DANIEL MALINSKY

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Date of Preparation of CV: October 3rd, 2023

ACADEMIC APPOINTMENTS

07/2020–present   Assistant Professor
Department of Biostatistics
Mailman School of Public Health
Columbia University

Affiliate, Columbia Data Science Institute

EDUCATION

08/2012–12/2017   Carnegie Mellon University

PhD in Logic, Computation, and Methodology (2017)
Dissertation title: "Data-driven causal modeling for policy"
Committee: Peter Spirtes, Clark Glymour, David Danks, and Kevin Hoover

MS in Logic, Computation, and Methodology (2015)
Thesis title: "Estimating intervention effects in systems with unobserved confounding"
Committee: Peter Spirtes and Clark Glymour

09/2007–05/2011   Columbia University

Bachelor of Arts *cum laude* (2011)
Majors in Physics and Music
Concentration (Minor) in Philosophy

TRAINING

01/2018–06/2020   Johns Hopkins University

Postdoctoral Fellow
Department of Computer Science
Supervisors: Ilya Shpitser (JHU) and Eric J. Tchetgen Tchetgen (UPenn)

HONORS AND AWARDS

2023	Co-authored 2016 article with L.K. Bright and M. Thompson selected for the *Philosophy of Science* 90th Anniversary Collection
2022	Invited Long-Term Visitor at the Simons Institute, UC Berkeley
2021	Calderone Health Equity Award (Columbia Mailman School of Public Health)
2019	AAAI Outstanding Program Committee Member Award
2016	NSF Travel Award (Philosophy of Science Association)
2011	Copper Crown Leadership Award (Columbia College)

ACADEMIC SERVICE

Committee Member	Qualifying exams (Theory), Dept. of Biostatistics, Columbia (2023–present)
Committee Member	Research advisory committee, Dept. of Biostatistics, Columbia (2023–present)
Committee Member	Diversity committee, Dept. of Biostatistics, Columbia (2020–present)
Committee Member	Doctoral admissions committee, Dept. of Biostatistics, Columbia (2020–present)
Seminar Organizer	Levin Lecture Series, Dept. of Biostatistics, Columbia (2022–2023)
Committee Co-chair	FORWARD anti-racism initiative ("Setting Goals & Measuring Progress" Action Corp), Mailman School, Columbia (2022)
Committee Member	Data Science and Health Initiative (DASHI) grant proposals, Data Science Institute, Columbia (2022)
Committee Member	Qualifying exams (Applications), Dept. of Biostatistics, Columbia (2021)
Committee Member	Data science seed grant proposals, Data Science Institute, Columbia (2020, 2022)
Committee Member	Curriculum committee, Dept. of Biostatistics, Columbia (2020, 2021)

PROFESSIONAL ORGANIZATIONS AND SOCIETIES

Member	American Statistical Association (2020–present)

Conference Organizer	Workflow Co-chair for 2nd Conference on Causal Learning and Reasoning (CLeaR) (2023)
Conference Organizer	Tutorial Co-chair for 38th Conference on Uncertainty in Artificial Intelligence (UAI) (2022)
Conference Organizer	Workflow Co-chair for 1st Conference on Causal Learning and Reasoning (CLeaR) (2022)
Workshop Organizer	Co-organizer of the Workshop on Causal Discovery and Causality-Inspired Machine Learning at NeurIPS (2020)
Session Organizer	Atlantic Causal Inference Conference (2018)
Session Chair	Eastern North American Regional (ENAR) Meeting of the International Biometric Society (2020)
Area Chair	ACM Conference on Fairness, Accountability, and Transparancy (FAccT) (2023)
Reviewer	Funding Agencies: National Science Foundation, Icelandic Research Fund Conferences: AAAI, AISTATS, ICML, NeurIPS, UAI Workshops: BIBM-CABB, KDD-CD, NeurIPS-CDML, NeurIPS-WHY Journals: *Annals of Statistics*, *Artificial Intelligence*, *Behaviormetrika*, *Biometrics*, *British Journal for the Philosophy of Science*, *Econometrics*, *Erkenntnis*, *International Journal of Approximate Reasoning*, *International Journal of Biostatistics*, *International Journal of Environmental Research and Public Health*, *Journal of the American Statistical Association*, *Journal of Causal Inference*, *Journal of Data Science and Analytics*, *Journal of Machine Learning Research*, *Journal of the Royal Statistical Society: Series B*, *Machine Learning*, *Philosophy of Science*, *Science Advances*, *Stat*, *Statistics in Medicine*, *Synthese*

