

# Elias Bareinboim

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## Research Interests

- Causal Inference: Theory and Applications.
- Causal Data Science; Causal Fairness Analysis; Causal Reinforcement Learning.
- Artificial Intelligence, Machine Learning, Statistics.
- Cognitive Science, Philosophy of Science.

## Education

- Ph.D. in Computer Science – University of California, Los Angeles (UCLA), 2014.  
Title: *Generalizability in Causal Inference: Theory and Algorithms*.  
Advisor: *Judea Pearl*.
- B.Sc., M.Sc. in Computer Science – Federal University of Rio de Janeiro (UFRJ), 2007.  
Title: *Descents and nodal load in scale-free networks*.  
Advisor: *Valmir C. Barbosa*.

## Academic Positions

- Associate Professor (tenured), Computer Science, Columbia University, Summer/2019-now.
  - Director, Causal Artificial Intelligence Laboratory.
  - Member, Data Science Institute.
  - Member, NSF National AI Institute for Artificial and Natural Intelligence.
  - Member, Program for Mathematical Genomics.
- Assistant Professor, Computer Science, Purdue University, Fall/2015-Spring/2019.
  - Director, Causal Artificial Intelligence Laboratory.
  - Assistant Professor, courtesy appointment, Statistics.
  - Faculty Affiliate, Regenstrief Center for Healthcare Engineering.
- Postdoctoral Scholar, Cognitive Systems Lab/UCLA, Judea Pearl, Fall/2014-Summer/2015.
- Research Assistant, Cognitive Systems Lab/UCLA, Judea Pearl, Fall/2009-Summer/2014.

## Awards and Honors

- 2023 DARPA Young Faculty Award.
- 2022 ONR Young Investigator Award.
- 2021 JP Morgan Faculty Research Award.
- 2020 Amazon Research Award.
- 2019 UAI Best Paper Award (1 out of 450 papers).
- 2018 NSF Faculty Early Career Development (CAREER) Award.

- 2018 Adobe Data Science Research Award.
- 2018 UAI Best Student Paper Award (1 out of 337 papers).
- 2018 AAAI Outstanding Paper Award Honorable Mention (2 out of 3800 papers).
- 2017 IBM Open Collaborative Award.
- 2016 IEEE AI's 10 to Watch, Intelligent Systems.
- 2015 ACM Notable Paper, 19th Annual Best of Computing, Computing Reviews.
- 2014 UCLA Edward K. Rice Outstanding Doctoral Student Award (given to a single PhD student in all engineering and applied sciences majors), School of Engineering and Applied Sciences, UCLA.
- 2014 AAAI Outstanding Paper Award (1 out of 1406 papers).
- 2014 UCLA Outstanding Graduating PhD Student (commencement award), Computer Science.
- 2014 Google Outstanding Graduate Research Award, Computer Science, UCLA.
- 2014 Dan David Scholar, Future Dimension: Artificial Intelligence (\$15,000), Dan David Foundation.
- 2013 UCLA Dissertation Year Fellowship (DYF) (~\$35,000).
- 2012 Yahoo! Key Scientific Challenges Award, area Machine Learning & Statistics (\$5,000).
- 2008 UCLA Ph.D.'s Fellowship (~\$45,000).
- 2008 Top 10 award – National contest of M.Sc. thesis (2007), Brazilian Computer Society.
- 2008-2012 Ph.D.'s Fellowship, Fulbright – U.S. Dep. of State / CAPES-MEC, declined.
- 2003-2007 Undergraduate's and Master's Fellowships, Brazilian Research Council CNPq.

## Publications

111. Arvind Raghavan, Elias Bareinboim (2024)  
Counterfactual Realizability and Decision-Making  
*Columbia CausalAI Laboratory, Technical Report (R-113), May/2024.*
110. Yonghan Jung, Jin Tian, Elias Bareinboim (2024)  
Unified Covariate Adjustment for Causal Inference  
*Columbia CausalAI Laboratory, Technical Report (R-112), May/2024.*
109. Prateek Jain, Elias Bareinboim (2024)  
Towards Causal Game Theory  
*Columbia CausalAI Laboratory, Technical Report (R-111), May/2024.*
108. Adam Li, Yushu Pan, Elias Bareinboim (2024)  
Disentangled Representation Learning in Non-Markovian Causal Systems  
*Columbia CausalAI Laboratory, Technical Report (R-110), May/2024.*
107. Alexis Bellot, Kasra Jalaldoust, Elias Bareinboim (2024)  
Partial Transportability for Domain Generalization  
*Columbia CausalAI Laboratory, Technical Report (R-109), May/2024.*
106. Drago Plecko, Elias Bareinboim (2024)  
Mind the Gap: A Causal Perspective on Bias Amplification in Prediction & Decision-Making  
*Columbia CausalAI Laboratory, Technical Report (R-108), May/2024.*

105. Drago Plecko, [Elias Bareinboim](#) (2024)  
Fairness-Accuracy Trade-Offs: A Causal Perspective  
*Columbia CausalAI Laboratory, Technical Report (R-107)*, May/2024.
104. Junzhe Zhang, [Elias Bareinboim](#) (2024)  
Eligibility Traces for Confounding Robust Off-Policy Evaluation  
*Columbia CausalAI Laboratory, Technical Report (R-105)*, May/2024.
103. Darren Kangrui, Junzhe Zhang, Sharon Di, [Elias Bareinboim](#) (2024)  
Causal Imitation for Markov Decision Processes: a Partial Identification Approach  
*Columbia CausalAI Laboratory, Technical Report (R-104)*, May/2024.
102. Yushu Pan, [Elias Bareinboim](#) (2023)  
Counterfactual Image Editing  
*Columbia CausalAI Laboratory, Technical Report (R-103)*, Dec/2023.  
*Proceedings of the 40th International Conference on Machine Learning (ICML)*, 2024.  
(Acceptance rate = 27.5%)
101. Mingxuan Li, Junzhe Zhang, [Elias Bareinboim](#) (2024)  
Causally Aligned Curriculum Learning  
*Columbia CausalAI Laboratory, Technical Report (R-102)*, Oct/2023.  
*Proc. of the 12th International Conference on Learning Representations (ICLR)*, 2024.  
(Acceptance rate = 31%)
100. Kevin Xia, [Elias Bareinboim](#) (2024)  
Neural Causal Abstractions  
*Columbia CausalAI Laboratory, Technical Report (R-101)*, Dec/2023.  
*Proceedings of the 38th AAAI Conference on Artificial Intelligence (AAAI)*, 2024.  
(Acceptance rate = 23.7%)
99. Kasra Jalaldoust, [Elias Bareinboim](#) (2024)  
Transportable Representations for Out-of-distribution Generalization  
*Columbia CausalAI Laboratory, Technical Report (R-99)*, May/2023.  
*Proceedings of the 38th AAAI Conference on Artificial Intelligence (AAAI)*, 2024.  
(Acceptance rate = 23.7%)
98. Adam Li, Amin Jaber, [Elias Bareinboim](#) (2023)  
Causal discovery from observational and interventional data across multiple environments  
*Columbia CausalAI Laboratory, Technical Report (R-98)*, May/2023.  
*Proc. of the 37th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2023.  
(Acceptance rate = 26%)
97. Yonghan Jung, Ivan Diaz, Jin Tian, [Elias Bareinboim](#) (2023)  
Estimating Causal Effects Identifiable from a Combination of Observations and Experiments  
*Columbia CausalAI Laboratory, Technical Report (R-97)*, May/2023.  
*Proc. of the 37th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2023.  
(Acceptance rate = 26%)

96. Shalmali Joshi, Junzhe Zhang, Elias Bareinboim (2024)  
Towards Safe Policy Learning under Partial Identifiability: A Causal Approach  
*Columbia CausalAI Laboratory, Technical Report (R-96)*, May/2023.  
*Proceedings of the 38th AAAI Conference on Artificial Intelligence (AAAI)*, 2024.  
(Acceptance rate = 23.75%)
  
95. Drago Plecko, Elias Bareinboim (2023)  
Causal Fairness for Outcome Control  
*Columbia CausalAI Laboratory, Technical Report (R-95)*, May/2023.  
*Proc. of the 37th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2023.  
(Acceptance rate = 26%)
  
