Momin M. Malik

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Current positions

2021– Senior Data Science Analyst – AI Ethics / Senior AI/ML Engineer, Center for Digital Health, Mayo Clinic. Rochester, MN [remote].

2021– Part-Time Lecturer, School of Social Policy & Practice, University of Pennsylvania. Philadelphia, PA [hybrid].

2021– Fellow, Institute in Critical Quantitative, Computational, & Mixed Methodologies (ICQCM), Johns Hopkins University. Baltimore, MD.

2023– Senior Investigator, ICQCM, Johns Hopkins University. Baltimore, MD.

Education

2018 PhD in Societal Computing. School of Computer Science, Carnegie Mellon University.
Dissertation: *Bias and beyond in digital trace data.* Committee: Jürgen Pfeffer (Institute for Software Research and Technical University of Munich) and Anind K. Dey (Human-Computer Interaction Institute and University of Washington) [coadvisors], Cosma R. Shalizi (Department of Statistics & Data Science), and David Lazer (Northeastern University).

2018 MS in Machine Learning. Machine Learning Department, School of Computer Science, Carnegie Mellon University.
Thesis: *Detecting friendship with smartphone co-location data.* Committee: Anind K. Dey (Human-Computer Interaction Institute and University of Washington), Afsaneh Doryah (Human-Computer Interaction Institute), and Nynke M. D. Niezink (Department of Statistics & Data Science).

2016 MS in Computation, Organizations and Society. School of Computer Science, Carnegie Mellon University.

2012 MSc with distinction in Social Science of the Internet. Oxford Internet Institute, University of Oxford.
Thesis: *Networks of collaboration and field emergence in 'Internet Studies'.* Advisor: Eric T. Meyer.

2009 AB cum laude in History and Science. Harvard University.
Thesis: *Rediscovering Ramanujan.* Advisor: Lukas Rieppel.

Previous positions

2021–2022 Consultant, Avant-garde Health. Boston, MA.

2020–2021 Director of Data Science, Avant-garde Health. Boston, MA. November 2020–November 2021.

2020 Data Analyst / Scientist, MoveOn. [remote]. August–November.

2018–2020 Data Science Postdoctoral Fellow, Berkman Klein Center for Internet & Society at Harvard University. Cambridge, MA.

2017 Summer Fellow, Data Science for Social Good Europe. Lisbon, Portugal. June–August.

Publications

Peer-reviewed

2024 Austin M. Stroud, Michele D. Anzabi, Journey L. Wise, Barbara A. Barry, **Momin M. Malik**, Michelle L. McGowan, and Richard R. Sharp. 2024. Toward safe and ethical implementation of healthcare AI: Insights from an Academic Medical Center. *Mayo Clinic Proceedings: Digital Health.* doi:10.1016/j.mcpdig.2024.100189.

Sayash Kapoor, Emily Cantrell, Kenny Peng, Thanh Hien Pham, Christopher A. Bail, Odd Erik Gundersen, Jake M. Hofman, Jessica Hullman, Michael A. Lones, **Momin M. Malik**, Priyanka Nanayakkara, Russel A. Poldrack, Inioluwa Deborah Raji, Michael Roberts, Matthew J. Salganik, Marta Serra-Garcia, Brandon M. Stewart, Gilles

Vandewiele, and Arvind Narayanan. 2024. Reforms: Consensus-based recommendations for machine-learning-based science. *Science Advances* 10 (18): eadk3452. doi:10.1126/sciadv.adk3452

Tracey A. Brereton, **Momin M. Malik**, Lauren M. Rost, Joshua W. Ohde, Lu Zheng, Kristelle A. Jose, Kevin J. Peterson, David Vidal, Mark A. Lifson, Joe Melnick, Bryce Flor, Jason D. Greenwood, Kyle Fisher, and Shauna M. Overgaard. 2024. AImedReport: A prototype tool to facilitate research reporting and translation of Artificial Intelligence technologies in health care. *Mayo Clinic Proceedings: Digital Health* 2 (2): 246–251. doi:10.1016/j.mcpdig.2024.03.008

