Samantha Kleinberg

Farber Chair Associate Professor
Stevens Institute of Technology
Computer Science

samantha.kleinberg@stevens.edu
Personal: http://www.skleinberg.org
Lab: http://www.healthailab.org

Research Interests

I develop technology that works with people, for the good of people. My specific interests are advancing human health by helping doctors and patients make better choices with data. My research thus spans algorithms for learning causal models from data, applications to challenging biomedical datasets, and work on decision-making.

Education

New York University

Ph.D. Computer Science   May 2010

- Dissertation: "An Algorithmic Enquiry Concerning Causality"
- Committee: Prof. Bud Mishra (advisor), Profs. Ernest Davis, Petter Kolm, Rohit Parikh, and Michael Strevens

M.S. Computer Science   May 2008

B.A. Computer Science and Physics   January 2006

Employment and Research Experience

Stevens Institute of Technology

Farber Chair Associate Professor, Computer Science	September 2023 - present
Associate Professor, Computer Science	September 2018-August 2023
(early promotion and tenure)	
Assistant Professor, Computer Science	September 2012-August 2018

University College London

Honorary Research Fellow	September 2019-June 2020
Division of Psychology & Language Sciences	

Columbia University

Postdoctoral Research Scientist   September 2010-August 2012
Department of Biomedical Informatics
Mentored by Prof. George Hripcsak and supported by an NSF/CRA Computing Innovation Fellowship (CIFellow).

New York University

Postdoctoral Research Scientist	Summer 2010
Research Assistant, Bioinformatics group	Fall 2006-Spring 2010
Internship, working with Marco Antoniotti	Spring 2005-Summer 2006

Mount Sinai School of Medicine

Internship with Craig Benham, Biomathematics Department   Fall 2000-Spring 2001

Books

[1] S. Kleinberg, editor. *Time and Causality across the Sciences*. Cambridge University Press, 2019.

[2] S. Kleinberg. *Why: A Guide to Finding and Using Causes*. O'Reilly Media, 2015.

[3] S. Kleinberg. *Causality, Probability, and Time*. Cambridge University Press, 2012.

Journal articles

[4] D. M. Thomas, R. Knight, J. A. Gilbert3, M. C. Cornelis, M. G. Gantz, K. Burdekin, K. Cummiskey, S. C. J. Sumner, K. P. Sazonov, Edward Gabriel, E. E. Dooley, M. A. Green, A. Pfluger, and S. Kleinberg. Transforming Big Data into AI Ready Data for Nutrition and Obesity Research. *Obesity*, 2024.

[5] C. J. Popp, C. Wang, A. Hoover, L. A. Gomez, M. Curran, D. E. St-Jules, S. Barua, M. A. Sevick, and S. Kleinberg. Objective Determination of Eating Occasion Timing (OREO): Combining self-report, wrist motion and continuous glucose monitoring to detect eating occasions in adults with pre-diabetes and obesity. *Journal of Diabetes Science and Technology*, 2023.

[6] S. Kleinberg and J. K. Marsh. Less is More: Information Needs, Information Wants, and What Makes Causal Models Useful. *Cognitive Research: Principles and Implications*, 8, 2023.

[7] L. A. Gomez, A. Toye, S. Hum, and S. Kleinberg. Simulating Realistic Continuous Glucose Monitor Time Series by Data Augmentation. *Journal of Diabetes Science and Technology*, 2023.

[8] L. A. Gomez, Q. Shen, K. Doyle, A. Vrosgou, A. Velazquez, M. Megjhani, S. Ghoshal, D. Roh, S. Agarwal, S. Park, J. Claassen, and S. Kleinberg. Classification of Level of Consciousness in a Neurological ICU Using Physiological Data. *Neurocritical Care*, 38(1):118–128, 2023.

[9] J. Huang, A. Yeung, D. Armstrong, A. Battarbee, J. Cuadros, J. Espinoza, S. Kleinberg, N. Mathioudakis, M. Swerdlow, and D. Klonoff. Artificial Intelligence for Predicting and Diagnosing Complications of Diabetes. *Journal of Diabetes Science and Technology*, 17(1):224–238, 2023.

[10] D. Thomas, S. Kleinberg, A. Brown, M. Crow, N. Bastian, N. Reisweber, R. Lasater, T. Kendall, P. Shafto, R. Blaine, S. Smith, D. Ruiz, C. Morrell, and N. Clark. Model Machine Learning Practices to Support the Principles of AI and Ethics in Nutrition Research. *Nutrition and Diabetes*, 12, 2022.

[11] E. Korshakova, J. K. Marsh, and S. Kleinberg. Health Information Sourcing and Health Knowledge Quality: Repeated Cross-sectional Survey. *JMIR Form Res*, 6(9):e39274, 2022.

[12] P. Zhang, C. Fonnesbeck, D. Schmidt, J. White, S. Kleinberg, and S. Mulvaney. Understanding Barriers to Self-Management Using Machine Learning and Momentary Assessment in Youth with Diabetes: An Observational Study. *JMIR mHealth and uHealth*, 10(3), 2022.

[13] M. Zheng, J. K. Marsh, J. V. Nickerson, and S. Kleinberg. How Causal Information Affects Decisions. *Cognitive Research: Principles and Implications*, 5(1):6, 2020.

[14] S. Kleinberg. On the use and abuse of Hill's viewpoints on causality: a commentary on Hill's 1972 "The environment and disease: association or causation?". *Observational Studies*, 6:17–19, 2020.