94. Julius von Kügelgen, Michel Besserve, Wendong Liang, Luigi Gresele, Armin Kekic, Elias Bareinboim, David Blei, Bernhard Schölkopf (2023)  
Nonparametric Identifiability of Causal Representations from Unknown Interventions  
*Columbia CausalAI Laboratory, Technical Report (R-97)*, June/2023.  
*Proc. of the 37th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2023.  
(Acceptance rate = 26%)
  
93. Drago Plecko, Elias Bareinboim (2023)  
A Causal Framework for Decomposing Spurious Variations  
*Columbia CausalAI Laboratory, Technical Report (R-94)*, May/2023.  
*Proc. of the 37th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2023.  
(Acceptance rate = 26%)
  
92. Drago Plecko, Elias Bareinboim (2024)  
Reconciling Predictive and Statistical Parity: A Causal Approach  
*Columbia CausalAI Laboratory, Technical Report (R-92)*, February/2023.  
*Proceedings of the 38th AAAI Conference on Artificial Intelligence (AAAI)*, 2024.  
(Acceptance rate = 23.75%)
  
91. Yonghan Jung, Jin Tian, Elias Bareinboim (2023)  
Estimating Joint Treatment Effects by Combining Multiple Experiments  
*Columbia CausalAI Laboratory, Technical Report (R-91)*, Apr/2023.  
*Proceedings of the 39th International Conference on Machine Learning (ICML)*, 2023.  
(Acceptance rate = 27%)
  
90. Drago Plecko, Elias Bareinboim (2022)  
Causal Fairness Analysis  
*Columbia CausalAI Laboratory, Technical Report (R-90)*, July/2022.  
*Foundations and Trends in Machine Learning*, forthcoming.
  
89. Darren Kangrui, Junzhe Zhang, Sharon Di, Elias Bareinboim (2023)  
Causal Imitation Learning via Inverse Reinforcement Learning  
*Columbia CausalAI Laboratory, Technical Report (R-89)*, May/2022.  
*Proc. of the 11th International Conference on Learning Representations (ICLR)*, 2023.  
(Acceptance rate = 31%)

88. Alexis Bellot, Elias Bareinboim (2023)  
Partial Transportability for Domain Generalization  
*Columbia CausalAI Laboratory, Technical Report (R-88)*, May/2023.
87. Kevin Xia, Yushu Pan, Elias Bareinboim (2023)  
Neural Causal Models for Counterfactual Identification and Estimation  
*Columbia CausalAI Laboratory, Technical Report (R-87)*, May/2022.  
*Proc. of the 11th International Conference on Learning Representations (ICLR)*, 2023.  
(Acceptance rate = 31%)
86. Amin Jaber, Adele Ribeiro, Jiji Zhang, Elias Bareinboim (2022)  
Causal Identification under Markov equivalence: Calculus, Algorithm, and Completeness  
*Columbia CausalAI Laboratory, Technical Report (R-86)*, May/2022.  
*Proc. of the 36th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2022.  
(Acceptance rate < 2% (highlight))
85. Hyunchai Jeong, Jin Tian, Elias Bareinboim (2022)  
Finding and Listing Front-door Adjustment Sets  
*Columbia CausalAI Laboratory, Technical Report (R-85)*, Sep/2022.  
*Proc. of the 36th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2022.  
(Acceptance rate = 26%)
84. Junzhe Zhang, Elias Bareinboim (2022)  
Online Reinforcement Learning for Mixed Policy Scopes  
*Columbia CausalAI Laboratory, Technical Report (R-84)*, May/2022.  
*Proc. of the 36th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2022.  
(Acceptance rate = 26%)
83. Alexis Bellot, Junzhe Zhang, Elias Bareinboim (2024)  
Scores for Learning Discrete Causal Graphs with Unobserved Confounders  
*Columbia CausalAI Laboratory, Technical Report (R-83)*, May/2022.  
*Proceedings of the 38th AAAI Conference on Artificial Intelligence (AAAI)*, 2024.  
(Acceptance rate = 23.75%)
82. Juan Correa, Sanghack Lee, Elias Bareinboim (2022)  
Counterfactual Transportability: A Formal Approach  
*Columbia CausalAI Laboratory, Technical Report (R-82)*, May/2022.  
*Proceedings of the 38th International Conference on Machine Learning (ICML)*, 2022.  
(Acceptance rate = 21%)
81. Yonghan Jung, Shiva Kasiviswanathan, Jin Tian, Dominik Janzing, Elias Bareinboim (2022)  
On Measuring Causal Contributions via do-Interventions  
*Columbia CausalAI Laboratory, Technical Report (R-81)*, May/2022.  
*Proceedings of the 38th International Conference on Machine Learning (ICML)*, 2022.  
(Acceptance rate = 21%)

80. Kevin Xia, Kai-Zhan Lee, Yoshua Bengio, Elias Bareinboim (2021)  
The Causal-Neural Connection: Expressiveness, Learnability, and Inference  
*Columbia CausalAI Laboratory, Technical Report (R-80)*, May/2021.  
*Proc. of the 35th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2021.  
(Acceptance rate = 26%)
79. Juan Correa, Sanghack Lee, Elias Bareinboim (2021)  
Nested Counterfactual Identification from Arbitrary Surrogate Experiments  
*Columbia CausalAI Laboratory, Technical Report (R-79)*, May/2021.  
*Proc. of the 35th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2021.  
(Acceptance rate = 26%)
78. Junzhe Zhang, Jin Tian, Elias Bareinboim (2022)  
Partial Counterfactual Identification from Observational and Interventional Data  
*Columbia CausalAI Laboratory, Technical Report (R-78)*, May/2021.  
*Proceedings of the 38th International Conference on Machine Learning (ICML)*, 2022.  
(Acceptance rate = 21%)
77. Tara Anand, Adele Ribeiro, Jin Tian, Elias Bareinboim (2023)  
Effect Identification in Causal Diagrams with Clustered Variables  
*Columbia CausalAI Laboratory, Technical Report (R-77)*, May/2021.  
*Proceedings of the 37th AAAI Conference on Artificial Intelligence (AAAI)*, 2023.  
(Acceptance rate = 19.6%)
76. Daniel Kumor Justin Zhang, Elias Bareinboim (2021)  
Sequential Causal Imitation Learning with Unobserved Confounders  
*Columbia CausalAI Laboratory, Technical Report (R-76)*, May/2021.  
*Proc. of the 35th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2021.  
(Acceptance rate < 1% (oral))
75. Yonghan Jung, Jin Tian, Elias Bareinboim (2021)  
Double Machine Learning Density Estimation for Local Treatment Effects with Instruments  
*Columbia CausalAI Laboratory, Technical Report (R-75)*, May/2021.  
*Proc. of the 35th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2021.  
(Acceptance rate < 3% (spotlight))
74. C. Mao, K. Xia, J. Wang, H. Wang, J. Yang, E. Bareinboim, C. Vondrick (2022)  
Causal Transportability for Neural Representations  
*Columbia CausalAI Laboratory, Technical Report (R-74)*, forthcoming.  
*Proc. of IEEE/CVF Conference on Computer Vision & Pattern Recognition (CVPR)*, 2022, in press.  
(Acceptance rate = 25%)
73. Adele Ribeiro, Elias Bareinboim (2022)  
Causal Inference and Data Fusion: Towards an Accelerated Process of Scientific Discovery  
*Columbia CausalAI Laboratory, Technical Report (R-73)*, Apr/2022.  
*Organisation for Economic Co-operation and Development (OECD)*,  
Volume “AI and the productivity of science”, forthcoming.

