

Razieh Nabi, Ph.D.

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Research Interests

Causal Inference, Missing Data, Algorithmic Fairness, Semiparametric Statistics, Graphical Models, Machine Learning

Employment

Rollins Assistant Professor Jul 2021 – Present

Department of Biostatistics and Bioinformatics

Rollins School of Public Health

Emory University, Atlanta, GA, USA

Secondary appointment: Department of Computer Science, Emory College of Arts and Sciences

Research Intern Jun 2020 – Aug 2020

Information and Data Sciences Group

Microsoft Research (Virtual)

Research Assistant Sep 2016 – May 2021

Department of Computer Science

Johns Hopkins University, Baltimore, MD, USA

Research Intern Jun 2015 – Sep 2015

Center of Institutional Evaluation, Research and Planning

University of Texas at El Paso, TX, USA

Research Assistant Feb 2014 – Jan 2015

Istanbul Sehir University, Istanbul, Turkey

Education

Johns Hopkins University, Baltimore, MD, USA Sep 2016 – May 2021

Ph.D. in Computer Science

Advisor: Ilya Shpitser

Thesis: *Causal Inference Methods for Bias Correction in Data Analyses*

Harvard University, Boston, MA, USA Sep 2019 – Oct 2019

Visiting Scholar

Host: James Robins

Department of Epidemiology, School of Public Health

University of Texas, El Paso, Texas, USA Jan 2015 – Aug 2016

M.Sc. in Statistics

Advisor: Xiaogang Su

Thesis: *coxphMIC: R Package for Sparse Estimation of Cox Proportional Hazards Models*

Istanbul Sehir University, Istanbul, Turkey Sep 2013 – Jan 2015

M.Sc. in Electronics and Computer Engineering

Advisor: Ahmet Bulut

Thesis: *Conversion Rate Prediction in Search Engine Marketing*

Sharif University of Technology, Tehran, Iran Sep 2007 – Jul 2012

B.Sc. in Aerospace Engineering

Advisor: Afshin Banazadeh

Thesis: *Trajectory Planning for Multiple Unmanned Aerial Vehicles in Urban Environment*

Publications

(Star indicates equal contributions)

Anna Guo, Jiwei Zhao, and **Razieh Nabi**, “Sufficient Identification Conditions and Semiparametric Estimation under Missing Not at Random Mechanisms,” *Proceedings of the Conference on Uncertainty in Artificial Intelligence (UAI)*, AUAI Press, 2023.

Razieh Nabi and Rohit Bhattacharya, “On Testability and Goodness of Fit Tests in Missing Data Models,” *Proceedings of the Conference on Uncertainty in Artificial Intelligence (UAI)*, AUAI Press, 2023.

Rohit Bhattacharya and **Razieh Nabi**, “On Testability of the Front-Door Model via Verma Constraints,” *Proceedings of the Conference on Uncertainty in Artificial Intelligence (UAI)*, AUAI Press, 2022.

Razieh Nabi*, Rohit Bhattacharya*, and Ilya Shpitser, “Semiparametric Inference For Causal Effects In Graphical Models With Hidden Variables,” *Journal of Machine Learning Research (JMLR)* 23:1–76, 2022.

Razieh Nabi, Todd McNutt, and Ilya Shpitser, “Semiparametric Causal Sufficient Dimension Reduction of Multidimensional Treatments,” *Proceedings of the Conference on Uncertainty in Artificial Intelligence (UAI)*, AUAI Press, 2022.

Razieh Nabi, Daniel Malinsky, and Ilya Shpitser, “Optimal Training of Fair Predictive Models,” In *Proceedings of the 1st Conference on Causal Learning and Reasoning (CLearR)*, PMLR 140:1–24, 2022.

Razieh Nabi, Joel Pfeiffer, Denis Charles, and Emre Kıcıman, “Causal Inference In The Presence Of Interference In Sponsored Search Advertising,” *Frontiers in Big Data, special issue on Causal Inference and Machine Learning with Network Data*, 2022.

Yue Yu, Xuan Kan, Hejie Cui, Ran Xu, Yujia Zheng, Xiangchen Song, Yanqiao Zhu, Kun Zhang, **Razieh Nabi**, Ying Guo, Chao Zhang, Carl Yang, “Learning Task-Aware Effective Brain Connectivity for fMRI Analysis with Graph Neural Networks,” In *Proceedings of the IEEE International Conference on Big Data*, 2022.

