

# Christine Herlihy

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## EDUCATION

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### University of Maryland, College Park

College Park, MD

Ph.D. in Computer Science

2019–present

- *Coursework*: Algorithms in ML: Guarantees and Analyses, Applied Mechanism Design, Computational Linguistics I & II, Common-sense Reasoning and Natural Language Understanding, Program Analysis
- *Advised by*: John Dickerson | *Research areas*: sequential and combinatorial decision-making under uncertainty (multi-armed bandits, RL); algorithmic fairness; graph-based knowledge representation/reasoning; healthcare.

### Georgia Institute of Technology

Atlanta, GA

M.S. in Computer Science | Concentration: Machine Learning

2017–2018

- *Coursework*: Machine Learning, Artificial Intelligence, Reinforcement Learning, ML for Trading, HPC, Big Data Analytics for Healthcare, Data Analytics using Deep Learning, Info. Security, Computability and Algorithms

### Georgetown University

Washington, DC

B.A. in Government; minor in Spanish

2007–2011

- *Coursework*: Political economy, institution/mechanism design, quantitative and qualitative methods, linguistics.
- Received academic honors during every semester of attendance; studied abroad in Santiago, Chile.

## EXPERIENCE

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### Google Research

Student Researcher, Responsible AI team

Remote

09/2022–present

- *Advised by*: Emmanuel Klu | causal modeling  $\cup$  algorithmic fairness in dynamic environments.

### Microsoft Research

Summer Researcher, FATE group

Remote

06/2022–09/2022

- *Advised by*: Miro Dudík and Alexandra Chouldechova | sample-efficient disaggregated model evaluation.

### Amazon Robotics

Summer Research Scientist

Remote

05/2021 - 08/2021

- *Advised by*: Victor Amelkin and Alex Barbosa | graph-based deep reinforcement learning algorithm development.

### Georgia Tech Research Institute

Atlanta, GA

Research Scientist II, High-Performance Computing & Data Analytics Branch

01/2017 - 08/2019

- Technical task lead and core contributor for a range of research projects and proposals, including: patient-level predictive modeling; computational phenotyping; application of unsupervised learning and NLP techniques on unstructured text to develop machine phenotypes and detect spatially/temporally co-occurring machine failures; development of models to predict geopolitical conflict and detect misinformation.

### Econometrica, Inc.

Research Associate II, Health Data Analytics

Bethesda, MD

08/2015 - 01/2017

- Patient and population-level predictive modeling; healthcare policy evaluation using Python, R, and Stata.
- Primary project was an impact evaluation contract that involved using various econometric methodologies, a genetic matching algorithm, and survey design schemes to detect changes in medical outcomes and unintended consequences associated with bundled payment and gainsharing mechanisms in health care systems.

### Frontier Strategy Group

Macroeconomic Research Analyst, Latin America

Washington, DC

08/2012 - 08/2014

- Conducted econometric research and built forecast models using Python and R to advise C-suite executives at over 200 multinationals on resource allocation and risk management in Latin America.

## TECHNICAL SKILLS

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- **Proficient:** Python, R, Julia, SQL,  $\text{\LaTeX}$  | **Familiar:** Java, C++, Scala, Spark, bash, Coq
- **Libraries & tools:** scikit-learn, pandas, NumPy, SciPy, OpenAI Gym, PyTorch, TensorFlow, spaCy/scispacy, nltk, gensim, textacy, AllenNLP, NetworkX, Deep Graph Library (DGL), Neo4j, ray, git, Gurobi, Postgres, Tableau
- **Languages:** English (Native), Spanish (Fluent), Portuguese (Intermediate), Farsi (Beginner)

## CONFERENCE PAPERS

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- [1] **C. Herlihy** and J. Dickerson, “Networked Restless Bandits with Positive Externalities”, in *AAAI Conference on Artificial Intelligence*, (to appear), 2023. [Online]. Available: <https://arxiv.org/abs/2212.05144>.
- [2] **C. Herlihy** and R. Rudinger, “MedNLI Is Not Immune: Natural Language Inference Artifacts in the Clinical Domain”, in *Proceedings of the 59th Annual Meeting of the Association for Computational Linguistics and the 11th International Joint Conference on Natural Language Processing (Volume 2: Short Papers)*, Online: Association for Computational Linguistics, Aug. 2021, pp. 1020–1027. [Online]. Available: <https://aclanthology.org/2021.acl-short.129>.
- [3] M. Halter, **C. Herlihy**, and J. P. Fairbanks, “A Compositional Framework for Scientific Model Augmentation”, in *Proceedings Applied Category Theory 2019, ACT 2019, University of Oxford, UK, 15-19 July 2019*, J. Baez and B. Coecke, Eds., ser. EPTCS, vol. 323, 2019, pp. 172–182. [Online]. Available: <https://doi.org/10.4204/EPTCS.323.12>.