FELLOWSHIP AND GRANT SUPPORT

CURRENT SUPPORT

08/2022–08/2027	1 K25 ES034064-01 NIH / NIEHS (PI: Malinsky) Flexible causal inference methods for estimating longitudinal effects of air pollution on chronic lung disease Amount: $513,008 direct costs over 5 years Role: Principal Investigator, 75% effort
09/2022–09/2024	Columbia Mailman Dean's Centennial Grand Challenges Award (PIs: Belsky/Herbstman/Wei) Towards a New Science of Health: Developing an Operational Definition of Intrinsic Health Role: Co-Investigator, 5% effort

PAST SUPPORT

01/2020–06/2020 NSF Award 1939675 (PI: Shpitser)
FAI: Quantifying Direct and Indirect Consequences of Racial Disparities in Outcomes Following Cardiac Surgery
Amount: $169,734 over 1 year
Role: Key Personnel (Postdoctoral Fellow), 45% effort

EDUCATIONAL CONTRIBUTIONS

ADVISING & MENTORSHIP

2022–   Zain Kahn (co-mentor, PhD student in Biomedical Engineering)

2021–   Safiya Sirota (mentor, PhD student in Biostatistics)

2021–2023 Ilan Cerna-Turoff (co-mentor, NIEHS T32 postdoctoral fellow)

2022   Ellie Schumacher (undergraduate, SIBDS summer program)

2022   John Yanev (undergraduate, SIBDS summer program)

2021   Jiarui Fu (practicum supervisor, MS Biostatistics)

2021   Mengyuan Li (practicum supervisor, MS Biostatistics)

2021   Tianna Couch (undergraduate, BEST summer program)

2021   Chloe Troxell (undergraduate, BEST summer program)

DOCTORAL EXAMINATION, ADVISORY, AND DEFENSE COMMITTEES

2022   Ranjani Srinivasan (PhD student in Electrical & Computer Engineering, Johns Hopkins University, dissertation defense)

2022   Domonique Reed (PhD student in Epidemiology, dissertation proposal oral exam)

2022   Charlotte Fowler (PhD student in Biostatistics, dissertation proposal oral exam)

2021   Erin McDonnell (PhD student in Biostatistics, dissertation defense)

DIRECT TEACHING

Fall 2021, 2022, 2023   Graphical Models for Complex Health Data (Columbia P8124)
Enrollment approximately 30-40 students, graduate

Fall 2023	Statistical Practices and Research for Interdisciplinary Science II (SPRIS2) faculty mentor (Columbia P9186)
Spring 2018	Machine Learning: Data to Models (at Johns Hopkins) Enrollment approximately 50 students, undergraduate and graduate
Spring 2017	Social Structure, Public Policy, & Ethics (at Carnegie Mellon) Enrollment approximately 25 students, undergraduate
Summers 2014, 2015	Introduction to Political Philosophy (at Carnegie Mellon) Enrollment approximately 5 students, undergraduate
Summer 2013	Introduction to Ethics (at Carnegie Mellon) Enrollment approximately 5 students, undergraduate

GUEST LECTURES AND TUTORIALS

Aug. 2022	"Fairness in Data Science: Criteria, Algorithms, and Open Problems" (at Joint Statistical Meetings, Washington DC) Half-day short-course, co-taught with Razieh Nabi and Ilya Shpitser Approximately 45 in-person attendees
Aug. 2022	"Case Study: Mediation analysis" (at Environmental Justice Bootcamp, Columbia MSPH SHARP Program) Guest lecture in virtual short-course, co-taught with Joan Casey Approximately 20 online attendees
Jan. 2022	"Introduction to Causal Discovery" (at University of California, Berkeley) Opening "bootcamp" (tutorial) of the Simons Institute Spring 2022 Program on Causality Approximately 50+ in-person attendees and 40+ online
Nov. 2019	"Introduction to Causal Inference" (at University of Maryland) Research Methods course for Pharmaceutical Health Services students Approximately 7 students, graduate