Razieh Nabi*, Rohit Bhattacharya*, and Ilya Shpitser, “Full Law Identification In Graphical Models Of Missing Data: Completeness Results,” In *Proceedings of the Thirty Seventh International Conference on Machine Learning (ICML)*, PMLR 119: 7153–7163, 2020.

Razieh Nabi*, Rohit Bhattacharya*, Ilya Shpitser, and James Robins, “Identification In Missing Data Models Represented By Directed Acyclic Graphs,” In *Proceedings of the Thirty Fifth Conference on Uncertainty in Artificial Intelligence (UAI)*, AUAI Press, 2019.

Recipient of the **Tom Ten Have award** at Atlantic Causal Inference Conference (ACIC).

Razieh Nabi, Daniel Malinsky, and Ilya Shpitser, “Learning Optimal Fair Policies.” In *Proceedings of the Thirty Sixth International Conference on Machine Learning (ICML)*, PMLR 97: 4674–4682, 2019.

Razieh Nabi, Phyllis Kanki, and Ilya Shpitser, “Estimation of Personalized Effects Associated With Causal Pathways,” In *Proceedings of the Thirty Fourth Conference on Uncertainty in Artificial Intelligence (UAI)*, AUAI Press, 2018.

Razieh Nabi and Ilya Shpitser, “Fair Inference on Outcomes,” In *Proceedings of the Thirty Second Conference on Association for the Advancement of Artificial Intelligence (AAAI)*, AAAI Press, 2018.

Razieh Nabi and Xiaogang Su, “coxphMIC: An R Package for Sparse Estimation of Cox Proportional Hazards Models via Approximated Information Criteria,” *The R Journal*, 9(1): 229–238, 2017.

Razieh Nabi and Afshin Banazadeh, “3D Offline Path Planning for Surveillance Aerial Vehicles using B-splines,” *International Conference on Advanced Mechatronic Systems*, 2013.

Preprints

Anna Guo, David Benkeser, and **Razieh Nabi**, “Targeted Machine Learning for Average Causal Effect Estimation Using the Front-Door Functional,” arXiv:2312.10234.

Razieh Nabi, Rohit Bhattacharya, Ilya Shpitser, and James Robins, “Causal and Counterfactual Views of Missing Data Models,” arXiv: 2210.05558.

Daniel Scharfstein, **Razieh Nabi**, Edward Kennedy, Ming-Yueh Huang, Matteo Bonvini, and Marcela Smid, “Semiparametric Sensitivity Analysis: Unmeasured Confounding in Observational Studies,” arXiv: 2104.08300.

Ranjani Srinivasan, Rohit Bhattacharya, **Razieh Nabi**, Elizabeth Ogburn, and Ilya Shpitser, “Graphical Models of Entangled Missingness,” arXiv: 2304.01953.

Jaron JR Lee, Rohit Bhattacharya, **Razieh Nabi**, and Ilya Shpitser “Ananke: A Python Package For Causal Inference Using Graphical Models,” arXiv: 2301.11477.

Numair Sani, Jaron Lee, **Razieh Nabi**, and Ilya Shpitser, “A Semiparametric Approach to Interpretable Machine Learning,” arXiv: 2006.04732.

Research Funding

Biostats, Epi, & Research Design (BERD) Pilot (R. Nabi, PI) Nov 2022 – Jan 2024
Georgia Clinical & Translational Science Alliance (CTSA)

Title: Tackling missing data from a causal and counterfactual point of view

NIH/NIMH – R01MH129855 (B. Risk, PI) Apr 2022 – Mar 2026

Title: Statistical approaches to improving functional connectivity estimates w. an application to autism

Professional Activities

Journal Reviewer: Journal of the American Statistical Association (JASA); Journal of the Royal Statistical Society (JRSS); Journal of Machine Learning Research (JMLR); Journal of Statistical Software (JSS); Journal of Causal Inference (JCI); American Journal of Epidemiology (AJE); Review of Economics and Statistics; Sociological Methods and Research; ACM Computing Surveys; Journal of Data Mining and Knowledge Discovery; Journal of Experimental and Theoretical AI.

Conference Proceedings Reviewer: Uncertainty in Artificial Intelligence (UAI 2020, 2022-23); Neural Information Processing Systems (NeurIPS 2018-20, 2022); Fairness, Accountability, and Transparency (FAccT 2022); International Conference on Machine Learning (ICML, 2019-20); Machine Learning for Healthcare (MLHC 2020); NeurIPS Reproducibility Challenge (2019); International Conference on Artificial Intelligence and Statistics (AISTATS 2019).

Grant Reviewer: NSF-NIH Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science (2022).