[15] M. Zheng, B. Ni, and S. Kleinberg. Automated Meal Detection from CGM Data Through Simulation and Explanation. *JAMIA*, 26(12):1592–1599, 2019.

[16] M. Mirtchouk, D. Lustig, A. Smith, I. Ching, M. Zheng, and S. Kleinberg. Recognizing Eating from Body-Worn Sensors: Combining Free-living and Laboratory Data. *IMWUT*, 1(3), 2017. IMWUT is now the publication venue for UbiComp.

[17] N. Heintzman and S. Kleinberg. Using Uncertain Data from Body-Worn Sensors to Gain Insight into Type 1 Diabetes. *Journal of Biomedical Informatics*, 63:259–268, 2016.

[18] J. Claassen, S. A. Rahman, Y. Huang, H. P. Frey, M. Schmidt, D. Albers, C. M. Falo, S. Park, S. Agarwal, E. S. Connolly, and S. Kleinberg. Causal Structure of Brain Physiology after Brain Injury from Subarachnoid Hemorrhage. *PLoS ONE*, 11(4):1–18, 2016.

[19] S. A. Rahman, Y. Huang, J. Claassen, N. Heintzman, and S. Kleinberg. Combining Fourier and Lagged k-Nearest Neighbor Imputation for Biomedical Time Series Data. *Journal of Biomedical Informatics*, 58:198–207, 2015.

[20] J. Claassen, A. Perotte, D. Albers, S. Kleinberg, J. M. Schmidt, B. Tu, N. Badjatia, H. Lantigua, L. J. Hirsch, S. A. Mayer, E. S. Connolly, and G. Hripcsak. Nonconvulsive seizures after subarachnoid hemorrhage: Multimodal detection and outcomes. *Annals of Neurology*, 74:53–64, 2013.

[21] S. Kleinberg and G. Hripcsak. A review of causal inference for biomedical informatics. *Journal of Biomedical Informatics*, 44(6):1102 – 1112, 2011.

[22] A. Mitrofanova, S. Kleinberg, J. Carlton, S. Kasif, and B. Mishra. Predicting Malaria Interactome Classifications from Time-Course Transcriptomic Data along the Intra-Erythrocytic Developmental Cycle. *Artificial Intelligence in Medicine*, 49(3):167–176, 2010. Originally appeared as [50].

[23] S. Kleinberg and B. Mishra. Metamorphosis: the Coming Transformation of Translational Systems Biology. *Queue*, 7(9):40–52, 2009.

[24] S. Kleinberg, K. Casey, and B. Mishra. Systems Biology via Redescription and Ontologies (I): Finding Phase Changes With Applications to Malaria Temporal Data. *Systems and Synthetic Biology*, 1(4):197–205, December 2007. Originally appeared as [52].

Refereed conference papers

[25] S. Kleinberg, E. Korshakova, and J. K. Marsh. How Beliefs Influence Choice Perceptions. In *Proceedings of the 45th Annual Meeting of the Cognitive Science Society (CogSci)*, 2023.

[26] E. Korshakova, J. K. Marsh, and S. Kleinberg. Quantifying the Utility of Causal Models for Decision-Making. In *Proceedings of the 45th Annual Meeting of the Cognitive Science Society (CogSci)*, 2023.

[27] S. Kleinberg, E. Alay, and J. K. Marsh. Absence Makes the Trust in Causal Models Grow Stronger. In *Proceedings of the 44th Annual Meeting of the Cognitive Science Society (CogSci)*, 2022.

[28] J. K. Marsh, C. Coachys, and S. Kleinberg. The Compelling Complexity of Conspiracy Theories. In *Proceedings of the 44th Annual Meeting of the Cognitive Science Society (CogSci)*, 2022.

[29] M. Mirtchouk, B. Srikishan, and S. Kleinberg. Hierarchical Information Criterion for Variable Abstraction. In *Machine Learning for Healthcare*, 2021.

[30] M. Mirtchouk and S. Kleinberg. Detecting Granular Eating Behaviors From Body-worn Audio and Motion Sensors. In *IEEE International Conference on Biomedical and Health Informatics (BHI)*, 2021.

[31] C. Lu, C. K. Reddy, P. Chakraborty, S. Kleinberg, and Y. Ning. Collaborative Graph Learning with Auxiliary Text for Temporal Event Prediction in Healthcare. In *Proceedings of the 30th International Joint Conference on Artificial Intelligence (IJCAI)*, 2021.

[32] S. Kleinberg and J. K. Marsh. It's Complicated: Improving Decisions on Causally Complex Topics. In *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society (CogSci)*, 2021.

[33] H. Hameed and S. Kleinberg. Comparing Machine Learning Techniques for Blood Glucose Forecasting Using Free-living and Patient Generated Data. In *Machine Learning for Healthcare*, 2020.

[34] S. Kleinberg and J. K. Marsh. Tell me something I don't know: How perceived knowledge influences the use of information during decision making. In *Proceedings of the 42nd Annual Meeting of the Cognitive Science Society (CogSci)*, 2020.

[35] T. T. Yavuz, J. Claassen, and S. Kleinberg. Lagged Correlations among Physiological Variables as Indicators of Consciousness in Stroke Patients. In *AMIA Annual Symposium Proceedings*, 2019. **Homer R. Warner Award (Best Paper Award)**.

[36] M. Zheng and S. Kleinberg. Using Domain Knowledge to Overcome Latent Variables in Causal Inference from Time Series. In *Machine Learning for Healthcare*, 2019.