72. Junzhe Zhang, Elias Bareinboim (2021)  
Non-Parametric Methods for Partial Identification of Causal Effects  
*Columbia CausalAI Laboratory, Technical Report (R-72)*, Feb/2021.
71. Yonghan Jung, Jin Tian, Elias Bareinboim (2021)  
Estimating Identifiable Causal Effects on Markov Equiv. Class through Double Machine Learning  
*Columbia CausalAI Laboratory, Technical Report (R-71)*, Feb/2021.  
*Proceedings of the 37th International Conference on Machine Learning (ICML)*, 2021.  
(Acceptance rate = 21%)
70. Sanghack Lee, Elias Bareinboim (2021)  
Causal Identification with Matrix Equations  
*Columbia CausalAI Laboratory, Technical Report (R-70)*, Jun/2021.  
*Proc. of the 35th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2021.  
(Acceptance rate < 1% (oral))
69. Yonghan Jung, Jin Tian, Elias Bareinboim (2021)  
Estimating Identifiable Causal Effects through Double Machine Learning  
*Columbia CausalAI Laboratory, Technical Report (R-69)*, Jun/2020.  
*Proceedings of the 35th AAAI Conference on Artificial Intelligence (AAAI)*, 2021.  
(Acceptance rate = 21%)
68. Junzhe Zhang and Elias Bareinboim (2021)  
Bounding Causal Effects on Continuous Outcomes  
*Columbia CausalAI Laboratory, Technical Report (R-61)*.  
*Proceedings of the 35th AAAI Conference on Artificial Intelligence (AAAI)*, 2021.  
(Acceptance rate = 21%)
67. Juan Correa and Elias Bareinboim (2020)  
General Transportability of Soft Interventions: Completeness Results  
*Columbia CausalAI Laboratory, Technical Report (R-68)*.  
*Proc. of the 34th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2020.  
(Acceptance rate = 20%)
66. Amin Jaber, Murat Kocaoglu, Karthikeyan Shanmugam, Elias Bareinboim (2020)  
Causal Discovery from Soft Interventions with Unknown Targets: Characterization & Learning  
*Columbia CausalAI Laboratory, Technical Report (R-67)*.  
*Proc. of the 34th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2020.  
(Acceptance rate = 20%)
65. Junzhe Zhang, Daniel Kumor, Elias Bareinboim (2020)  
Causal Imitation Learning with Unobserved Confounders  
*Columbia CausalAI Laboratory, Technical Report (R-66)*.  
*Proc. of the 34th Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2020.  
(Acceptance rate < 1% (oral))

64. Elias Bareinboim, Sanghack Lee, Junzhe Zhang (2020)  
An Introduction to Causal Reinforcement Learning  
*Columbia CausalAI Laboratory, Technical Report (R-65), forthcoming.*
63. Junzhe Zhang and Elias Bareinboim (2022)  
Can Humans Be Out of the Loop?  
*Columbia CausalAI Laboratory, Technical Report (R-64), Jun/2020.*  
*Proc. of the 1st Conference on Causal Learning and Reasoning (CLearR), 2022.*
62. Sanghack Lee and Elias Bareinboim (2020)  
Characterizing Optimal Mixed Policies: Where to Intervene, What to Observe  
*Columbia CausalAI Laboratory, Technical Report (R-63).*  
*Proc. of the 34th Annual Conference on Neural Information Processing Systems (NeurIPS), 2020.*  
(Acceptance rate = 20%)
61. Yonghan Jung, Jin Tian, Elias Bareinboim (2020)  
Learning Causal Effects via Empirical Risk Minimization  
*Columbia CausalAI Laboratory, Technical Report (R-62).*  
*Proc. of the 34th Annual Conference on Neural Information Processing Systems (NeurIPS), 2020.*  
(Acceptance rate = 20%)
60. Elias Bareinboim, Juan Correa, Duligur Ibeling, Thomas Icard (2020)  
On Pearl's Hierarchy and the Foundations of Causal Inference  
*Columbia CausalAI Laboratory, Technical Report (R-60), 2020.*  
*ACM Special Turing Series, Vol. "Probabilistic and Causal Inference: The Works of Judea Pearl".*
59. Yonghan Jung, Yuhao Wang, Jin Tian, Elias Bareinboim (2020)  
Efficient and Doubly Robust Estimation of Causal Effects  
*Columbia CausalAI Laboratory, Technical Report (R-59), 2020, forthcoming.*
58. Sanghack Lee and Elias Bareinboim (2020)  
Causal Effect Identifiability under Partial-Observability  
*Columbia CausalAI Laboratory, Technical Report (R-58), 2020.*  
*Proceedings of the 37th International Conference on Machine Learning (ICML), 2020.*  
(Acceptance rate = 21.8%)
57. Junzhe Zhang and Elias Bareinboim (2020)  
Designing Optimal Dynamic Treatment Regimes: A Causal RL Approach  
*Columbia CausalAI Laboratory, Technical Report (R-57), 2020.*  
*Proceedings of the 37th International Conference on Machine Learning (ICML), 2020.*  
(Acceptance rate = 21.8%)
56. Daniel Kumor, Carlos Cinelli, Elias Bareinboim (2020)  
Efficient Identification in Linear Structural Causal Models with Auxiliary Cutsets  
*Columbia CausalAI Laboratory, Technical Report (R-56), 2020.*  
*Proceedings of the 37th International Conference on Machine Learning (ICML), 2020.*  
(Acceptance rate = 21.8%)



55. Juan Correa and [Elias Bareinboim](#) (2020)  
A Calculus For Stochastic Interventions: Causal Effect Identification and Surrogate Experiments  
*Columbia CausalAI Laboratory, Technical Report (R-55), 2020.*  
*Proceedings of the 34th AAAI Conference on Artificial Intelligence (AAAI), 2020.*  
(Acceptance rate = 20.6%)
54. Yonghan Jung, Jin Tian, [Elias Bareinboim](#) (2020)  
Estimating Causal Effects Using Weighting-Based Estimators  
*Columbia CausalAI Laboratory, Technical Report (R-54), 2020.*  
*Proceedings of the 34th AAAI Conference on Artificial Intelligence (AAAI), 2020.*  
(Acceptance rate = 20.6%)
53. Sanghack Lee, Juan Correa, [Elias Bareinboim](#) (2020)  
Generalized Transportability: Synthesis of Experiments from Heterogeneous Domains  
*Columbia CausalAI Laboratory, Technical Report (R-53), 2020.*  
*Proceedings of the 34th AAAI Conference on Artificial Intelligence (AAAI), 2020.*  
(Acceptance rate = 20.6%)
52. Sanghack Lee, Juan Correa, [Elias Bareinboim](#) (2020)  
Identifiability from a Combination of Observations and Experiments  
*Columbia CausalAI Laboratory, Technical Report (R-52), 2020.*  
*Proceedings of the 34th AAAI Conference on Artificial Intelligence (AAAI), 2020.*  
(Acceptance rate = 20.6% [best paper award — sister’s conference track])
51. P. Hunermund and [Elias Bareinboim](#) (2019)  
Causal Inference and Data-Fusion in Econometrics  
*Columbia CausalAI Laboratory, Technical Report (R-51), 2019.*  
*The Econometrics Journal, 2023 in press.*
50. Amin Jaber, Jiji Zhang, [Elias Bareinboim](#) (2019)  
Identification of Conditional Causal Effects under Markov Equivalence  
*Columbia CausalAI Laboratory, Technical Report (R-50), 2019.*  
*Proc. of the 33rd Annual Conference on Neural Information Processing Systems (NeurIPS), 2019.*  
(Acceptance rate = 2.5% (spotlight))
49. Daniel Kumor, Bryant Chen, [Elias Bareinboim](#) (2019)  
Efficient Identification in Linear Structural Causal Models with Instrumental Cutsets  
*Columbia CausalAI Laboratory, Technical Report (R-49), 2019.*  
*Proc. of the 33rd Annual Conference on Neural Information Processing Systems (NeurIPS), 2019.*  
(Acceptance rate = 21%)
48. Junzhe Zhang and [Elias Bareinboim](#) (2019)  
Near-Optimal Reinforcement Learning in Dynamic Treatment Regimes  
*Columbia CausalAI Laboratory, Technical Report (R-48), 2019.*  
*Proc. of the 33rd Annual Conference on Neural Information Processing Systems (NeurIPS), 2019.*  
(Acceptance rate = 21%)

47. Murat Kocaoglu, Amin Jaber, Karthikeyan Shanmugam, Elias Bareinboim (2019)  
 Characterization and Learning of Causal Graphs with Latent Variables from Soft Interventions  
*Columbia CausalAI Laboratory, Technical Report (R-47), 2019.*  
*Proc. of the 33rd Annual Conference on Neural Information Processing Systems (NeurIPS), 2019.*  
 (Acceptance rate = 21%)
  
46. Sanglack Lee, Juan Correa, Elias Bareinboim (2019)  
 General Identifiability with Arbitrary Surrogate Experiments  
*Columbia CausalAI Laboratory, Technical Report (R-46), 2019.*  
*Proceedings of the 35th Uncertainty in Artificial Intelligence (UAI), 2019.*  
***Best Paper Award (1 out of 450 papers).***  
 (Acceptance rate = 26%)
  