Organizing Committee Member: Moderator, Online Causal Inference Seminar (OCIS 2024); **Area Chair**, Conference on Causal Learning and Reasoning (CLear 2023-24); **Workshop Chair**, Uncertainty in AI (UAI 2023); **Workshop Organizer**, “The Neglected Assumptions In Causal Inference,” (ICML 2021).

Workshop Committee Member: Causal Discovery and Causality-Inspired Machine Learning (NeurIPS 2020); Algorithmic Fairness through the Lens of Causality & Interpretability (NeurIPS 2020); Consequential Decision Making in Dynamic Environments (NeurIPS 2020); Algorithmic Bias in Search and Recommendation, European Conference on Information Retrieval (ECIR 2020); Knowledge Discovery in Healthcare Data, International Joint Conference on Artificial Intelligence (IJCAI 2016).

Session Chair: Causal Discovery Session, European Causal Inference Meeting (EuroCIM 2023); Advances in Causal Inference Workshop (UAI 2021).

Teaching Experience

Instructor

Advanced Causal Inference (BIOS 760R)	Fall 2022-23
<i>Recipient of the Departmental Distinguished Teaching Award, Apr 2023</i>	
Should Susan Smoke: An Introduction to Causal Inference	Interession 2020
<i>The course was co-instructed and featured at the Johns Hopkins Hub magazine</i>	
Pre-College Math, University of Texas at El Paso	Summer 2015

Instructor of Short Courses

Causal Graphical Methods for Handling Nonignorable Missing Data	May 2023
<i>American Causal Inference Conference (ACIC)</i>	
Fairness in Data Science: Criteria, Algorithms and Open Problems	Apr 2023
<i>16th annual Innovations in Design, Analysis, and Dissemination: Frontiers in Biostatistics and Data Science meeting (IDAD)</i>	
Fairness in Data Science: Criteria, Algorithms and Open Problems	Aug 2022
<i>Statistics in Epidemiology session at Joint Statistical Meetings (JSM)</i>	

Teaching Assistant

Machine Learning: Data to Models, Johns Hopkins University	Spring 2019
Causal Inference, Johns Hopkins University	Fall 2018
Probability and Statistics, University of Texas at El Paso	Spring 2016
Elementary Statistical Methods, University of Texas at El Paso	Fall 2015
Calculus I/II, University of Texas at El Paso	Spring 2015
Physics I/II and Laboratory, Istanbul Sehir University	Sep 2013 – Jan 2015

Invited Talks

Michigan State University , Department of Epidemiology and Biostatistics, MI	Feb 2014
Topic: causal inference, graphical models, vaccine studies (Colloquium Talk)	
New York University , School of Global Public Health, NY	Jan 2024
Topic: causal inference, graphical models, vaccine studies (Colloquium Talk)	
IMS Conference on Statistics and Data Science (ICSDS), Lisbon, Portugal	Dec 2023
Topic: missing data, causal inference	
AI Health Symposium , Emory School of Medicine, Atlanta, GA	Nov 2023
Topic: causal inference, decision making, data biases	
Yale University , Department of Biostatistics, New Haven, CT	Oct 2023
Topic: missing data, causal inference (Colloquium Talk)	
YoungStatS Webinar (Sub-initiative of the IMS New Researcher Group), Virtual	Oct 2023
Topic: algorithmic fairness, machine learning, causal inference (Discussant)	
Penn Conference on Big Data in Biomedical and Health Sciences Philadelphia, PA	Sep 2023
Topic: algorithmic fairness, causal inference, automated decision making (Plenary Talk)	
University of Michigan , Department of Biostatistics, Ann Arbor, MI	Sep 2023
Topic: algorithmic fairness, causal inference, automated decision making (Colloquium Talk)	