PUBLICATIONS

PEER-REVIEWED RESEARCH PUBLICATIONS

1. P. Meunnig, D.W. Belsky, **D. Malinsky**, K-G Nguyen, Z. Rosen, H. Allen (2023) "The effect of the earned income tax credit on physical and mental health – results from the Atlanta Paycheck Plus experiment." In Press at *The Milbank Quarterly*.

2. A.T. Strauss, C.N. Sidoti, H.C. Sung, V.S. Jain, H. Lehmann, T.S. Purnell, J.W. Jackson, **D. Malinsky**, J.P. Hamilton, J. Garonzik-Wang, S.H. Gray, M.L. Levan, J.S. Hinson, A.P. Gurses, A. Gurakar, D.L. Segev, S. Levin (2023) "Artificial intelligence-based clinical decision support for liver transplant evaluation and considerations about fairness: A qualitative study." *Hepatology Communications* 7: e0239.

3. J.M. Chen, **D. Malinsky**, R. Bhattacharya (2023) "Causal Inference With Outcome-Dependent Missingness and Self-Censoring." In *Proceedings of the 39th Conference on Uncertainty in Artificial Intelligence* (UAI).

4. E.D. Angelini, J. Yang, P.P. Balte, . . . , **D. Malinsky**, . . . , A.F. Laine, and R.G. Barr (2023) "Pulmonary Emphysema Subtypes Defined by Unsupervised Machine Learning on Computed Tomography Scans." In Press at *Thorax*.

5. M. Vameghestahbanati, C. Sack, A. Wysoczanski, . . . , **D. Malinsky**, . . . , R.G. Barr, and B.M. Smith (2023) "Association of dysanapsis with mortality among older adults." In Press at *European Respiratory Journal*.

6. A.T. Strauss, E. Moughames, J.W. Jackson, **D. Malinsky**, D.L. Segev, J.P. Hamilton, J. Garonzik-Wang, A. Gurakar, A. Cameron, L. Dean, E. Klein, S. Levin, T.S. Purnell (2023) "Critical interactions between race and the highly granular Area Deprivation Index in liver transplant evaluation." In Press at *Clinical Transplantation*.

7. J.J.R. Lee, R. Srinivasan, C.S. Ong, D. Alejo, S. Schena, I. Shpitser, M. Sussman, G.J.R. Whitman, and **D. Malinsky** (2022) "Causal determinants of postoperative length of stay in cardiac surgery using causal graphical learning." In Press at *Journal of Thoracic and Cardiovascular Surgery*.

8. N.P. Taskiran, G.T. Hiura, X. Zhang, R.G. Barr, S.M. Dashnaw, E.A. Hoffman, **D. Malinsky**, E.C. Oelsner, M.R. Prince, B.M. Smith, Y. Sun, Y. Sun, J.M. Wild, W. Shen, and E.W. Hughes (2022) "Mapping Alveolar Oxygen Partial Pressure in COPD Using Hyperpolarized Helium-3: The Multi-Ethnic Study of Atherosclerosis (MESA) COPD Study." *Tomography* 8(5): 2268-2284.

9. A.T. Strauss, C.N. Sidoti, T.S. Purnell, H.C. Sung, J.W. Jackson, S. Levin, V.S. Jain, **D. Malinsky**, D.L. Segev, J.P. Hamilton, J. Garonzik-Wang, S.H. Gray, M.L. Levan, J.R. Scalea, A.M. Cameron, A. Gurakar, A.P. Gurses (2022) "Multicenter study of racial and ethnic inequities in liver transplantation evaluation: Understanding mechanisms and identifying solutions." *Liver Transplantation* 28(12):1841–1856.