45. Juan Correa and Elias Bareinboim (2019)  
 From Statistical Transportability to Estimating the Effects of Stochastic Interventions  
*Columbia CausalAI Laboratory, Technical Report (R-45), 2019.*  
*Proceedings of the 28th International Joint Conference on Artificial Intelligence (IJCAI), 2019.*  
 (Acceptance rate = 17.8%)
  
44. Amin Jaber, Jiji Zhang, Elias Bareinboim (2019)  
 On Causal Identification under Markov Equivalence  
*Columbia CausalAI Laboratory, Technical Report (R-44), 2019.*  
*Proceedings of the 28th International Joint Conference on Artificial Intelligence (IJCAI), 2019.*  
 (Acceptance rate = 17.8%)
  
43. Juan Correa, Jin Tian, Elias Bareinboim (2019)  
 Adjustment Criteria for Generalizing Experimental Findings  
*Columbia CausalAI Laboratory, Technical Report (R-43), 2019.*  
*Proceedings of the 36th International Conference on Machine Learning (ICML), 2019.*  
 (Acceptance rate = 22.5%)
  
42. Amin Jaber, Jiji Zhang, Elias Bareinboim (2019)  
 Causal Identification under Markov Equivalence: Completeness Results  
*Columbia CausalAI Laboratory, Technical Report (R-42), 2019.*  
*Proceedings of the 36th International Conference on Machine Learning (ICML), 2019.*  
 (Acceptance rate = 22.5%)
  
41. Carlos Cinelli, Daniel Kumor, Bryant Chen, Judea Pearl, Elias Bareinboim (2019)  
 Sensitivity Analysis of Linear Structural Causal Models  
*Columbia CausalAI Laboratory, Technical Report (R-41), 2019.*  
*Proceedings of the 36th International Conference on Machine Learning (ICML), 2019.*  
 (Acceptance rate = 22.5%)
  
40. Sanghack Lee and Elias Bareinboim (2019)  
 On Structural Causal Bandits with Non-manipulable Variables  
*Columbia CausalAI Laboratory, Technical Report (R-40), 2019.*  
*Proceedings of the 33th AAAI Conference on Artificial Intelligence (AAAI), 2019.*  
 (Acceptance rate = 16.2%)

39. Andrew Forney and [Elias Bareinboim](#) (2019)  
Counterfactual Randomization: Rescuing Experimental Studies from Obscured Confounding  
*Columbia CausalAI Laboratory, Technical Report (R-39), 2019.*  
*Proceedings of the 33th AAAI Conference on Artificial Intelligence (AAAI), 2019.*  
(Acceptance rate = 16.2%)
  
38. Juan Correa, Jin Tian, [Elias Bareinboim](#) (2019)  
Identification of Causal Effects in the Presence of Selection Bias  
*Columbia CausalAI Laboratory, Technical Report (R-38), 2019.*  
*Proceedings of the 33th AAAI Conference on Artificial Intelligence (AAAI), 2019.*  
(Acceptance rate = 16.2%)
  
37. Junzhe Zhang and [Elias Bareinboim](#) (2018)  
Equality of Opportunity in Classification: A Causal Approach  
*Proc. of the 32nd Annual Conference on Neural Information Processing Systems (NeurIPS), 2018.*  
(Acceptance rate = 21%)
  
36. Sanghack Lee and [Elias Bareinboim](#) (2018)  
Structural Causal Bandits: Where to intervene?  
*Proc. of the 32nd Annual Conference on Neural Information Processing Systems (NeurIPS), 2018.*  
(Acceptance rate = 21%)
  
35. Amin Jaber, Jiji Zhang, [Elias Bareinboim](#) (2018)  
Causal Identification under Markov Equivalence  
*Proceedings of the 34th Uncertainty in Artificial Intelligence (UAI), 2018.*  
***Best Student Paper Award (1 out of 337 papers).***  
(Acceptance rate = 9% (plenary))
  
34. Junzhe Zhang and [Elias Bareinboim](#) (2018)  
Non-Parametric Path Analysis in Structural Causal Models  
*Proceedings of the 34th Uncertainty in Artificial Intelligence (UAI), 2018.*  
(Acceptance rate = 9% (plenary))
  
33. Amiremad Ghassami, Saber Salehkaleybar, Negar Kiyavash, [Elias Bareinboim](#) (2018)  
Budgeted Experimental Design for Causal Structural Learning  
*Proceedings of the 35th International Conference on Machine Learning (ICML), 2018.*  
(Acceptance rate = 25%)
  
32. Amin Jaber, Jiji Zhang, [Elias Bareinboim](#) (2018)  
A Graphical Criterion for Effect Identification in Equivalence Classes of Causal Diagrams  
*Proceedings of the 27th International Joint Conference on Artificial Intelligence (IJCAI), 2018.*  
(Acceptance rate = 20%)
  
31. Judea Pearl and [Elias Bareinboim](#) (2018)  
A note on “Generalizability of Study Results (Lesko et al., 2017)”  
*Purdue CausalAI Laboratory, Technical Report (R-31), Apr/2018.*  
*Epidemiology*, v. 30(2), pp. 186-188, Mar/2019.

30. Junzhe Zhang and [Elias Bareinboim](#) (2018)  
 Fairness in Decision-Making — The Causal Explanation Formula  
*Proceedings of the 32nd AAAI Conference on Artificial Intelligence (AAAI)*, 2018.  
 (Acceptance rate = 24%)
29. Juan Correa, Jin Tian, [Elias Bareinboim](#) (2018)  
 Generalized Adjustment under Confounding and Selection Biases  
*Proceedings of the 32nd AAAI Conference on Artificial Intelligence (AAAI)*, 2018.  
***Outstanding Paper Honorable Mention (2 out of 3800 papers).***  
 (Acceptance rate = 24%)
28. Murat Kocaoglu, Karthikeyan Shanmugam, [Elias Bareinboim](#) (2017)  
 Experimental Design for Learning Causal Graphs with Latent Variables  
*Proceedings of the 31st Annual Conference on Neural Information Processing Systems (NIPS)*, 2017.  
 (Acceptance rate = 21%)
27. Bryant Chen, Daniel Kumor, [Elias Bareinboim](#) (2017)  
 Identification and Model Testing in Linear Structural Equation Models using Auxiliary Variables  
*Proceedings of the 34th International Conference on Machine Learning (ICML)*, 2017.  
 (Acceptance rate = 24%)
26. Andrew Forney, Judea Pearl, [Elias Bareinboim](#) (2017)  
 Counterfactual Data-Fusion for Online Reinforcement Learners  
*Proceedings of the 34th International Conference on Machine Learning (ICML)*, 2017.  
 (Acceptance rate = 24%)
25. Junzhe Zhang and [Elias Bareinboim](#) (2017)  
 Transfer Learning in Multi-Armed Bandits: A Causal Approach  
*Proceedings of the 26th International Joint Conference on Artificial Intelligence (IJCAI)*, 2017.  
 (Acceptance rate = 26%)
24. Juan Correa and [Elias Bareinboim](#) (2017)  
 Causal Effect Identification by Adjustment under Confounding and Selection Biases  
*Proceedings of the 31th AAAI Conference on Artificial Intelligence (AAAI)*, 2017.  
 (Acceptance rate = 25%)
23. Junzhe Zhang and [Elias Bareinboim](#) (2016)  
 Markov Decision Processes with Unobserved Confounders: A Causal Approach  
*Columbia CausalAI Laboratory, Technical Report (R-23), Dec/2016.*
22. Bryant Chen, Judea Pearl, [Elias Bareinboim](#) (2016)  
 Identification by Auxiliary Instrumental Sets in Linear Structural Equation Models  
*Proceedings of the 25th International Joint Conference on Artificial Intelligence (IJCAI)*, AAAI Press, pp. 3577-3583, 2016.  
 (Acceptance rate = 25%)
21. [Elias Bareinboim](#) and Judea Pearl (2016)  
 Causal Inference and the Data-Fusion Problem  
*Proceedings of the National Academy of Sciences (PNAS)*, v. 113(27), 2016.