## WORKSHOP PAPERS

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- [1] **C. Herlihy**, P. Goel, and J. Dickerson, *Networked Restless Bandits with Positive Externalities*, Disinformation Countermeasures and Machine Learning Workshop, ICML, 2022.
- [2] **C. Herlihy**, A. Prins, A. Srinivasan, and J. Dickerson, *Planning to Fairly Allocate: Probabilistic Fairness in the Restless Bandit Setting*, Responsible Decision Making in Dynamic Environments Workshop, ICML, 2022.
- [3] A. Prins, **C. Herlihy**, and J. Dickerson, *What Should I Grow Today so I Make Money Tomorrow? Supporting Small Farmers’ Crop Planning with Social, Environmental, and Market Data*, Practical ML for Developing Countries Workshop, ICLR, 2022.
- [4] **C. Herlihy**, S. Huang, M. Diep, N. Johnson, N. Sehgal, J. Dickerson, D. Jackson, and C. Baur, *An mHealth Intervention for African American and Hispanic Adults: Preliminary Field Test Results about User-reported Article Relevance*, Workshop on Machine Learning in Public Health, NeurIPS, 2021.

## PREPRINTS

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- [1] **C. Herlihy**, A. Prins, A. Srinivasan, and J. Dickerson, *Planning to Fairly Allocate: Probabilistic Fairness in the Restless Bandit Setting*, Under review, 2022. arXiv: 2106.07677 [cs.LG].

## ADDITIONAL PUBLICATIONS

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- [1] A. Moreland, **C. Herlihy**, M. Tynan, G. Sunshine, R. McCord, C. Hilton, J. Poovey, A. Werner, C. Jones, E. Fulmer, A. Gundlapalli, H. Strosnider, A. Potvien, M. García, S. Honeycutt, and G. Baldwin, “Timing of State and Territorial COVID-19 Stay-at-Home Orders and Changes in Population Movement - United States, March 1-May 31, 2020”, *Morbidity and Mortality Weekly Report*, vol. 69, no. 35, Sep. 2020.
- [2] D. Ruiz, D. Stout, and **C. Herlihy**, “Use of Genetic Matching in Program Evaluation: The Case of RAD”, *Cityscape*, vol. 19, no. 2, pp. 337–350, 2017, ISSN: 1936007X. [Online]. Available: <http://www.jstor.org/stable/26328344>.

## SELECT PROJECTS

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- **Constrained Resource Allocation in the Restless Bandit Setting** | UMD (Python, 2020-present)  
Developing algorithms to provide fairness guarantees and exploit spillover effects/structural relationships among arms.
- **A Compositional Approach to Representing and Manipulating Scientific Models** | GTRI (Julia, 2018-2019)  
Developed program analysis and category-theoretic techniques for epi model extraction and composition from text and code.
- **ClarityNLP: An open-source NLP framework for clinical phenotyping** | GTRI & Celgene (Python, 2018-2019)  
Developed supervised and unsupervised methods for clinical text mining, feature engineering, and cohort identification.
- **NLP Pipeline to Detect Cascading and Co-occurring Machine Failures** | GTRI (Python & Neo4j, 2018-2019)  
Statistical analysis and topic modeling of work order notes; constructed KG to identify spatial/temporal failure patterns.
- **Chest X-ray Disease Diagnosis with Deep Convolutional Neural Networks** | Georgia Tech (PyTorch, 2018)  
Used CNNs to detect and localize the 14 thoracic pathologies present in the NIH Chest X-ray dataset.

## TEACHING

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- **Co-Instructor** at Georgia Tech Professional Education  
*Machine Learning Short Course* 2018
- **Teaching Assistant** at Johns Hopkins University  
*Algorithms and Data Structures* 2017
- **Teaching Assistant** at University of Maryland, College Park  
*Political Theory; International Relations* 2014–2015
- **Volunteer Teacher** at Latino Student Fund  
*English as a Second Language (ESL) for Adult Learners* 2012–2014

## SERVICE

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- **Program Committee Member**, AI for Social Good workshop to be held at AAAI 2023 2022–pres.
- **Graduate Student Peer Mentor**, University of Maryland CS Department 2022–pres.
- **Co-organizer**, Pasteur's Quadrant AI for Social Good Seminar Series 2021–2022
- **Reviewer**, AMIA (2020); NeurIPS (2022) 2020–pres.
- **Student Advisory Board Member**, Iribe Initiative for Inclusion & Diversity in Computing 2019–2021

## PERSONAL INTERESTS

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- **Hiking & long-distance running**: I'm currently training to run my 3<sup>rd</sup> half-marathon in March 2023.
- **Learning languages**: Working on Farsi, American Sign Language (ASL), and Haskell.
- **Training my puppy**: Reward shaping for fun and ~~profit~~ *slightly* less chaos— every day is a new (mis)adventure.

## SCHOLARSHIPS AND AWARDS

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- **Grace Hopper Conference Scholarship Recipient** | University of Maryland, College Park 2021
- **Professional Research Experience Program (PREP) Researcher** | NIST 2019–2021
- **Dean's Fellowship (CS)** | University of Maryland, College Park 2019–2020
- **HIVE \$25K Research Grant Winner** | Georgia Tech Research Institute 2017
- **FIA-Deutsch \$25K Seed Grant Fellow** | University of Maryland, College Park 2014–2015
- **Dean's Fellowship (GVPT)** | University of Maryland, College Park 2014–2015
- **Merit-based scholarship recipient; academic honors** | Georgetown University 2007–2011
- **Gilman International Scholarship Recipient** | United States Department of State 2010