10. R. Nabi, **D. Malinsky**, and I. Shpitser (2022) "Optimal Training of Fair Predictive Models." In *Proceedings of the First Conference on Causal Learning and Reasoning* (CLeaR).

11. A. Martinez, R.H. Tobe, P.A. Gaspar, **D. Malinsky**, E.C. Dias, P. Sehatpour, P. Lakatos, G.H. Patel, D.H. Bermudez, G. Silipo, and D.C. Javitt (2022) "Disease-Specific Contribution of Pulvinar Dysfunction to Impaired Emotion Recognition in Schizophrenia." *Frontiers in Behavioral Neuroscience* 15:787383.

12. **D. Malinsky**, I. Shpitser, and E.J. Tchetgen Tchetgen (2022) "Semiparametric Inference for Non-monotone Missing-Not-at-Random Data: the No Self-Censoring Model." *Journal of the American Statistical Association* 117(539): 1415–1423.

13. R. Bhattacharya, T. Nagarajan, **D. Malinsky**, and I. Shpitser (2021) "Differentiable Causal Structure Learning Under Unmeasured Confounding." In *Proceedings of the 23rd International Conference on Artificial Intelligence and Statistics* (AISTATS).

14. J.D. Ramsey, **D. Malinsky**, and K.V. Bui (2020) "`algcomparison`: Comparing the Performance of Graphical Structure Learning Algorithms with TETRAD." *Journal of Machine Learning Research* 21(238): 1–6.

15. R. Bhattacharya, **D. Malinsky**, and I. Shpitser (2019) "Causal Inference Under Interference and Network Uncertainty." In *Proceedings of the 35th Conference on Uncertainty in Artificial Intelligence* (UAI).

16. R. Nabi, **D. Malinsky**, and I. Shpitser (2019) "Learning Optimal Fair Policies." In *Proceedings of the 36th International Conference on Machine Learning* (ICML).

17. **D. Malinsky**, I. Shpitser, and T.S. Richardson (2019) "A Potential Outcomes Calculus for Identifying Conditional Path-Specific Effects." In *Proceedings of the 22nd International Conference on Artificial Intelligence and Statistics* (AISTATS).

18. **D. Malinsky** and P. Spirtes (2019) "Learning the Structure of a Nonstationary Vector Autoregression." In *Proceedings of the 22nd International Conference on Artificial Intelligence and Statistics* (AISTATS).

19. S.W. Mogensen, **D. Malinsky**, and N.R. Hansen (2018) "Causal Learning for Partially Observed Stochastic Dynamical Systems." In *Proceedings of the 34th Conference on Uncertainty in Artificial Intelligence* (UAI).

20. **D. Malinsky** and P. Spirtes (2018) "Causal Structure Learning from Multivariate Time Series in Settings with Unmeasured Confounding." In *Proceedings of the 2018 ACM SIGKDD Workshop on Causal Discovery* (KDD-CD).

21. **D. Malinsky** and D. Danks (2018) "Causal Discovery Algorithms: A Practical Guide." *Philosophy Compass* 13: e12470.

22. **D. Malinsky** (2018) "Intervening on Structure." *Synthese* 135(5): 2295–2312.

23. **D. Malinsky** and P. Spirtes (2017) "Estimating Bounds on Causal Effects in High-dimensional and Possibly Confounded Systems." *International Journal of Approximate Reasoning* 88: 371–384.

24. **D. Malinsky** and P. Spirtes (2016) "Estimating Causal Effects with Ancestral Graph Markov Models." In *Proceedings of the Eighth International Conference on Probabilistic Graphical Models* (PGM).

25. L.K. Bright, **D. Malinsky**, and M. Thompson (2016) "Causally Interpreting Intersectionality Theory." *Philosophy of Science* 83(1): 60–81.

26. **D. Malinsky** (2015) "Hypothesis Testing, 'Dutch Book' Arguments, and Risk." *Philosophy of Science* 82(5): 917–929.