20. Elias Bareinboim (2016)  
 Comment on “Causal Inference using invariance prediction: identification and confidence intervals  
 by Peters, Buhlmann and Meinshausen”  
*Journal of the Royal Statistical Society, Series B.*
  
19. Elias Bareinboim, Andrew Forney, Judea Pearl (2015)  
 Bandits with Unobserved Confounders: A Causal Approach  
*Proceedings of the 29th Annual Conference on Neural Information Processing Systems (NIPS)*, pp.  
 1342-1350, 2015.  
 (Acceptance rate = 21.9%)
  
18. Elias Bareinboim and Jin Tian (2015)  
 Recovering Causal Effects From Selection Bias  
*Proceedings of the 29th AAAI Conference on Artificial Intelligence (AAAI)*, pp. 3475-3481, 2015.  
 (Acceptance rate = 26.7%)
  
17. Judea Pearl and Elias Bareinboim (2014)  
 External Validity: From do-calculus to Transportability across Populations  
*Statistical Science*, v. 29(4), pp. 579-595, 2014.
  
16. Elias Bareinboim and Judea Pearl (2014)  
 Transportability from Multiple Environments with Limited Experiments: Completeness Results  
*Proceedings of the 28th Annual Conference on Neural Information Processing Systems (NIPS)*, pp.  
 280-288, 2014.  
 (Acceptance rate = 24.7%.)
  
15. Elias Bareinboim, Jin Tian, Judea Pearl (2014)  
 Recovering from Selection Bias in Causal and Statistical Inference  
*Proceedings of the 28th AAAI Conference on Artificial Intelligence (AAAI)*, pp. 2410-2416, 2014.  
***Outstanding Paper Award (1 out of 1406 papers).***  
 (Acceptance rate = 28%.)
  
14. Elias Bareinboim and Judea Pearl (2013)  
 A General Algorithm for Deciding Transportability of Experimental Results  
*Journal of Causal Inference*, v. 1(1), pp. 107-134, 2013.
  
13. Elias Bareinboim, Sanghack Lee, Vasant Honavar, Judea Pearl (2013)  
 Transportability from Multiple Environments with Limited Experiments  
*Proceedings of the 27th Annual Conference on Neural Information Processing Systems (NIPS)*, pp.  
 136-144, 2013.  
 (Acceptance rate = 25%)
  
12. Elias Bareinboim and Judea Pearl (2013)  
 Causal Transportability with Limited Experiments  
*Proceedings of the 27th AAAI Conference on Artificial Intelligence (AAAI)*, pp. 95-101, 2013.  
 (Acceptance rate = 29%)
  
11. Elias Bareinboim and Judea Pearl (2013)  
 Meta-transportability of Causal Effects: A Formal Approach

*Proceedings of the 16th International Conference on Artificial Intelligence and Statistics (AISTATS), JMLR, pp. 135-143, 2013.*  
(Acceptance rate = 11% (plenary))

10. Elias Bareinboim and Judea Pearl (2012)  
Causal Inference by Surrogate Experiments (or,  $z$ -Identifiability)  
*Proceedings of the 28th Conference on Uncertainty in Artificial Intelligence (UAI)*, AUAI Press, pp. 113-120, 2012.  
(Acceptance rate = 31%)
9. Elias Bareinboim and Judea Pearl (2012)  
Transportability of Causal Effects: Completeness Results  
*Proceedings of the 26th AAAI Conference on Artificial Intelligence (AAAI)*, pp. 698-704, 2012.  
(Acceptance rate = 26%)
8. Elias Bareinboim and Judea Pearl (2012)  
Controlling Selection Bias in Causal Inference  
*Proceedings of the 15th International Conference on Artificial Intelligence and Statistics (AISTATS), JMLR, pp. 100-108, 2012.*  
(Acceptance rate = 33%)
7. Elias Bareinboim, Carlos Brito, Judea Pearl (2012)  
Local characterizations of Causal Bayesian Networks  
*Lecture Notes in Artificial Intelligence*, v. 7205, Springer-Verlag, pp. 1-17, 2012.
6. Judea Pearl and Elias Bareinboim (2011)  
Transportability across studies: A formal approach  
*Proceedings of the 25th AAAI Conference on Artificial Intelligence (AAAI)*, pp. 247-254, 2011.  
(Acceptance rate = 24.8%)
5. Judea Pearl and Elias Bareinboim (2011)  
External Validity and Transportability: A formal approach  
*Proceedings of the Joint Statistical Meetings*, American Statistical Association, pp. 157-171, 2011.
4. Paulo Carvalho, J. Fischer, J. Perales, J. Yates, V. C. Barbosa, Elias Bareinboim (2011)  
A statistical approach for analyzing marginal cases in shotgun proteomics  
*Bioinformatics*, v. 27(2), 2011.
3. Elias Bareinboim, Carlos Brito, Judea Pearl (2011)  
Local characterizations of Causal Bayesian Networks  
*Proceedings of Graph Structures for Knowledge Representation and Reasoning — IJCAI, 2011.*
2. Elias Bareinboim and Valmir C. Barbosa (2008)  
Descents and nodal load in scale-free networks  
*Physical Review E*, v. 77(4), American Physical Society, 2008.
1. Elias Bareinboim, Ana T. R. Vasconcelos, Joao C. P. Silva (2007)  
Grammatical inference applied to linguistic modeling of biological networks  
*E. Journal of Communication, Information & Innovation in Health*, v.1, pp.329-333, 2007.

## Team / Mentoring

### — Ph.D. students

- Yonghan Jung (Fall/18-)  
Title (tentative): Estimation of Causal Effects
- Hyun Chai Jeong (Fall/18-)
- Kevin Xia (Spring/20-)
- Kasra Jalaldoust (Fall/21-)
- Kai-Zhan Lee (Fall/21-)
- Mingxuan Li (Fall/21-)
- Yushu Pan (Fall/21-)
- Tara Anand (Fall/21-; co-advised w/ Prof. George Hripcsak @DBMI)
- Aurghya Maiti (Fall/22-)
- Arvind Raghavan (Spring/23-)
- Adiba Ejaz (Fall/23-)
- Hongshuo Yang (Fall/23-)
- Jeffrey Wu (Fall/24-)
- Shreyas Havaladar (Fall/24-)

### — Postdoctoral Scholars

- Drago Plecko (Fall/22-)
- Adam Li (Spring/22-)
- Junzhe Zhang (Fall/23-)

### — Alumni

- Juan David Correa (PhD; Fall/16-Summer/21)  
Title: A Computational Perspective of Causal Inference and the Data Fusion Problem
- Daniel Kumor (PhD; Fall/16-Spring/21)  
Title: Effect Algorithms for Identification in Linear Systems and Imitation Learning
- Amin Jaber (PhD; Fall/16-Fall/22)  
Title: Causal Identification in Equivalence Classes
- Junzhe Zhang (PhD; Fall/16-Summer/23)  
Title: Towards Causal Reinforcement Learning
- Alexis Bellot (Postdoc; Summer/21-Spring/22)  
Current: Researcher, Deep Mind
- Adele Ribeiro (Postdoc; Fall/19-Summer/22)  
Current: Postdoc Scholar, Philipps-Universität Marburg
- Sanghack Lee (Postdoc; Spring/18-Spring/21)  
Current: Assistant Professor, Seoul National University

## — Visiting Scholars

- Prof. Juan Correa (Summer/22, Summer/23)
- Christoffer Riis (Fall/22-Spring/23)
- Julius von Kügelgen (Jun/22)
- Drago Plecko (Fall/21-Spring/22)
- Prof. Jin Tian (Fall/20-Summer/21)

## — M.Sc. students

- Prateek Jain (Spring/23-Fall/24)
- Yusuf Efe (Fall/22-Spring/24)

## — Undergraduate

- Noah Rouleau (Fall/15)
- Mahimna Kelkar (Fall/17)  
Current: PhD student, Cornell University

## — PhD Committees

- Dustin Train (defense: 8/20)  
Advisor: David Blei
- Tyler Joseph (defense: 3/21)  
Advisor: Itsik Pe'er

## Teaching

### — At Columbia (instructor)

- CS 4775 (graduate), Causal Inference I: Spring/2020, Fall/2020, Fall/2021, Fall/2022, Fall/2023.
- CS 4995 (graduate), Causal Inference II: Spring/2021, Spring/2022, Spring/2023.
- CS 6995 (graduate), Causal Trustworthy AI: Fall/2023.