[37] M. Mirtchouk, D. L. McGuire, A. L. Deierlein, and S. Kleinberg. Automated Estimation of Food Type from Body-worn Audio and Motion Sensors in Free-Living Environments. In *Machine Learning for Healthcare*, 2019.

[38] R. S. Hum and S. Kleinberg. Replicability, Reproducibility, and Agent-based Simulation of Interventions. In *AMIA Annual Symposium Proceedings*, 2017.

[39] M. Zheng and S. Kleinberg. A Method for Automating Token Causal Explanation and Discovery. In *Proceedings of the 30th annual FLAIRS conference (FLAIRS)*, 2017.

[40] M. Mirtchouk, C. Merck, and S. Kleinberg. Automated Estimation of Food Type and Amount Consumed from Body-worn Audio and Motion Sensors. In *UbiComp*, 2016. **Best Paper Honorable Mention**.

[41] C. Merck, C. Maher, M. Mirtchouk, M. Zheng, Y. Huang, and S. Kleinberg. Multimodality Sensing for Eating Recognition. In *Pervasive Health*, 2016.

[42] C. Merck and S. Kleinberg. Causal Explanation under Indeterminism: A Sampling Approach. In *Proceedings of the 30th AAAI Conference on Artificial Intelligence (AAAI)*, 2016.

[43] S. A. Rahman, C. Merck, Y. Huang, and S. Kleinberg. Unintrusive Eating Recognition using Google Glass. In *Pervasive Health*, 2015.

[44] Y. Huang and S. Kleinberg. Fast and Accurate Causal Inference from Time Series Data. In *Proceedings of the 28th annual FLAIRS conference (FLAIRS)*, 2015.

[45] S. Kleinberg and N. Elhadad. Lessons Learned in Replicating Data-Driven Experiments in Multiple Medical Systems and Patient Populations. In *AMIA Annual Symposium Proceedings*, 2013.

[46] S. Kleinberg. Causal Inference with Rare Events in Large-Scale Time-Series Data. In *Proceedings of the 23rd International Joint Conference on Artificial Intelligence (IJCAI)*, 2013.

[47] S. Kleinberg. A Logic for Causal Inference in Time Series with Discrete and Continuous Variables. In *Proceedings of the 22nd International Joint Conference on Artificial Intelligence (IJCAI)*, 2011.

[48] S. Kleinberg and B. Mishra. The Temporal Logic of Token Causes. In *Proceedings of the 12th International Conference on the Principles of Knowledge Representation and Reasoning (KR)*, 2010.

[49] S. Kleinberg and B. Mishra. The Temporal Logic of Causal Structures. In *Proceedings of the 25th Conference on Uncertainty in Artificial Intelligence (UAI)*, 2009.

[50] A. Mitrofanova, S. Kleinberg, J. Carlton, S. Kasif, and B. Mishra. Systems Biology via Redescription and Ontologies (III): Protein Classification using Malaria Parasite's Temporal Transcriptomic Profiles. In *IEEE International Conference on Bioinformatics & Biomedicine (BIBM)*, 2008.

[51] S. Kleinberg, M. Antoniotti, S. Tadepalli, N. Ramakrishnan, and B. Mishra. Systems Biology via Redescription and Ontologies(II): A Tool for Discovery in Complex Systems. In *Unifying Themes in Complex Systems*, volume VI: Proceedings of the Sixth International Conference on Complex Systems. Springer-Verlag/NECSI, 2008. Significantly revised version of [53].

[52] S. Kleinberg, K. Casey, and B. Mishra. Systems Biology via Redescription and Ontologies: Untangling the Malaria Parasite Life Cycle. In *Life Systems Modeling and Simulation (LSMS)*, 2007.

[53] S. Kleinberg, M. Antoniotti, S. Tadepalli, N. Ramakrishnan, and B. Mishra. Remembrance of Experiments Past: A Redescription Based Tool for Discovery in Complex Systems. In *International Conference on Complex Systems (ICCS)*, 2006.

Refereed workshop papers

[54] H. Hameed and S. Kleinberg. Investigating potentials and pitfalls of knowledge distillation across datasets for blood glucose forecasting. In *Proceedings of the 5th Annual Workshop on Knowledge Discovery in Healthcare Data*, 2020.

[55] M. Zheng, J. Claassen, and S. Kleinberg. Automated Identification of Causal Moderators in Time-Series Data. In *Proceedings of the 2018 ACM SIGKDD Workshop on Causal Discovery*, Proceedings of Machine Learning Research. PMLR, 2018.

[56] Z. Ebrahimzadeh and S. Kleinberg. Multi-Scale Change Point Detection in Multivariate Time Series. In *NIPS Time Series Workshop*, 2017.

[57] S. A. Rahman, Y. Huang, J. Claassen, and S. Kleinberg. Imputation of Missing Values in Time Series with Lagged Correlations. In *IEEE ICDM Workshop on Data Mining in Biomedical Informatics and Healthcare*, 2014.

Chapters in refereed volumes

[58] S. Kleinberg. What makes a causal model useful? In P. M. Illari and F. Russo, editors, *Routledge Handbook of Causation*. Routledge. Accepted and awaiting publication of the volume.

[59] S. Kleinberg and B. Mishra. Multiple Testing of Causal Hypotheses. In P. M. Illari, F. Russo, and J. Williamson, editors, *Causality in the Sciences*. Oxford University Press, 2011.