Raphael Frankfurter, Maya Malik, Sahr David Kpakiwa, Timothy McGinnis, **Momin M. Malik**, Smit Chitre, Mohamed Bailor Barrie, Yusupha Dibba, Lulwama Mulalu, Raquel Baldwinson, Mosoka Fallah, Ismail Rashid, J. Daniel Kelly, and Eugene T. Richardson. 2024. Representations of an Ebola 'outbreak' through story technologies. *BMJ Global Health* 9 (2): e013210. doi:10.1136/bmjgh-2023-013210

Young J. Juhn, **Momin M. Malik**, Euijung Ryu, Chung-Il Wi, and John D. Halamka. 2024. Socioeconomic bias in applying artificial intelligence models to health care. In *Artificial intelligence in clinical practice: How AI technologies impact medical research and clinics*, edited by Chayakrit Krittanawong, 413–435. London: Elsevier. doi:10.1016/B978-0-443-15688-5.00044-9

2023   Matthew J. Best, Catherine J. Fedorka, Robert M. Belniak, Derek A. Haas, Xiaoran Zhang, April D. Armstrong, Joseph A. Abboud, Andrew Jawa, Evan A. O'Donnell, Jason E. Simon, Eric R. Wagner, **Momin Malik**, Michael B. Gottschalk, Adam Z. Khan, Gary F. Updegrove, Eric C. Makhni, Jon J. P. Warner, and Uma Srikumaran. 2023. The impact of the COVID-19 pandemic on racial disparities in patients undergoing total shoulder arthroplasty in the United States. *JSES International* 7 (2): 252–256. doi:10.1016/j.jseint.2022.10.014.

Matthew J. Best, Catherine J. Fedorka, Derek A. Haas, Xiaoran Zhang, Adam Z. Khan, April D. Armstrong, Joseph A. Abboud, Andrew Jawa, Evan A. O'Donnell, Robert M. Belniak, Jason E. Simon, Eric R. Wagner, **Momin Malik**, Michael B. Gottschalk, Gary F. Updegrove, Jon J. P. Warner, and Uma Srikumaran. 2023. Higher surgeon volume is associated with a lower rate of subsequent revision procedures after total shoulder arthroplasty: A national analysis. *Clinical Orthopaedics and Related Research* 481 (8): 1572–1580. doi:10.1097/CORR.0000000000002605

Tracey A. Brereton, **Momin M. Malik**, Mark A. Lifson, Jason D. Greenwood, Kevin J. Peterson, and Shauna M. Overgaard. 2023. The role of AI model documentation in translational science: A scoping review. *Interactive Journal of Medical Research* 12: e45903. doi:10.2196/45903

2022   Adam Z. Khan, Matthew J. Best, Catherine J. Fedorka, Robert M. Belniak, Derek A. Haas, Xiaoran Zhang, April D. Armstrong, Andrew Jawa, Evan A. O'Donnell, Jason E. Simon, Eric R. Wagner, **Momin Malik**, Michael B. Gottschalk, Gary F. Updegrove, Eric C. Makhni, Jon J. P. Warner, Uma Srikumaran, and Joseph A. Abboud. Impact of the COVID-19 pandemic on shoulder arthroplasty: Surgical trends and postoperative care pathway analysis. *Journal of Shoulder and Elbow Surgery* 31 (12): 2457–2464. doi:10.1016/j.jse.2022.07.020

Angelina Mooseder, **Momin M. Malik**, Hemank Lamba, Earth Erowid, Sylvia Thyssen, and Jürgen Pfeffer. 2022. Glowing experience or bad trip? A quantitative analysis of user reported drug experiences on Erowid.org. In *Proceedings of the Sixteenth International AAAI Conference on Web and Social Media* (ICWSM-2022), 675–686. doi:10.1609/icwsm.v16i1.19325