### — At Purdue (instructor)

- CS 47100 (undergraduate), Artificial Intelligence, Spring/2017, Spring/2018.
- CS 57800 (graduate) Machine Learning, Fall/2015.
- CS 59000-AI (graduate), Artificial Intelligence, Fall/2016, Fall/2018.
- CS 59000-AML (graduate), Causal Inference / Advanced Machine Learning, Spring/2016, Fall/2017, Spring/2019.

### — Before

- CS 262Z (graduate), Causal Inference, instructor with J. Pearl and J. Tian, UCLA, Spring/2013.
- CS 262Z (graduate), Causal Inference, teaching assistant, UCLA, Spring/2010, Spring/2011.
- MAB 525 (undergrad), Special Topics in Artificial Intelligence, instructor with J. C. P. Silva, Federal University of Rio de Janeiro (UFRJ), Spring/2007.



## Tutorials & Short Courses

- “Causal Fairness Analysis” (with D. Plecko)  
European Conference on Artificial Intelligence (ECAI), Santiago de Compostela, forthcoming.
- “Causal Fairness Analysis” (with D. Plecko)  
Association for Advancement of Artificial Intelligence (AAAI), Vancouver, Feb/2024.
- “Causal Fairness Analysis” (with D. Plecko)  
International Conference on Machine Learning (ICML), Baltimore, Jul/2022.
- “Causal Inference and the Data-Fusion Problem” (with A Ribeiro)  
Lisbon Machine Learning School (LxML), Jul/2022.
- “An Introduction to Causal Inference”  
Bellairs Invitational Workshop on Causal Inference & Representation Learning, Barbados, Mar/2022.
- “Causal Inference and the Data-Fusion Problem” (with A Ribeiro)  
Lisbon Machine Learning School (LxML), Jun/2021.
- “Causal Fairness Analysis” (with D. Plecko, J. Zhang)  
ACM Conference on Fairness, Accountability, and Transparency (FaccT), Mar/2021.
- “Causal Inference and the Data-Fusion Problem” (with A Ribeiro)  
Annual Deming Conference on Applied Statistics , NY, Dec/2020.
- “Causal Inference in the Health Sciences” (with M. Adibuzzaman, A. Ribeiro).  
American Medical Informatics Association Annual Symposium (AMIA), Nov/2020.
- “Causal Reinforcement Learning”  
International Conference on Machine Learning (ICML), Jul/2020.
- “Causal Reinforcement Learning” (with S. Lee, J. Zhang)  
International Joint Conference on Artificial Intelligence (IJCAI), Macau, China, Aug/2019.
- “An Introduction to Causal Inference”  
Machine Learning Research School (MLRS), Bangkok, Thailand, Aug/2019.
- “Causal Reinforcement Learning”  
Uncertainty in Artificial Intelligence (UAI), Tel Aviv, Israel, Jul/2019.
- “Causal Inference and the Data-Fusion Problem”  
International Conference on Autonomous Agents and Multi-agent Systems (AAMAS), Sao Paulo, Brazil, May/2017.

- “An Introduction to Causal Inference”  
West Coast Experiments Conference (Graphical Models in Economics), Los Angeles, CA, Apr/2017.
- “Causal Inference and the Data-Fusion Problem”  
Association for Advancement of Artificial Intelligence (AAAI), San Francisco, CA, Feb/2017.
- “Causal Inference and the Data-Fusion Problem”  
Department of Computing Science, University of Alberta, Edmonton, Canada, August/2016.
- “Causes and Counterfactuals: Concepts, principles, and tools” (with J. Pearl)  
Neural Information Processing (NIPS), Lake Tahoe, Nevada, December/2013.
- “Causality and Big Data”  
EMC<sup>2</sup> Summer School on Big Data, Rio de Janeiro, Brazil, February/2013.
- “An Introduction to Causal Inference”  
The Second IEEE Conference on Healthcare Informatics and Systems Biology (Analyzing Big Data For Healthcare and Biomedical Sciences), UCSD, La Jolla, California, September/2012.

## Invited Talks, Lectures, Panels

- 2024 Workshop on Applied Algorithms for Machine Learning (Future of Computation), forthcoming.
- 2024 Joint Statistical Meetings, forthcoming.
- 2024 Yale AI in Medicine Interest Group, forthcoming.
- 2024 Columbia Engineering Alumni Reunion.
- 2024 Universitatea Politehnica Timișoara, Tech Talks.
- 2024 Workshop on Causal Discovery in Semiconductor Manufacturing (NSF/NIST).
- 2024 Columbia-Dream Sports Research Center (kickoff).
- 2023 Yale Research Initiative on Innovation and Scale Annual Meeting.
- 2023 Columbia Economics Department.
- 2023 NSF NAIL (kickoff), The Artificial and Natural Intelligence Institute.
- 2023 National Academy of Sciences.
- 2023 IROS workshop on Causality for Robotics.
- 2023 Causality for Ethics and Society Workshop, LMU Munich.
- 2023 CVPR Workshop on Compositionality, Prompts and Causality.
- 2023 Bloomberg’s Quant seminar series.
- 2023 UChicago Booth Econometrics and Statistics seminar.
- 2023 UIUC Causal Inference Workshop: Current Trends and the Future of Research.
- 2023 Vanderbilt Biostatistics seminar.
- 2023 Columbia Department of Biomedical Informatics.
- 2023 UMass Computer Science seminar.
- 2022 Boeing Aerospace & Autonomy Center.
- 2022 Bloomberg’s Data Science Speaker Series.
- 2022 Oregon State University, AI seminar.

- 2022 ICLR Workshop on “Privacy, Accountability, Interpretability, Robustness, Reasoning on Structured Data” (PAIR2Struct).
- 2022 1st International Workshop on Interactive Causal Learning.
- 2022 MIT IDSS Distinguished Speaker Seminar.
- 2022 UC Berkeley/Simons Institute Workshop on “Learning from Interventions”.
- 2021 NeurIPS Workshop on Algorithmic Fairness thr. the Lens of Causality & Robustness.
- 2021 NeurIPS Workshop on Causality in Sequential Decision Making.
- 2021 MIT-Harvard Economics seminar.
- 2021 ICML Algorithmic Recourse Workshop.
- 2021 ICAPS Workshop on Planning and Reinforcement Learning.
- 2021 JPMorgan Chase Faculty Research Meeting.
- 2021 OECD workshop on AI & the Productivity of Science.
- 2021 Society for Imprecise Probability (SIPTA) Annual Meeting Keynote.
- 2021 Inria Workshop “Leveraging Observational Data with Machine Learning”.
- 2021 23rd Japanese Workshop on Information-Based Induction Sciences (IBIS).
- 2021 Seoul National University, Data Science Seminar.
- 2021 Columbia Data Science Institute.
- 2020 Machine Learning in Science and Engineering Conference (MLSE).
- 2020 Society for Epidemiologic Research (SER) Annual Meetings.
- 2020 AMIA Causal Inference from Observational Healthcare Data.
- 2020 CMU Machine Learning Department Seminar.
- 2020 MICCAI Causality in Medical Computing.
- 2020 AFOSR Understanding in the Human and the Machine Workshop.
- 2020 KDD Workshop on Causal Discovery.
- 2020 Microsoft Research Frontiers of Machine Learning.
- 2019 Max Planck Institute (Intelligent Systems), Tübingen, Germany.
- 2019 Mailman School of Public Health, Columbia University, NY.
- 2019 Data Council New York City, NY.
- 2019 INFORMS Annual Meeting, Seattle, WA.
- 2019 Stanford Graduate School of Business, CA.
- 2019 MIT-IBM Watson AI Lab - workshop on “Bridging causal inference, reinforcement learning and transfer learning (CRT)”, MA.
- 2019 MIT workshop on “Graphical Models, Causality, Exchangeable Models, Graphons”, MA.
- 2019 Technion - Israel Institute of Technology, Haifa, Israel.
- 2019 Hebrew University of Jerusalem, Jerusalem, Israel.
- 2019 Oberwolfach Research Institute for Mathematics, “Foundations and New Horizons for Causal Inference”, Germany.
- 2019 Foundations of Data Science, Purdue University, Lafayette, IN.
- 2019 FDA / DIA Statistics Forum, Washington DC.
- 2019 Computer Science, Columbia University, NY.
- 2019 Harvard Medical School, Boston, MA.
- 2019 UIC Department of Information & Decision Sciences, Chicago, IL.