Technical reports

[60] Z. Ebrahimzadeh, M. Zheng, S. Karakas, and S. Kleinberg. Deep Learning for Multi-Scale Changepoint Detection in Multivariate Time Series. http://arxiv.org/abs/1905.06913, 2019.

[61] S. Kleinberg, P. Kolm, and B. Mishra. Investigating Causal Relationships in Stock Returns with Temporal Logic Based Methods. http://arxiv.org/abs/1006.1791, 2010.

[62] S. Kleinberg, M. Antoniotti, N. Ramakrishnan, and B. Mishra. Modal Logic, Temporal Models and Neural Circuits: What Connects Them. Technical Report TR2007-907, New York University, 2007.

Op-eds and other writing

[63] S. Kleinberg. Americans are obsessed with health and fitness tracking. It's time for a data diet. *STAT*, 2024. Op-ed.

Abstracts and Posters

[64] S. Kleinberg, D. Czarnowski, and J. K. Marsh. Linking Mental Models of Health to Health Choices. Society for Applied Research in Memory and Cognition (SARMAC), 2023.

[65] J. Pleuss and S. Kleinberg. Leveraging Hierarchical Food Structure to Improve Health Response Models: NHANES 2007-2018. International Conference on Dietary Assessment Methods (ICDAM), 2023.

[66] V. Cheung, C. Leone, D. Lagnado, and S. Kleinberg. Causal reasoning with gradual and abrupt events. Heuristics and Causality in the Sciences (HaCitS)), 2023.

[67] Y. Shen and S. Kleinberg. Personalized Blood Glucose Forecasting from CGM Data Using an Incrementally Retrained LSTM. International Conference on Advanced Technologies & Treatments for Diabetes (ATTD), 2023.

[68] L. Gomez, A. Toye, R. S. Hum, and S. Kleinberg. Simulating Health Time Series by Data Augmentation. Black in AI Workshop at NeurIPS, 2022.

[69] S. Kleinberg and J. K. Marsh. You're Not Wrong, But You're Not Entirely Right: How Patients' Beliefs Influence How They are Perceived. International Conference on Advanced Technologies & Treatments for Diabetes (ATTD), 2022.

[70] C. Popp, C. Wang, L. Gomez, S. Kleinberg, A. Hoover, M. Curran, B. B. Laferrere, D. St-Jules, and M. Sevick. Objective Determination of Eating Occasion Timing (OREO): A Descriptive Study in Adults with Obesity. ObesityWeek, 2021.

[71] J. K. Marsh and S. Kleinberg. Perceived Penalties for Sharing Incorrect Information with Experts. Psychonomics, 2021.

[72] C. L. Leone, S. Kleinberg, and D. Lagnado. Mitigating collider bias in the evaluation of causal claims. International Conference on Thinking, 2021.

[73] S. Kleinberg and J. K. Marsh. Take it easy: Making better choices with causal information. International Conference on Thinking, 2021.

[74] J. K. Marsh and S. Kleinberg. Penalties for Incorrect Beliefs in the Healthcare Setting. Society for Applied Research in Memory and Cognition (SARMAC), 2021.

[75] L. Gomez, J. Claassen, and S. Kleinberg. Classification of consciousness in a Neurological ICU using physiological data. Black in AI Workshop at NeurIPS, 2020.

[76] J. K. Marsh, J. Nickerson, M. Zheng, and S. Kleinberg. Making Bad Choices. Psychonomics, 2019.

[77] M. Zheng, J. K. Marsh, and S. Kleinberg. The Role of Causal Information and Perceived Knowledge in Decision-Making. Cognitive Science Society Annual Meeting, 2019.

[78] S. Kleinberg. Are Accurate Causal Models the Most Useful Models? Causality in the Neuro- and Psychological Sciences, 2018.

[79] M. Zheng, J. Nickerson, and S. Kleinberg. More Information May Not Mean Better Decisions: Comparing the Utility of Causal Information for BG Management Decisions Among Individuals with T2D and Without Diabetes. International Conference on Advanced Technologies & Treatments for Diabetes (ATTD), 2018.

[80] S. Kleinberg. What Causes a Causal Relationship? Causality in the Sciences of Mind and Brain, 2016.

[81] S. Kleinberg, C. Merck, C. Maher, M. Mirtchouk, M. Zheng, and Y. Huang. Combining Audio and Motion Sensors for Automated Dietary Monitoring. International Conference on Advanced Technologies & Treatments for Diabetes (ATTD), 2016.

[82] S. Kleinberg, C. Merck, S. A. Rahman, and Y. Huang. Real-Time Eating Recognition Using Google Glass to Improve Closed-Loop Glucose Control. International Conference on Advanced Technologies & Treatments for Diabetes (ATTD), 2015.

[83] S. Kleinberg. Replication and the Need for Simulated Data. Philosophy of Science Association Biennial Meeting, Symposium on Heterogeneity in Medicine and Psychiatry, 2014.

[84] S. Kleinberg and N. Heintzman. Causal Inference with Uncertainty Identifies Features of Intense Physical Activity as Significant Predictors of Hyperglycemia in Type 1 Diabetes. International Conference on Advanced Technologies & Treatments for Diabetes (ATTD), 2014.

[85] S. Hutchison and S. Kleinberg. Causal Inference under Uncertainty via Adjustments and SOPDs. Causality and Experimentation in the Sciences, 2013.

[86] S. Kleinberg. Quantifying the Impact of Rare Causes. Evidence and Causality in the Sciences, 2012.