Young J. Juhn, Euijung Ryu, Chung-Il Wi, Katherine S. King, **Momin Malik**, Santiago Romero-Brufau, Chunhua Weng, Sunghwan Sohn, Richard R. Sharp, and John D. Halamka. 2022. Assessing socioeconomic bias in machine learning algorithms in health care: A case study of the HOUSES index. *Journal of the American Medical Informatics Association* 29 (7): 1142–1151. **Editor's Choice**; **Featured**. doi:10.1093/jamia/ocac052

Nicole C. Nelson, Kelsey Ichikawa, Julie Chung, and **Momin M. Malik**. 2022. Psychology exceptionalism and the multiple discovery of the replication crisis. *Review of General Psychology* 26 (2): 184—198. doi:10.1177/10892680211046508

2021   Maya Malik and **Momin M. Malik**. 2021. Critical technical awakenings. *Journal of Social Computing* 4 (4): 365–384. doi:10.23919/JSC.2021.0035

Nicole C. Nelson, Kelsey Ichikawa, Julie Chung, and **Momin M. Malik**. 2021. Mapping the discursive dimensions of the reproducibility crisis: A mixed methods analysis. *PLOS ONE* 16 (7): e0254090. doi:10.1371/journal.pone.0254090

Hal Roberts, Rahul Bhargava, Linas Valiukas, Dennis Jen, **Momin M. Malik**, Cindy Bishop, Emily Ndulue, Aashka Dave, Justin Clark, Bruce Etling, Rob Faris, Anushka Shah, Jasmin Rubinovitz, Alexis Hope, Catherine D'Ignazio, Fernando Bermejo, Yochai Benkler, and Ethan Zuckerman. 2021. Media Cloud: Massive open source collection

of global news on the open Web. In *Proceedings of the Fifteenth International AAAI Conference on Web and Social Media* (ICWSM-2021), 1046–1052. doi:10.1609/icwsm.v15i1.18127

Eugene T. Richardson*, **Momin M. Malik***, William A. Darity, Jr., A. Kirsten Mullen, Michelle E. Morse, Maya Malik, Aletha Maybank, Mary T. Bassett, Paul E. Farmer, Lee Worden, and James Holland Jones. 2021. Reparations for Black American descendants of persons enslaved in the U.S. and their potential impact on SARS-CoV-2 transmission. *Social Science & Medicine* 276: 113741. doi:10.1016/j.socscimed.2021.113741 *Co-first authors.

2019 Diego Alburez-Gutierrez, Eshwar Chandrasekharan, Rumi Chunara, Sofia Gil-Clavel, Aniko Hannak, Roberto Interdonato, Kenneth Joseph, Kyriaki Kalimeri, **Momin M. Malik**, Katja Mayer, Yelena Mejova, Daniela Paolotti, and Emilio Zagheni. 2019. Reports of the workshops held at the 2019 International AAAI Conference on Web and Social Media. *AI Magazine* 40 (4): 78–82. doi:10.1609/aimag.v40i4.5287

Kar-Hai Chu, Jason Colditz, **Momin M. Malik**, Tabitha Yates, and Brian Primack. 2019. Identifying key target audiences for public health campaigns: Leveraging machine learning in the case of hookah tobacco smoking. *Journal of Medical Internet Research* 21 (7): e12443. doi:10.2196/12443

2017 Jürgen Pfeffer and **Momin M. Malik**. 2017. Simulating the dynamics of socio-economic systems. In *Networked governance: New research perspectives*, edited by Betina Hollstein, Wenzel Matiaske, and Kai-Uwe Schnapp, 143–161. Cham, Switzerland: Springer. doi:978-3-319-50386-8_9

2016 **Momin M. Malik** and Jürgen Pfeffer. 2016. Identifying platform effects in social media data. In *Proceedings of the Tenth International AAAI Conference on Web and Social Media* (ICWSM-2016), 241–249. doi:10.1609/icwsm.v10i1.14756