- 2019 DARPA CausalX-World Modelers' meeting, Los Angeles, CA.
- 2019 AI Roadmap: Learning and Robotics, Computing Community Consortium (CCC), CA.
- 2018 NeurIPS-18 Workshop "Causal Learning", Montreal, Canada.
- 2018 School of Medicine, Indiana University, Indianapolis, IN.
- 2018 NIH Division of Cancer Biology, National Cancer Institute (NCI), Rockville, MD.
- 2018 UAI-18 Workshop on Causal Inference, Monterey, CA.
- 2018 Adobe Research, San Jose, CA.
- 2018 RSS-18 Workshop "Causal Imitation in Robotics", Pittsburgh, PA.
- 2018 Atlantic Causal Inference Conference (ACIC), Pittsburgh, PA.
- 2018 TTI Vanguard Conference (Intelligence: Natural and Artificial), New York, NY.
- 2017 CVPR-17 Workshop "Functionality, Physics, Intentionality, and Causality", Honolulu, HI.
- 2017 Statistical Society of Canada Annual Meeting, Winnipeg, Canada.
- 2017 School of Engineering, University of São Paulo (USP), São Paulo, Brazil.
- 2017 Institute of Computing, University of Campinas (UNICAMP), Campinas, Brazil.
- 2017 Workshop on Causal Analysis in the Social Sciences, UCLA, CA.
- 2017 NSF Workshop: Advancing the Science of Transportation Demand Modeling, UC Berkeley, CA.
- 2017 Computer Science, University of Wisconsin, Madison, WI.
- 2017 Computer Science, ISI / University of Southern California (USC), CA.
- 2016 NeurIPS-16 Workshop "Inference and Learning of Hypothetical and Counterfactual Interventions in Complex Systems", Barcelona, Spain.
- 2016 AAAI-16 Fall Symposium on Accelerating Science: A Grand Challenge for AI, Arlington, VA.
- 2016 Department of Public Health Sciences, University of Chicago, Chicago.
- 2016 54th Allerton Conference on Communication, Control, and Computing, UIUC, IL.
- 2016 Department of Computing Science, University of Alberta, Edmonton, Canada.
- 2016 International Conference on Thinking (ICT), Providence, RI.
- 2016 Joint Statistical Meetings (JSM), Chicago, IL.
- 2016 Workshop on Statistical Causal Inference and its Applications to Genetics, Centre de Recherches Mathématiques (CRM), Montreal, Canada.
- 2016 Frontiers of Engineering Symposium (US-JP), National Academy of Engineering (NAE), CA.
- 2016 Max Planck Institute (Empirical Inference Dept.), Tübingen, Germany.
- 2016 Department of Computer Science and Mathematics, University of Passau, Germany.
- 2016 Munich Workshop on Causal Inference and Information Theory (MCI), Munich, Germany.
- 2016 Statistics Colloquium, Purdue University, West Lafayette, IN.
- 2015 Computer Science, Purdue University, West Lafayette, Indiana.
- 2015 Biostatistics and Computer Science, Johns Hopkins University, Baltimore, Maryland.
- 2015 Computer Science Division, University of California, Berkeley, California.
- 2015 Department of Computer Science, University of Southern California (USC), CA.
- 2015 School of Information and Computer Science, University of California, Irvine, CA.
- 2015 Department of Computer Science, Cornell University, New York.
- 2015 Department of Statistics, Stanford University, California.
- 2015 60th World Congress of Statistics, International Statistics Institute (ISI), Brazil.

- 2014 Department of Economics, University of Chicago, Chicago.
- 2014 Kyoto International Conference on Modern Statistics, Kyoto.
- 2014 International Workshop on Causal Inference and its related topics, Tokyo.
- 2014 ACM-SIGKDD-14 Workshop on Discovery Informatics, New York.
- 2014 UAI-14 Workshop on Causality: Learning and Prediction, Quebec City, Canada.
- 2014 NICTA, Sydney, Australia.
- 2014 Institute of Mathematical Statistics (IMS) Annual Meeting, Sydney, Australia.
- 2014 MURI, Office of Naval Research (ONR), UCLA, Los Angeles, California.
- 2014 Atlantic Causal Inference Conference, Brown University, Providence, RI.
- 2014 Joint Mathematics Meetings, American Mathematical Society, Baltimore, Maryland.
- 2013 NeurIPS-13 Workshop “Causality: Large-scale Experimental Design”, Lake Tahoe, NV.
- 2013 MURI, Office of Naval Research (ONR), UCLA, Los Angeles, California.
- 2012 Graduate School of Engineering, Federal University of Rio de Janeiro (UFRJ), Brazil.
- 2012 Computer Science Colloquium, Federal University of Rio de Janeiro (UFRJ), Brazil.
- 2012 MURI, Office of Naval Research (ONR), UCLA, Los Angeles, California.
- 2011 International Workshop on Mining Multiple Information Sources, International Conference on Data Mining (ICDM), Vancouver, Canada.
- 2011 58th World Congress of Statistics, International Statistics Institute (ISI), Dublin.
- 2011 DERI/National University of Ireland (NUI), Galway, Ireland

## Funding (Bareinboim’s share > \$8M)

- NSF CISE: Large: Causal Foundations of Decision Making and Learning, PI  
Title: Causal Decision-Making, 10/2023-09/2028.  
Amount: \$1,672,312 (=33% of total).
- Defense Advanced Research Projects Agency (DARPA), Young Faculty Award, PI  
Title: Causal Reinforcement Learning, 9/2023 - 8/2026.  
Amount: \$1,000,000 (=100% of total).
- Columbia-Amazon Center of AI Technology, PI  
Title: Algorithmic Fairness through a Causal Lens, 7/2023 - 6/2024.  
Amount: \$100,000 (=100% of total).
- NSF Eager, Robust Intelligence/IIS, PI  
Title: Causal Decision-Making, 9/2022-8/2023.  
Amount: \$150,000 (=50% of total).
- Computing Research Association, PI  
Title: Computing Innovation Fellows, 1/2022-5/2024.  
Amount: \$321,288 (=100% of total).

- Air Force Office of Scientific Research (AFOSR), PI  
Title: Causal Reinforcement Learning: Discovery and Decision Making, 09/2022-08/2025.  
Amount: \$825,000 (=100% of total).
- Office of Naval Research (ONR), Young Investigator Program (YIP), PI  
Title: Causal Reinforcement Learning: Theory, Algorithms, & Applications, 05/2022-04/2025.  
Amount: \$510,000 (=100% of total).
- The Alfred P. Sloan Foundation Award, PI  
Title: The Mathematics of Fair Decision-Making, 08/2021-07/2023.  
Amount: \$564,726 (=100% of total).
- Amazon, Research Award (gift)  
Title: Approximate Causal Inference, cycle 2021; awarded 2022.  
Amount: \$140,000 (=100% of total).
- JP Morgan, Research Award (gift)  
Title: Causal Reinforcement Learning, cycle 2021.  
Amount: \$120,000 (=100% of total).
- Carnegie Mellon University, Software Engineering Institute (SEI)  
Title: Investigating the Maturation of Determining the Limits of AI Robustness, 09/2021-08/2022.  
Amount: \$200,000 (=20% of total).
- Department of Energy (DoE), ASCR (thr. UCSD); CU PI: Gentine  
Title: Discovering Physically Meaningful Structures from Climate Extreme Data, 09/2021-08/2024.  
Amount: \$300,000 (=25% of total).
- Columbia University, SIRS/STAR Program, PI  
Title: Causal Data Science: Towards an Accelerated Process of Cancer Translation Research, (cycles: 2021-22 and 2022-23). Co-PI: Prof. Anil Rustgi (Medical School).  
Amount: \$170,000 (=100% of total).
- Amazon, Research Award (gift)  
Title: Off-policy Evaluation through Causal Models, cycle 2020; awarded 2021.  
Amount: \$90,000 (=100% of total).
- NSF, Robust Intelligent/IIS, PI  
Title: Towards Causal Fair Decision-Making, 04/2021 - 03/2023.  
Amount: \$270,000 (=35% of total).
- Columbia-Amazon Center of AI Technology, PI  
Title: Counterfactual Reinforcement Learning for Personalized Decision-Making, 1/2021 - 12/2021.  
Amount: \$150,000 (=100% of total).