[87] S. Kleinberg and G. Hripcsak. Automated Temporal Causal Inference from EHR Data. AMIA Summit on Translational Bioinformatics, 2012. (Podium abstract).

[88] D. Albers, J. Claassen, A. Perotte, S. Kleinberg, and G. Hripcsak. Using NICU Data to understand Physiology and Identify Damage in Patients with Acute Brain Injury. AMIA Summit on Translational Bioinformatics, 2012.

[89] S. Kleinberg. Temporal Token Causal Explanation. Causality and Explanation in the Sciences, 2011.

[90] S. Kleinberg and G. Hripcsak. Understanding variable representation for causal inference in EHRs. AMIA Summit on Translational Bioinformatics, 2011.

[91] S. Kleinberg. A causal understanding of electronic health records. Causality in the Biomedical and Social Sciences, 2010.

[92] S. Kleinberg and B. Mishra. Multiple Testing of Causal Hypotheses. CAPITS Causality Study Fortnight, 2008.

[93] S. Kleinberg and B. Mishra. Psst: a web-based system for tracking political statements. In *WWW '08: Proceeding of the 17th international conference on World Wide Web*, 2008.

[94] S. Kleinberg, K. Casey, and B. Mishra. Logic in the Time of Malaria: Segmenting Time Course Data to Understand the Plasmodium Falciparum Life Cycle. Asia Pacific Bioinformatics Conference (APBC), 2008.

[95] S. Kleinberg and B. Mishra. CLARITY: Algorithms for Semantic Comparison of Time-course Transcriptomic Data. International Symposium on Computational Biology & Bioinformatics: ISBB 06, 2006.

Funding

Total external funding as PI since joining Stevens in Fall 2012: $8,023,616

NSF BCS (PI: Kleinberg)   2022-2025
Collaborative Research: Using Causal Explanations and Computation to Understand Misplaced Beliefs
Role: Stevens PI, with Lehigh PI: Marsh $206,682
(total $566,729 with Lehigh portion)

NIH U54 (Center PIs: Lee, Thomas, Project PI: Kleinberg)   2022-2026
Project 2: Causal Relationship Disentangler for Precision Nutrition
Role: Project 2 Lead $1,257,396
(total $12,440,716 for Artificial Intelligence, Modeling, and Informatics for Nutrition Guidance and Systems (AIMINGS) Center)

NIH R01 LM011826 (PI: Kleinberg)   2021-2025
BIGDATA: Causal Inference in Large-Scale Time Series
Role: PI $1,139,620

NSF Smart & Connected Health (PI: Kleinberg, co-PI: Asan)   2019-2023
SCH: INT: Collaborative Research: Uniting Causal and Mental Models for Shared Decision-Making in Diabetes
Role: PI $917,879
(total $1,199,821 with Lehigh portion)

NIH R01 LM013308 (PI: Kleinberg, Deierlein)   2019-2023
Harnessing Patient Generated Data to Find Causes and Effects of Diet in Pregnancy
Role: PI $864,220

NSF (PI: Kleinberg)   2019-2022
III: SMALL: Moving Beyond Knowledge to Action: Evaluating and Improving the Utility of Causal Inference
Role: PI $499,454

NIH R01 LM011826 (PI: Kleinberg)   2016-2021
BIGDATA: Causal Inference in Large-Scale Time Series
Role: PI $1,504,412

JSMF Studying Complex Systems Scholar Award (PI: Kleinberg)   2015-2020
Multiscale Causality Across Time and Space
Role: PI $450,000

NSF CAREER Award (PI: Kleinberg)   2014-2019
CAREER: Learning from Observational Data with Knowledge
Role: PI $529,099

NIH R01 LM011826 (PI: Kleinberg)   2013-2016
BIGDATA: Causal Inference in Large-Scale Time Series with Rare and Latent Events
Role: PI $654,854

NSF/CRA Computing Innovation Fellowship   2010-2012
Role: PI (Postdoctoral fellowship) $273,812.50

NLM Computational Thinking Contract (PI: Elhadad)   2010-2012
Causal inference on narrative and structured temporal data $373,073
Role: Key personnel. Worked on proposal and study design, and was responsible for multiple aims.

NYULMC-Geisinger Seed Grant (Co-PIs: Mishra, Stewart)   2009-2010
Predicting Congestive Heart Failure using Causal Analysis of EHR Data $27,350
Role: Key personnel. Worked on writing proposal, conceiving study, managing grant and carrying out causal analysis and development of predictive tools.

$4500 Google "Summer of Code" grant to create open source software   2006

$4500 Google "Summer of Code" grant to create open source software   2005

Honors and Awards

2019 Homer R. Warner Award at AMIA Annual Symposium (Best Paper, one awarded)

2017 Provost's Early Career Award for Research Excellence

2016 Best Paper Honorable Mention, UbiComp

2016 Kavli Fellow, National Academy of Sciences

2015 James S. McDonnell Foundation Studying Complex Systems Scholar Award (7 selected internationally)

2014 NSF CAREER Award

2013 Selected for Google/O'Reilly/Nature SciFoo (invitation-only) meeting

2011 International Joint Conference on Artificial Intelligence Travel Grant

2010 Sandra Bleistein Prize for notable achievement by a woman in applied mathematics or computer science, Courant Institute of Mathematical Sciences

2009 Uncertainty in Artificial Intelligence Travel Grant

2006-2010 NYU McCracken Fellowship

2006 Max Goldstein Prize for undergraduate creativity in computing, Courant Institute of Mathematical Sciences

2001-2006 NYU Trustees Scholarship

2000 First Place in Rube Goldberg competition at New York Science, Mathematics, and Technology Expo. Awards for project also received from Society of Women Engineers and Metropolitan Engineering Societies Council. Winner of school science fair for Rube Goldberg Machine.