Momin M. Malik and Jürgen Pfeffer. 2016. A macroscopic analysis of news content on Twitter. *Digital Journalism* 4 (8): 955–979. doi:10.1080/21670811.2015.1133249

Gabriel Ferreira, **Momin Malik**, Christian Kästner, Jürgen Pfeffer, and Sven Apel. 2016. Do #ifdefs influence the occurrence of vulnerabilities? An empirical study of the Linux Kernel. In *Proceedings of the 20th International Systems and Software Product Line Conference* (SPLC '16), 65–73. Nominated for Best Paper Award. doi:10.1145/2934466.2934467

Kathleen M. Carley, **Momin Malik**, Peter M. Landwehr, Jürgen Pfeffer, and Michael Kowalchuck. 2016. Crowd sourcing disaster management: The complex nature of Twitter usage in Padang Indonesia. *Safety Science* 90: 48–61. doi:10.1016/j.ssci.2016.04.002

2015 Hemank Lamba*, **Momin M. Malik***, and Jürgen Pfeffer. 2015. A tempest in a teacup? Analyzing firestorms on Twitter. In *Proceedings of the 2015 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining* (ASONAM 2015), 17–24. **Best Student Paper Award**. doi:10.1145/2808797.2808828 *Co-first authors.

Momin M. Malik, Hemank Lamba, Constantine Nakos, and Jürgen Pfeffer. 2015. Population bias in geotagged tweets. In *Papers from the 2015 ICWSM Workshop on Standards and Practices in Large-Scale Social Media Research* (ICWSM-2015 SPSM), 18–27. doi:10.1609/icwsm.v9i4.14688

Preprints

2021 **Momin M. Malik**, Afsaneh Doryab, Mike A. Merrill, Jürgen Pfeffer, and Anind K. Dey. 2021 (preprint). Can co-location data detect friendship? It depends how you model it. arXiv:2008.02919

2020 **Momin M. Malik**. 2020 (preprint). A hierarchy of limitations in machine learning. arXiv:2002.05193

Reports

2022 Christelle Tessono, Yuan Stevens, **Momin M. Malik**, Supriya Dwivedi, Sonja Solomun, and Sam Andrey. 2022. *AI oversight, accountability and protecting human rights: Comments on Canada's proposed Artificial Intelligence and Data Act.* November 2. Cybersecure Policy Exchange, Center for Information Technology Policy at Princeton University, and Centre for Media, Technology and Democracy at McGill University. https://www.cybersecurepolicy.ca/aida

2019 Katja Mayer and **Momin M. Malik**. 2019. Critical data scientists at work: Summary report of the ICWSM-2019 Workshop on Critical Data Science. https://critical-data-science.github.io/

2017   Io Flament, Cristina Lozano, and **Momin M. Malik**. 2017. *Data-driven planning for sustainable tourism in Tuscany.* Cascais, Portugal: Data Science for Social Good Europe. https://github.com/DSSG-EUROPE/florence/blob/master/docs/DSSG_Florence_report.pdf

2013   Urs Gasser, **Momin Malik**, Sandra Cortesi, and Meredith Beaton. 2013. *Mapping approaches to news literacy curriculum development: A navigation aid.* Berkman Center Research Publication No. 2013-25. https://ssrn.com/abstract=2354500

   Momin Malik, Sandra Cortesi, and Urs Gasser. 2013. *The challenges of defining 'news literacy'.* Berkman Center Research Publication No. 2013-20. https://ssrn.com/abstract=2342313

2012   Urs Gasser, Sandra Cortesi, **Momin Malik**, and Ashley Lee. 2012. *Youth and digital media: From credibility to information quality.* Berkman Center Research Publication No. 2012-1. https://ssrn.com/abstract=2005272

2010   Urs Gasser, Sandra Cortesi, **Momin Malik**, and Ashley Lee. 2010. Information quality, youth, and media: A research update. *Youth Media Reporter*, August 30. http://www.youthmediareporter.org/2010/08/30/information-quality-youth-and-media-a-research-update/