- NIH, R01, PI: George Hripcsak  
Title: NLM:Discovering and Applying Knowledge in Clinical Databases. 09/2020 - 08/2021.  
Amount: \$74,485 (=5% of total)
- NSF, CAREER, PI  
Title: Approximate Causal Inference, 04/2018 - 03/2023.  
Amount: \$499,712 (=100% of total).
- NSF, Robust Intelligence, Medium, PI  
Title: Causal Inference: Identification, Learning, and Decision-Making, 10/2017 - 09/2020.  
Amount: \$536,515 (=50% of total).
- Purdue, Integrative Data Science Initiative, PI  
Title: Causally-driven Healthcare Science, 06/2018 - 05/2020.  
Amount: \$200,000 (=75% of total).
- Adobe, Data Science Research Award (gift)  
Title: Optimal Decision-making under Causal Constraints, 2018.  
Amount: \$50,000 (100% of total).
- IBM, Open Collaborative Research Award (gift)  
Title: Machine Learning and Causal Inference, 2017.  
Amount: \$50,000 (100% of total).
- DARPA, Fundamental Limits of Learning (FunLol), co-PI  
Title: Fundamental Limits of Learning Concepts and Models for Complex Systems, 10/2016-12/2017.  
Amount: \$125,000 (=16.6% of total).

## Community Service

- Editor-in-Chief, Journal of Causal Inference (JCI), 2023-now.
- Action Editor, Journal of Machine Learning Research (JMLR), 2022-now.
- Reviewer, Israel National Science Foundation, 2023.
- Editorial Board, Journal of Causal Inference (JCI), 2017-2023.
- Chair (with J. Pearl, B. Schölkopf, Y. Bengio, T. Sejnowski), NeurIPS-21 workshop, "WHY-21 Causal Inference and Machine Learning: Why now?", 2021.
- Editor (w/ Mark V. D. Laan), Journal of Causal Inference Special issue on "Integrating Observational Studies with Randomized Trials", 2021-2022.
- Reviewer, National Science Foundation (NSF), area: IIS, 2019, 2020, 2021, 2023.
- Co-chair (w/ B. Schölkopf, K. Zhang, B. Huang et al), NeurIPS Workshop on Causal Discovery, 2020.
- Chair (w/ J. Pearl, B. Schölkopf, C. Szepesvari, S. Mahadevan, P. Tadepalli), AAAI-SS-19, "WHY-19 Beyond Curve Fitting: Causation, Counterfactuals, and Imagination-based AI", 2019.
- Chair (with K. Zhang, C. Uhler, J. Zhang, D. Janzing), 7th UAI Causality Workshop, 2017.

- Co-chair (with K. Zhang, J. Li, L. Liu), KDD Workshop on Causal Discovery, 2016.
- Co-chair (with F. Eberhardt, R. Silva, J. Mooij, M. Maathuis), UAI Causality Workshop, 2016.
- Guest Editor (with J. Pearl, B. Schölkopf, K. Zhang, J. Li), Special Issue on Causality, ACM Transactions on Intelligent Systems and Technology (TIST), 2015.
- Co-chair (with B. Schölkopf, K. Zhang, J. Zhang), ICML 2014 Workshop on Causal Modeling and Machine Learning, 2014.
- Reviewer, National Science Foundation (NSF), area: Methodology, Measurement, and Statistics, 2014.
- Area Chair / Senior PC-Conferences (\* Senior AC):
  - 2024: NeurIPS\*, ICML\*.
  - 2023: NeurIPS\*, AAAI\*, ICLR.
  - 2022: NeurIPS\*, ICML, AAAI, AISTats, ICLR<sup>1</sup>, CLeaR.
  - 2021: NeurIPS\*, ICML, AAAI, AISTats, ICLR, UAI, IJCAI.
  - 2020: NeurIPS, ICML, AAAI, AISTats, UAI, IJCAI.
  - 2019: NeurIPS, AAAI.
- Program Committee-Conferences:
  - 2020: FODS (Foundations of Data Science).
  - 2019: UAI, IJCAI, ICML.
  - 2018: NeurIPS, UAI, AAAI, IJCAI, ICML.
  - 2017: NeurIPS, UAI, AAAI, AISTATS.
  - 2016: NeurIPS, UAI, AAAI, IJCAI, ECAI.
  - 2015: NeurIPS, UAI, AAAI, AISTATS, UAI-Causality.
  - 2014: UAI, ICML, AISTATS, KDD-DI.
  - 2013: UAI, AAAI, IJCAI, ICML, NeurIPS-Causality, IEEE-BigData, UAI-Causality.
  - 2012: UAI, ICML.
  - 2011: NeurIPS, UAI, IJCAI, ICDM-MMIS.
  - 2010: KR (rev).
- Reviewer-Journals:
  - 2023: Statistics in Medicine.
  - 2022: J. of Machine Learning Research (JMLR), Statistical Science, Journal of the ACM (JACM).
  - 2021: J. of Machine Learning Research (JMLR), Statistical Science, PloS Medicine, Epidemiology, Am. J. of Epidemiology.
  - 2020: J. of Machine Learning Research (JMLR), Statistical Science, Statistics in Medicine.
  - 2019: J. of Machine Learning Research (JMLR), Statistical Science, Statistics in Medicine.
  - 2018: J. of Machine Learning Research (JMLR), Artificial Intelligence Journal (AIJ), Statistics in Medicine, Peer J (Computer Science).
  - 2017: J. of Machine Learning Research (JMLR), J. of Causal Inference.
  - 2016: Biometrika, Bayesian Analysis, J. Causal Inference, Epidemiology, Behaviormetrika.
  - 2015: Artificial Intelligence Journal (AIJ), Biometrics, J. of Causal Inference, Epidemiology.
  - 2014: Statistical Science, The British Journal for the Philosophy of Science, Annals of Applied Statistics.

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<sup>1</sup> Selected as “Highlighted Area Chair”.



- 2013: J. of Machine Learning Research (JMLR), Scandinavian Journal of Statistics, Annals of Applied Statistics, J. of Causal Inference, Statistics in Medicine, Statistics.
- 2012: J. of Machine Learning Research (JMLR), IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), Statistics in Medicine, Bioinformatics, J. of Proteome Research.
- 2011: J. of Causal Inference.
- 2009: J. of Proteomics, Bioinformatics, Physica A.

## Departmental/University Service

- Member, Task Force for AI Initiative, School of Engineering, Columbia University, since 2021.
- Member, Data Science in Health Initiative (DASHI), Data Science Institute, Columbia University, since 2021.
- Columbia University (CS Department):
  - Member, Graduate Admissions Committee, since Fall/2020.
  - Member, Student Nominations Committee, since Fall/2019.
- Purdue University (CS Department):
  - Member, Graduate Committee, Fall/2017-Spring/2019.
  - Member, Graduate Admissions Committee, cycle: Fall/2016, Fall/2017.
- UCLA (CS Department):
  - Reviewer, Graduate Admissions Committee, 2013-2014;
  - Mentor for 3 PhD students, 2010-2013.

## Industrial Experience

- Software Engineer, Intern (Systems/Data Mining), Google, Mountain View/CA, USA, Summer 2009.
- Software Engineer, Programare Software Factory, Brazil, Feb/2008 – Aug/2008.
- CTO and Co-Founder, Linux Solutions Ltda, Brazil, 1999 – 2004.

## Professional Associations

- Association for the Advancement of Artificial Intelligence (AAAI), since 2011.
- Association for Computing Machinery (ACM), since 2011.
- Brazilian Computer Society (SBC), since 2004.

## Media coverage

- MIT Technology Review (featured), “What AI still can’t do”, Feb/2020 ([link](#)).
- NewScientist (featured), “Correlation or causation? Mathematics can finally give us an answer”, Apr/2020 ([link](#)).
- Communication of ACM (featured), “Solving for Why”, Vol. 65(2), p. 11-13, Feb/2022 ([link](#)).
- The State of Sao Paulo (in Portuguese), “Brazilians in AI: Elias Bareinboim”, Oct/2023 ([link](#)).