Teaching Experience

Stevens Institute of Technology

Health Informatics (CS 544, created course)   Spring 2014-2018, 2021, 2023
Course created for undergraduate, and graduate students covering the use of health data for computational research.

Causal Inference (CS 582, created course)   Fall 2012-2016, 2018, 2021

Course created for advanced undergraduate, and graduate students covering concepts of and methods for causal inference.

Introduction to Scientific Computing (CS 105)   Spring 2013
Introductory course for non-computer science majors covering the basics of computational thinking using MATLAB.

New York University

Programming Languages (G22.2110), TA   Spring, Summer 2009

Guest Lectures
Statistical methods (Computational Biology, Fall 2009, Spring 2010)
Model checking biology (Bioinformatics, Spring 2008)

Invited Talks

Conference on Health, Inference, Learning (CHIL) (Keynote)   June 2024 (scheduled)

Oxford, Causal Cognition in Humans and Machines Conference (Keynote) January 2024

Yale, Probing the nature of inference from data, models and simulations across disciplines workshop   December 2023

Case Western, CS Colloquium   November 2023 (scheduled)

Causality in Minds and Machines, Society for Mathematical Philosophy Workshop November 2023 (scheduled)

Discovery to Impact: Scientific Storytelling with Data Symposium, University of Pennsylvania (Keynote)   October 2023

Univates, the University of Vale do Taquari, Lecture on Advanced Topics in Medicine and Health Sciences   October 2023

UIUC, Causal Inference: Current Trends and the Future of Research Workshop (Keynote)   May 2023

Forum on Philosophy, Engineering and Technology (fPET, Keynote)   April 2023

University College London, Causal Cognition Seminar   January 2023

Annual Diabetes Technology Meeting   November 2022

Montreal Children's Hospital, Neonatology Seminar   October 2022

McGill, Clinical and Health Informatics Research Group Seminar   October 2022

University of Salzburg, Causality and Complexity Conference   September 2022

University College London, Modelling Methodology Workshop   May 2022

McMaster University, Biomedical Engineering Symposium   April 2022

National Academies of Sciences, Engineering, and Medicine (NASEM)
Food Forum Workshop   August 2021

Rutgers AI Day   July 2021

American Diabetes Association Scientific Sessions   June 2021

Vanderbilt, Biomedical Informatics Research Colloquium   February 2021

SRI, Seminar	January 2021
Instituto Superior Técnico, Lisbon, Mathematics, Physics and Machine Learning Seminar	December 2020
NSF Technology for Automated Capture of Diet, Nutrition, and Eating Behaviors in Context Workshop	October 2020
Ben Gurion University, Data Science Seminar	January 2020
Tel Aviv University, Psychology Colloquium	January 2020
Microsoft Research, Cambridge	November 2019
Sorbonne University, Sciences, Normes, Décision Seminar	November 2019
University College London, Experimental Psychology Seminar	October 2019
NII Shonan Meeting, Causal Reasoning in Systems	June 2019
Radcliffe Inst. for Advanced Study, Causality and Dynamics workshop	June 2019
Vector Institute Health AI Rounds	May 2019
BSN Automatic Dietary Monitoring Workshop	May 2019
Lehigh University Health, Medicine and Society Seminar	April 2019
NLM Biomedical Informatics and Data Science Lecture	March 2019
NYU Concepts and Categories (ConCats) Seminar	October 2018
TTI/Vanguard Designing and Doing Conference	March 2018
Virginia Tech, Discovery Analytics Center Seminar	November 2017
University of Pennsylvania, PRECISE Seminar	October 2017
Open Data Science Conference UK	October 2017
BSN Automatic Dietary Monitoring Workshop	May 2017
ETAPS Causal Reasoning for Embedded and Safety-critical Systems Technologies (CREST) Workshop (Keynote)	April 2017
Bio-inspired Information and Communications Technologies Conf.	April 2017
Brown University, CCMB Seminar	February 2017
AAAI Fall Symposium on Accelerating Science	November 2016
UMass Amherst, Machine Learning and Friends Lunch	November 2016
Kavli Frontiers of Science Symposium	November 2016
Open Data Science Conference UK	October 2016
Dexcom	August, 2016
Data Science + FinTech Meetup JC-NY	August 2016
Statistical Causal Inference and Applications to Genetics Workshop	July 2016
MLconf NYC	April 2016
Columbia University, From Data to Solutions IGERT Seminar	March 2016

Columbia University, DBMI Seminar	January 2016
Massachusetts Institute of Technology, CSAIL Seminar	December 2015
Carnegie Mellon University, HCII Seminar	November 2015
University of Texas, Austin	November 2015
Georgia Tech, Computational Science & Engineering Seminar	October 2015
Washington University in St. Louis, CS Department Seminar	October 2015
Meaningful Use of Complex Medical Data	August 2015
PSA Biennial, Philosophy of Medicine Symposium	November 2014
MLconf NYC	April 2014
NIPS Machine Learning for Clinical Data Analysis and Healthcare Workshop	December 2013
Columbia University, From Data to Solutions IGERT Seminar	November 2013
Johns Hopkins University, CS Department Seminar	November 2013
University of California, San Diego iDASH Webinar	August 2013
New Jersey Institute of Technology, CS Department Seminar	April 2013
Syracuse University, EECS Colloquium	April 2013
Columbia University, DBMI Seminar	October 2011
Patients Like Me	January 2011
Columbia University, Pe'er Lab	June 2010
IBM Watson, Computational Biology Seminar	April 2010
Columbia University, Meeting in Biological Networks	November 2009
CUNY Seminar in Logic and Games	August 2008