Tutorials, modules

2023   Laurie Baker, Helen Grundman, Lily Khadjavi, Saeja Kim, **Momin Malik**, Ariana Mendible, Omayra Ortega, José Pabón, Chad M. Topaz, Thomas Wakefield, and Institute for the Quantitative Study of Inclusion, Diversity, and Equity (QSIDE). Federal district courts and race-based criminal sentencing disparities: Analysis with linear regression. https://bebailey.github.io/qside-sentencing-case-study/index.html

Podcasts, blog posts

2023   Adria Hoffman, host. 2023. Episode 4: Ethical AI in medicine with Dr. Momin Malik. *Intelligent Machines + Medicine* (Mayo Clinic podcast), June 8. https://blubrry.com/1474188/97090855/episode-4-ethical-ai-in-medicine-with-dr-momin-malik/

2019   Momin M. Malik. 2019. Can algorithms themselves be biased? *Medium* Berkman Klein Center Collection (blog), April 24. https://link.medium.com/ULLHZJQL3Y

Grants

Awarded

2023   Senior personnel. National Science Foundation (2321179), "Critical data science methods to broaden capacity in STEM education research." Principal investigator: Odis D. Johnson, Jr.; Co-principal investigator: Ebony O. McGee. $999,980. January 2024 – December 2026.

Under review

2023   Co-principal investigator. National Institutes of Health, "Assessing bias in socioeconomic status in Artificial Intelligence (AI) models for childhood asthma." Principal investigator: Young J. Juhn.

Teaching and Advising

2022–   Instructor, MSSP 8970: Applied Linear Modeling (2 sections each semester, from Spring 2022 onwards). Master of Science in Social Policy, School of Social Policy & Practice, University of Pennsylvania. Philadelphia, PA.

2021   Instructor, MSSP 897: Applied Linear Modeling, Fall 2021. Master of Science in Social Policy, School of Social Policy & Practice, University of Pennsylvania. Philadelphia, PA.

   Instructor, MSSP 710: Democratizing data? Critical data studies in algorithmic governance, Fall 2021. Master of Science in Social Policy, School of Social Policy & Practice, University of Pennsylvania. Philadelphia, PA.

   Mentor, Institute in Critical Quantitative, Computational, & Mixed Methodologies (ICQCM).

"Computational Approaches III: Applications." 1.5-hour tutorial and demo on machine learning for social science. Institute in Critical Quantitative, Computational, & Mixed Methodologies (ICQCM). Baltimore, MD [held online], July 22, 2021. https://mominmalik.com/icqcm2021b.pdf

2020 Mentor, Berkman Klein 2020 Summer Institute. Berkman Klein Center for Internet & Society at Harvard University.

2019 "A critical introduction to machine learning." 1-hour workshop at the 2019 ACM Richard Tapia Celebration of Diversity in Computing Conference (Tapia 2019). Marriott Marquis San Diego Marina, San Diego, CA, September 19, 2019. https://mominmalik.com/tapia2019.pdf

"Everything you ever wanted to know about network statistics but were afraid to ask." 3-hour tutorial at the XXXIX Sunbelt Social Networks Conference of the International Network for Social Network Analysis (Sunbelt 2019). Montreal, Quebec, June 18, 2019. https://mominmalik.com/sunbelt2019.pdf

2014–2018 Future Faculty Program (completed). Eberly Center for Teaching Excellence and Educational Innovation, Carnegie Mellon University. Pittsburgh, PA.

2016 Teaching Assistant, 08-200/08-630/19-211: Ethics and Policy Issues in Computing, Spring 2016 (Instructor: Dr. Jim Herbsleb). Institute for Software Research and Computer Science Department, School of Computer Science, Carnegie Mellon University. Pittsburgh, PA.

2015 Teaching Assistant, 08-302/08-622: Introduction to Network Science, Fall 2015 (Instructor: Dr. Jürgen Pfeffer). Institute for Software Research, School of Computer Science, Carnegie Mellon University. Pittsburgh, PA.