TECHNICAL REPORTS

1. L. Carminati, M. Delmastro, M. Hance, M. Jimenez Belenguer, R. Ishmukhametov, Z. Liang, G. Marchiori, V. Perez Reale, **D. Malinsky**, M. Tripiana, and G. Unal (2011) "Reconstruction and Identification Efficiency of Inclusive Isolated Photons." ATLAS Collaboration Note ATL-PHYS-INT-2011-014, CERN, Geneva.

OTHER MEDIA

1. I. Shpitser and **D. Malinsky** (2020) "Using Causal Reasoning To Guide Algorithms Toward a Fairer World." *The Ethical Machine*, Shorenstein Center on Media, Politics, and Public Policy, Harvard Kennedy School.

PRESENTATIONS

SCIENTIFIC MEETINGS (**DESIGNATES INVITED)

2023	"A cautious approach to constraint-based causal model selection based on equivalence tests" Joint Statistical Meetings (Toronto, Canada)
2023	"A cautious approach to constraint-based causal model selection based on equivalence tests"** Simons Institute Causality Program Workshop, U.C. Berkeley (Berkeley, USA)
2023	"A cautious approach to constraint-based causal model selection based on equivalence tests"** (keynote) Conference on "When Causal Inference Meets Statistical Analysis" (Paris, France)
2023	"A cautious approach to constraint-based causal model selection based on equivalence tests" The European Causal Inference Meeting (EuroCIM) (Oslo, Norway)
2023	"Causal determinants of postoperative length of stay in cardiac surgery using causal graphical learning"** The Second International Israel Data Science Initiative (IDSI) Conference (Virtual/Ein Gedi, Israel)

2022	"On interpreting the causal effects of race" Philosophy of Science Association (PSA) Meeting (Pittsburgh, USA)
2022	"Causal determinants of postoperative length of stay in cardiac surgery using causal graphical learning"** Pacific Causal Inference Conference (Virtual/Beijing, China)
2022	"Estimating longitudinal causal effects of air pollution exposures using marginal structural models" Joint Statistical Meetings (Washington, DC)
2022	"Optimal training of fair predictive models" 1st Conference on Causal Learning and Reasoning (CLeaR) (Eureka, USA)
2021	"Fairness in data-driven decision-making: a causal modeling perspective" Philosophy of Science Association (PSA) Meeting (Baltimore, USA)
2021	"Causality, interference, and network learning"** International Conference on Machine Learning (ICML) Workshop on Neglected Assumptions in Causal Inference (Virtual)
2021	"Causal inference under interference and network uncertainty"** 4th International Conference on Econometrics and Statistics (EcoSta) (Virtual/Hong Kong)
2020	"A potential outcomes calculus for identifying conditional path-specific effects"** 13th International Conference of the ERCIM Working Group on Computational and Methodological Statistics (CMStatistics) (Virtual)
2020	"Semiparametric inference for non-monotone missing-not-at-random data: the no self-censoring model"** Hikone Data Science, Shiga University (Virtual/Hikone, Japan)
2020	"Semiparametric inference for non-monotone missing-not-at-random data: the no self-censoring model"** Joint Statistical Meetings (Virtual)
2019	"Fairness by causal mediation analysis: criteria, algorithms, and open problems"** Johns Hopkins Behavioral Science Forum on Artificial Intelligence (Baltimore, USA)
2019	"Learning optimal fair policies" 10th Workshop in Decisions, Games, & Logic: Ethics, Statistics, and Fair AI (Pasadena, USA)
2019	"Data-driven causal inference for applications in political economy" 2nd Annual Conference on Politics and Computational Social Science (Washington DC, USA)
2019	"A potential outcomes calculus for identifying conditional path-specific effects" Atlantic Causal Inference Conference (Montreal, CA)

2018   "Learning about changes to causal structure"**
        Conference on Causation vs Constitution, University of Bergen (Bergen, Norway)

2018   "Causal structure learning from multivariate time series in settings with unmeasured confounding"
        KDD Workshop on Causal Discovery (London, UK)

2018   "Causal structure learning from partially observed and nonstationary multivariate time series"
        Atlantic Causal Inference Conference (Pittsburgh, USA)