Advising and mentoring

I have been highly committed to providing opportunities to women and students from other groups traditionally under-represented in computing. These students are indicated with an asterisk. Of the 28 undergraduates who have done research with me, 13 were women (46%); 7 of the 9 MS students I have supervised have been women (78%); and five of my current six PhD students are women, members of under-represented groups, or women from under-represented groups (83%). These rates are well above the national averages in CS and are the result of long-term effort and culture building, not chance.

Postdoctoral researchers supervised

Yuxiao Huang	November 2013 - May 2016
(now Assistant Professor at George Washington University)	
Shah Atiqur Rahman	July 2013 - July 2015
(now Senior Software Engineer at Realtor.com)	

Current Ph.D. students

Bethel Hall*	Fall 2022 - present
James Pleuss	Fall 2022 - present
Adedolapo Aishat Toye*	Fall 2021 - present
Yiheng Shen*	Fall 2021 - present

Passed qualifying exam May 2023.

Elena Korshakova*	Spring 2021 - present

Passed qualifying exams, and has published 3 papers.

Louis Adedapo Gomez*	Fall 2019 - present

Completed thesis proposal May 2023, Graduation expected May 2024. Published paper that was the first to use physiologic signals to classify consciousness.

Ph.D. students graduated

Min Zheng	May 2019

Thesis title: *Individualized Causal Model for Assisting Real World Decision Making* *(now Senior Data Scientist at Aetna)*

M.S. students supervised

Aishwarya Muralidharan Nair*	Fall 2023 - present
Euiji Choi*	Spring 2023 - present
Shivani Mogili*	Summer 2022
Michelle Morrone*	Fall 2021
Prajwal Prakash	Spring 2021 - Fall 2021

Thesis title: *Multivariate Blood Glucose Forecasting Using Machine Learning* *(now Software Development Engineer at Amazon)*

Ayesha Parveen*	Fall 2020 - Fall 2021

Thesis title: *A Personalized Deep Learning Approach for Blood Glucose Prediction in People with T1DM*

Hadia Hameed*	Spring 2019 - Spring 2020

Thesis title: *Blood Glucose Forecasting Using Machine Learning* *(Published 2 papers during MS. now Data Scientist at Afiniti)*

Tianchan (Tara) Xu*	Spring 2019 - Fall 2019

(now Software Developer at Marsh & McLennan)

Yiying Hu*	Summer 2017

(now Data Scientist at NeoCura)

Stephen Hansen	Spring 2016 - Fall 2016

Undergraduate students supervised

Miguel Merlin	Fall 2023
Ethan Cecchetti	Spring 2023
Susan McAloon*	Summer 2022 - Fall 2022
Jo-Anne Rivera*	Summer 2022
Leigha Tierney*	Summer 2021 - Spring 2022

BS Thesis Title: *Integration of Biobehavioral Feedback into Blood Glucose Monitoring for Adolescents with Type 1 Diabetes* *(now Science Writing Student at Johns Hopkins University)*

Jhanvi Ganesh*	Summer 2021

(now Intern at Cigna)

Abdellah Amrhar	Summer 2021
Harrison Chachko	Summer 2021

(now Cybersecurity Consultant at EY)

Matthew Viafora	Summer 2021

(now Data Science Analyst at JPMorgan Chase)

Jared Donnelly	Fall 2020 - present

(AIRS Fellowship Summer 2021)

Glendon Chin	Fall 2020 - Summer 2021
Jolene Ciccarone*	Fall 2020 - Summer 2021

(AIRS Fellowship Summer 2021)

Alexandra Wong*	Fall 2020 - Summer 2021
Michelle Morrone*	Fall 2020 - Spring 2021
Completed Senior Research Project	
Siddanth Patel	Summer 2020
Boris Tzankov	Summer 2020
(now Graduate Student at Princeton)	
John Brummer	Summer 2020
Ni Baohua	July 2019 - August 2019

(Visiting student from Tsinghua University. Resulted in co-authorship of a journal paper.)

Kaitlyn Sharo*	Summer 2019

(now Software Engineer at CACI International)

Dylan DiGeronimo	Summer 2018 - Summer 2019

(CHI Scholarship 2018-2019. Now Senior Software Engineer at SeerAI)

Kyle Bernardes	Summer 2018 - Spring 2019

(I&E summer fellowship, CHI Scholarship 2018-2019. Now Full Stack Developer at Classlink)

Dana McGuire*	Summer 2017, Fall 2019 - Spring 2020

(resulted in MLHC paper. Now Technology Business Analyst at Bank of America.)

Ivan Ching	Fall 2016 - Spring 2018
BS Thesis Title: *Chewing Detection with CNN-LSTM Structure*	May 2018

(resulted in IMWUT/UbiComp paper. Now Senior Data Scientist at Fintegra.)