Uncertainty in AI (UAI) Conference, Pittsburgh, PA Topic: missing data (Plenary Talk)	Aug 2023
European Causal Inference Meeting (EuroCIM) , Oslo, Norway Topic: missing data, causal inference (Plenary Talk)	Apr 2023
Columbia University , Department of Biostatistics, New York City, NY Topic: missing data, causal inference (Colloquium Talk)	Mar 2023
Eastern North American Region (ENAR) Meeting, Nashville, TN Session on When Machine Learning Meets Missing Data Analysis Topic: missing data	Mar 2023
Computational & Methodological Statistics (CMStatistics) Working Group, Virtual Session on Missing Data Analysis and Its Application Topic: missing data, causal inference	Dec 2022
Neural Information Processing Systems (NeurIPS) Conference, Virtual Workshop on Algorithmic Fairness through the Lens of Time Topic: algorithmic fairness, causal inference, policy learning (Keynote Talk)	Dec 2022
TU Dortmund University , Department of Statistics, Dortmund, Germany Topic: missing data, causal inference (Colloquium Talk)	Nov 2022
Georgia Statistics Day , University of Georgia, Athens, GA Topic: missing data, causal inference	Oct 2022
Cornell University , Department of Statistics and Data Science, Virtual Topic: missing data, causal inference (Colloquium Talk)	Oct 2022
University of Jyväskylä , Department of Mathematics and Statistics, Virtual Topic: missing data, causal inference (Colloquium Talk)	Oct 2022
Pacific Causal Inference Conference (PCIC) , Virtual Topic: algorithmic fairness, causal inference, policy learning (Keynote Talk)	Sep 2022
Knowledge Discovery and Data Mining (KDD) Conference, Washington DC Workshop on Causal Discovery Topic: causal inference, causal discovery, graphical models (Keynote Talk)	Aug 2022
Joint Statistical Meeting (JSM) , Washington DC Session on Causal Inference in Neuroimaging and Radiology Topic: causal inference, high dimensional exposures, semiparametrics	Aug 2022
Society for Epidemiologic Research (SER) , Virtual Symposium on What We Think About When We Think About Fairness Topic: algorithmic fairness, causal inference, automated decision making	Jun 2022
University of Angers in France , Virtual Workshop on Missing Data and Sensitivity analysis Topic: missing data, causal inference	May 2022
Americal Causal Inference Conference (ACIC) , Berkeley, CA Topic: missing data, causal inference	May 2022
Vanderbilt University , Department of Biostatistics, Virtual Topic: algorithmic fairness, causal inference (Colloquium Talk)	Mar 2022
Neural Information Processing Systems (NeurIPS) Conference, Virtual Workshop on Causal Inference Challenges in Sequential Decision Making Topic: algorithmic fairness, causal inference (Keynote Talk)	Dec 2021

INFORMS Annual Meeting , Virtual Topic: causal inference, semiparametrics, graphical models	Oct 2021
University of Chicago , Booth School of Business, Chicago, IL Topic: missing data, causal inference (Colloquium Talk)	Oct 2021
Georgia Statistics Day , Emory Rollins School of Public Health, Atlanta, GA Topic: causal inference, mediation analysis, personalized medicine	Oct 2021
Uncertainty in AI (UAI) Conference , Virtual Workshop on Advances in Causal Inference Topic: causal inference, semiparametrics, graphical models (Keynote Talk)	Jul 2021
Online Causal Inference Seminar (OCIS) , Virtual Topic: causal inference, semiparametrics, graphical models (Plenary Talk)	May 2021
Helmholtz AI , Dr. Niki Kilbertus Research Group, Virtual Topic: causal inference, semiparametrics, graphical models	Apr 2021
Computational & Methodological Statistics (CMStatistics) Working Group , Virtual Session on Advances in Causal Inference Topic: causal inference, semiparametrics, graphical models	Dec 2020
Amazon Research in Tuebingen Germany, Dr. Dominik Janzing's team, Virtual Topic: algorithmic fairness, causal mediation analysis	Dec 2020
Cornell Tech , Dr. Nathan Kallus's research group, Virtual Topic: semiparametrics, causal inference, graphical models	Oct 2020
Microsoft Bing Ads and Microsoft Research join meeting, Virtual Topic: causal inference, interference, ad placement	Aug 2020
Microsoft Research in Washington, AI and Society Seminar Series, Virtual Topic: algorithmic fairness, machine learning, causal inference	Jul 2020
University College London in London UK, Dr. Ricardo Silva's research group, Virtual Topic: missing data, graphical models	Jul 2020
Netflix Inc in California, Virtual Topic: missing data, graphical models	Jun 2020
University of Oxford and DeepMind , AI Safety Teams in UK, Virtual Topic: algorithmic fairness, machine learning, causal inference	Jun 2020
Ecole Polytechnique, INRIA Saclay, and Google Brain , Virtual Topic: missing data, graphical models	May 2020
Johns Hopkins University , Causal Inference Working Group, Baltimore, MD Topic: causal inference, semiparametrics, graphical models	Apr 2020
Harvard University , Kolokotronis Circle, Boston, MA Topic: optimal fair policies, causal inference	Oct 2019
Harvard University , Dr. James Robins' reading group at IQSS, Boston, MA Topic: missing data, directed acyclic graphs	Oct 2019
International Conference on Machine Learning (ICML) , Long Beach, CA Topic: optimal fair policies, causal inference (Plenary Talk)	Jun 2019
California Institute of Technology (Caltech) , Pasadena, CA Workshop on Decisions, Games, and Logic Topic: optimal fair policies, causal inference	Jun 2019