2016   "Learning causal models from time series data with latent variables"**
        9th International Conference of the ERCIM Working Group on Computational and Methodological Statistics (CMStatistics) (Seville, Spain)

2016   "Estimating causal effects with ancestral graph Markov models"
        Eighth International Conference on Probabilistic Graphical Models (Lugano, Switzerland)

2016   "Decision making under causal uncertainty"
        Explanation, Normativity, and Uncertainty in Economic Modelling at the London School of Economics (London, UK)

2016   "Decision making under causal uncertainty"
        Munich-Sydney-Tilburg Conference on Evidence, Inference, and Risk (Munich, Germany)

2015   "Using graphical models for data-driven estimates of causal effects"
        XII Conference of the International Network for Economic Method (Cape Town, South Africa)

INVITED SEMINARS

2022   "Identifying causal determinants of clinical outcomes from electronic health records using graphical structure learning" Department of Computer Science, Williams College (Williamstown, USA)

2022   "Identifying causal determinants of clinical outcomes from electronic health records using graphical structure learning" Columbia Seminar in Quantiative Methods for the Social Sciences (QMSS) (New York, USA)

2022   "Identifying causal determinants of clinical outcomes from electronic health records using graphical structure learning" Division of Biostatistics, NYU Grossman School of Medicine (New York, USA)

2022   "Causal determinants of postoperative length of stay in cardiac surgery using causal graphical learning" Fei Wang Group at Weill Cornell Medicine (Virtual/New York, USA)

2022	Invited Discussant of presentation by S. Wang Online Causal Inference Seminar (Virtual)
2021	"Semiparametric inference for non-monotone missing-not-at-random data: the no self-censoring model" Department of Statistics, Columbia University (New York, USA)
2021	"Explaining the behavior of black-box prediction algorithms with causal learning" Online Causal Inference Seminar (Virtual)
2021	"Semiparametric inference for non-monotone missing-not-at-random data: the no self-censoring model" Statistics Seminar, Ecole Polytechnique Federal de Lausanne (Virtual/Lausanne, Switzerland)
2021	"Quantitative approaches to fairness and equity for medical algorithms" Welsh Center for Prevention, Epidemiology, and Clinical Research, Johns Hopkins University (Virtual/Baltimore, USA)
2021	"Explaining the behavior of black-box prediction algorithms with causal learning" Copenhagen Causality Lab, Mathematical Sciences, University of Copenhagen (Virtual/Copenhagen, Denmark)
2020	Invited Discussant of presentation by M. Maathuis Online Causal Inference Seminar (Virtual)
2020	"Causal model selection from nonstationary time series data" Massive Data Institute, Georgetown University (Washington DC, USA)
2020	"Graphical causal model selection for applications in health and policy" Division of Biostatistics, University of Pennsylvania (Philadelphia, USA)
2020	"Graphical causal model selection for applications in health and policy" Department of Mathematics and Statistics, University of Maryland Baltimore County (Baltimore, USA)
2020	"Graphical causal model selection for applications in health and policy" Department of Statistics, Rutgers University (New Brunswick, USA)
2020	"Graphical causal model selection for applications in health and policy" Department of Biostatistics, Columbia School of Public Health (New York, USA)
2019	"A primer on causal structure learning with graphical models" Division of General Medicine, Columbia University Medical Center (New York, USA)
2018	"Learning the structure of causal graphical models from observational data" Department of Biostatistics (Causal Inference Group), Johns Hopkins School of Public Health (Boston, USA)

2018   "Learning the structure of causal graphical models from observational data"
Department of Biostatistics (Causal Inference Group), Harvard School of Public Health
(Boston, USA)

2017   "Learning ancestral graph Markov models from multivariate time series"
Seminar in Applied Mathematics and Statistics, University of Copenhagen (Copen-
hagen, Denmark)

2017   "Graphical structure learning and data-driven causal inference for policy applica-
tions"
Depts of Statistics and Economics, University of California, Riverside (Riverside, USA)

2016   "Estimating causal effects with graphical models in systems with latent confounding"
Machine Learning Lunch Seminar at Carnegie Mellon University (Pittsburgh, USA)