Alexandra Smith*	Summer 2016 - Spring 2018

(resulted in IMWUT/UbiComp paper. Now Senior Software Engineer II at Sitetracker)

Drew Lustig*	Spring 2016 - Summer 2018

(resulted in IMWUT/UbiComp paper. Now Markets Tech at Stone Ridge Asset Management.)

Christina Maher*	Summer 2015

(resulted in Pervasive Health paper and ATTD abstract)

Mark Mirtchouk	Summer 2014 - Summer 2017

(resulted in CHI Scholarship 2014-2015, two papers including UbiComp Best Paper Honorable Mention
Award, and NSF Graduate Research Fellowship honorable mention)

Jason Gardella	Summer 2014

(Now Engineering Manager at Checkout.com)

Shana Hutchison*	Spring 2013

(resulted in 2014 CRA Outstanding Undergraduate Researcher Award Honorable Mention, 2014-15 Barry Goldwater Scholarship, conference abstract, and NSF Graduate Research Fellowship. Now Software Engineer at Blue Origin.)

Professional Activities and Service

Research community

Editorial boards

Observational Studies	2019 - present
European Journal for Philosophy of Science	2017 - present

Program Committees

Conference for Health, Inference and Learning (CHIL), track chair	2023
Machine Learning for Healthcare	2021
Conference for Health, Inference and Learning (CHIL) Steering Committee	2020-2025
KDD Workshop on Causal Discovery (CD)	2017, 2019, 2021-2023
Senior Program Committee, IJCAI	2016-2017, 2020-2023
AAAI	2016-2019
Senior Program Committee, ML4Health NIPS Workshop	2016-2018

ACM SIGAI Career Network Conference (CNC)	2015
IEEE ICDM Workshop on Causal Discovery (CD)	2013
Scientific Program Committee, AMIA	2013, 2018
Poster Committee, Grace Hopper Celebration	2013

Reviewing

Selected conferences and journals: AAAI, AISTATS, AMIA, CHI, CogSci, ICLR, IMWUT, JAMIA, JBI, NeurIPS, PSA

Judge for Lisp in Summer Projects Programming Contest	2013

Grant reviewing

NIH, BLR study section, member	2018-2024
UC Multicampus Research Programs and Initiatives (MRPI) review panel	2023
European Science Foundation (ESF), College of Expert Reviewers, member present	2022 -
NSF Review Panels, 2014, 2015, 2017, and 2023. Ad Hoc review 2016.	
External reviewer for University of Missouri Internal Grants Program	2013-2015

International: INSERM, the French National Institute of Health and Medical Research (2022); Swiss National Science Foundation (2022); Research Foundation Flanders' (FWO) (2022); Research Council of Norway (2018); Canadian Institutes of Health Research (2015)

Organizing

Heuristics and Causality in the Sciences (HaCitS) Conference Co-chair	2023
Machine Learning in Real Life (ML-IRL) ICLR Workshop chair	2020
ETAPS CREST Workshop Co-chair	2018
BSN Automatic Dietary Monitoring Workshop	2018, 2019
Causality in the Sciences Conference Steering committee	2017 - present
Time and Causality in the Sciences (TaCitS) Conference Co-chair	2017
SIGAI Career Network Conference Co-chair	2016
IJCAI Exhibitions Chair	2016
SIGAI Career Network Conference Treasurer	2015
Workshop on *Causality across disciplines*	2009
NYU Bioinformatics group seminar	2006 - 2009

Other service to the profession

Nutrition for Precision Health, AI-Ready Data working group chair	2022 - present
Nutrition for Precision Health, Data committee member	2022 - present
Nutrition for Precision Health, Test diet working group	2022
Nutrition for Precision Health, Dietary Assessment Expert Panel	2022

Invited Participant

SciFoo camp, hosted by Google/Nature/O'Reilly	2013
CCC Symposium, Computing and Healthcare: New Opportunities and Directions	2012

Professional memberships

Association for the Advancement of Artificial Intelligence (AAAI), Association for Computing Machinery (ACM), American Medical Informatics Association (AMIA), Cognitive Science Society (CogSci), Philosophy of Science Association (PSA)

UNIVERSITY

Departmental Service

CS Tenure-track search committee (chair)	AY 2021-2022
Faculty mentor to CS Clark Scholars	Fall 2021 - present
CS Department chair search committee	Spring 2021 - Spring 2022
CS P&T Committee	2018 - present
CS Faculty Search Committee	Spring 2013, 2016, 2018
CS Communications Committee	2015 - 2018

MS Advising Committee	2015 - 2018
PhD Admissions Committee	2012 - present
MS Admissions Committee	2012 - 2014

School, and University Service

SES Strategic Planning Steering Committee	Fall 2022 - Spring 2023
Committee to review SES Associate Dean for Research	Spring 2021
ASPIRE committee	2020 - 2023
SES Research committee	Fall 2018 - present
SES Strategic Planning Steering Committee	Fall 2017 - Spring 2018
Search Committee for SES Dean	AY 2016-2017
Seton Hall Hackensack Meridian School of Medicine, Curriculum Assessment Planning Committee	2016 - 2017
Data Science and Engineering Committee: Research Subcommittee	2015 - 2017

PATENTS

Method, System and Computer-Accessible Medium and Software Arrangement for Organization and Analysis of Multiple Sets Of Data (United States Patent 8,090,747 awarded 01/02/2012)

Method, System, And Computer-Accessible Medium For Inferring And/Or Determining Causation In Time Course Data With Temporal Logic (United States Patent 8,762,319 awarded 6/24/2014)

LAST UPDATED

March 1, 2024