Johns Hopkins University , CS Grad Council Student Seminar, Baltimore, MD Topic: optimal policies, algorithmic fairness, causal inference	Jun 2019
Johns Hopkins University , Guest Lecturer (CS 477-677), Baltimore, MD Topic: fair regressions and policies	Dec 2018
Association for the Advancement of AI (AAAI) Conference, New Orleans, LA Topic: algorithmic fairness, fair prediction, causal inference (Plenary Talk)	Jan 2018
Johns Hopkins University , Bloomberg School of Public Health, Baltimore, MD Join Meeting of Statistical Genetics and Causal Inference Research Groups Topic: Mendelian randomization, causal inference	Oct 2017

Poster Presentations

Uncertainty in AI (UAI) Conference, Pittsburgh, PA Title: On Testability and Goodness of Fit Tests in Missing Data Models	Aug 2023
Uncertainty in AI (UAI) Conference, Eindhoven, Netherlands Title: Semiparametric Causal Sufficient Dimension Reduction of Multidimensional Treatments	Jul 2022
Neural Information Processing Systems (NeurIPS) Conference, Virtual Workshop on Causal Discovery and Causality-Inspired ML Title: Causal Inference in the Presence of Interference in Sponsored Search Advertising	Dec 2020
Statistical and Applied Mathematical Sciences Institute (SAMSI) , Duke University Title 1: Identification in Missing Data Models Represented by Directed Acyclic Graphs Title 2: Estimation of Personalized Effects Associated with Causal Pathways	Dec 2019
International Conference on Machine Learning (ICML) , Long Beach, CA Title: Learning Optimal Fair Policies	Jun 2019
Uncertainty in AI (UAI) Conference, Monterey, CA Workshop on Causal Inference Title 1: Learning Optimal Fair Policies Title 2: Semiparametric Causal Sufficient Dimension Reduction of High Dimensional Treatment	Aug 2018
Atlantic Causal Inference Conference (ACIC) , Pittsburgh, PA Title 1: Estimation of Optimal Path-Specific Policies Title 2: Fair Inference on Outcomes Title 3: Semiparametric Causal Sufficient Dimension Reduction of High Dimensional Treatment	May 2018
Computing Research Association (CRA) , San Francisco, CA Grad Cohort for Women Title: Fair Inference on Outcomes	Apr 2018
Neural Information Processing Systems (NeurIPS) Conference, Long Beach, CA Workshop on Causal Inference & Machine Learning for Intelligent Decision Making Title 1: Fair Inference on Outcomes Title 2: Semiparametric Causal Sufficient Dimension Reduction of High Dimensional Treatment	Dec 2017
Computing Community Consortium (CCC) , Washington DC Symposium on Computing Research: Addressing National Priorities and Societal Needs Title: Fairness Through Causality	Oct 2017

Honors and Awards

Distinguished Teaching Award , Department of Biostatistics & Bioinformatics Awarded for offering an Advanced Causal Inference Course at Rollins School of Public Health	Apr 2023
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Reviewer Award , Neural Information Processing Systems (NeurIPS) Conference Awarded to top 10% of high-scoring reviewers at the NeurIPS conference	Dec 2020
Student Scholarship , Grace Hopper Celebration (GHC) Organized by AnitaB.org for celebration of women in computing	Sep 2020
Travel Award , Statistical and Applied Mathematical Sciences Institute (SAMSI) Causal Inference Program Opening Workshop at Duke University	Dec 2019
Thomas R. Ten Have Award , Atlantic Causal Inference Conference (ACIC) Awarded for best poster at the ACIC conference, Montreal, Canada	May 2019
Summer Institute Scholarship , University of Washington Program: Summer Institute In Statistics and Modeling in Infectious Diseases (SISMID)	Jun 2018
Travel Award , Grad Cohort for Women, San Francisco, CA Awarded by the Computing Research Association (CRA)	Apr 2018
Travel Award , Computing Community Consortium (CCC), Washington DC	Oct 2017
Distinguished Bachelor Dissertation Award , Tehran, Iran	Jul 2012

Razieh Nabi, Ph.D. (she/her/hers)
 Rollins Assistant Professor
 Department of Biostatistics and Bioinformatics
 Rollins School of Public Health
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