policy, Harvard University - 2023-2024

- Harvard Graduate Prize Fellowship - 2022-2023

- Stanford Engineering Coterminal Fellowship - 2019-2020

- U.S. Government Graduate Scholar - 2019-2021

- U.S. Government Undergraduate Scholar - 2017-2019

Skills Summary

- **Languages**: Python, R, SQL, Julia, JavaScript, HTML, CSS
- **Skills**: Machine Learning, Stochastic Modeling, Linear Optimization, Probabilistic Analysis, Decision and Risk Analysis, Data Visualization, Web Development