Honors and Awards

2016 Best Paper Award Nomination for "Do #ifdefs influence the occurrence of vulnerabilities? An empirical study of the Linux Kernel" at the 20th International Systems and Software Product Line Conference (SPLC '16). Beijing, China, September 19–23, 2016.

2015 Best Student Paper Award for "A tempest in a teacup? Analyzing firestorms on Twitter" at the 2015 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2015). Paris, France, August 25–28, 2015.

2013 ARCS Foundation Award. Carnegie Mellon University.

2012 Distinction, MSc. University of Oxford.

2009 Cum laude, AB. Harvard University.

Presentations

2024 Talk and discussion (invited) on "A hierarchy of limitations in machine learning." Department of Philosophy of Science & Technology of Computer Simulation, High Performance Computing Center Stuttgart, University of Stuttgart. Stuttgart, Germany [remote], June 6, 2024. https://www.mominmalik.com/hlrs2024.pdf

"Critical technical awakenings" (invited talk). With Maya Malik. Module 3: Theories and Methods, Easter 2022 (Instructor: Dr. Jonnie Penn). Master of Studies in AI Ethics and Society, Institute of Continuing Education, University of Cambridge. Cambridge, UK [remote], June 3, 2024. https://www.mominmalik.com/cambridge2024.pdf

"What AI ethics ought to be about: The nature, limits, and consequences of non-causal, outcome-only modeling" (invited presentation). Lunch & Learn, Department of Artificial Intelligence & Informatics, Mayo Clinic. Rochester, MN, January 25, 2024.

2023 "AI translation for healthcare: Ethics & bias." 2023 FDA Experiential Learning Program, virtual site visit to Mayo Clinic Software as a Medical Device (SaMD) Regulatory. Rochester, MN [remote], September 20, 2023.

"What AI ethics ought to be about: A framework for healthcare based on AI as correlation-only modeling" (invited presentation). AI Speaker Series, Mayo Clinic. Rochester, MN [remote], July 14, 2023.

"Don't trust explainable AI: Proper validation is what matters" (poster presentation). AI Summit. Department of Artificial Intelligence & Informatics, Mayo Clinic. Rochester, MN, June 19-21, 2023. https://www.mominmalik.com/mayo2023.pdf

"Critique and quantitative methods in the case for reparations." The FXB Center's Making the Public Health Case for Reparations Methods Workshop. François-Xavier Bagnoud Center for Health and Human Rights at Harvard University. Boston, MA, June 5, 2023. https://www.mominmalik.com/fxb2023.pdf

"Generalizability, meaningfulness, and meaning: Machine learning in the social world" (invited talk). Seminario Conjunto de Estadística y Ciencia de Datos [Joint Seminar on Statistics and Data Science], Centro de Investigación en Matemáticas (CIMAT). Guanajuato, Mexico [held online], May 10, 2023. https://mominmalik.com/cimat2023.pdf

"Conceptualizing progress: Beyond the 'common task framework'." Part of "Beyond the data and model: Integration, enrichment, and progress", Webinar 3 in support of the NIH/NCATS Bias Detection Tools for Clinical Decision Making Challenge. With Shauna M. Overgaard, Young J. Juhn, and Chung Il Wi. National Center for Advancing Translational Sciences, National Institutes of Health. [virtual], February 17, 2023. https://mominmalik.com/ncats2023.pdf; video at https://vimeo.com/799944018

2022 "Making a framework for AI ethics." Health Data and Technology Advisory Board (community advisory board), Biomedical Ethics Research Program, Mayo Clinic. Rochester, MN [held online], November 1, 2022.

Invited panelist, "Incorporating ethical thinking into research & innovation through education, planning, conduct, and communication." Chaired by Michael Hawes, with session organizers Jing Cao and Stephanie Shipp, and co-panelists James Giordano, Jeri Mulrow, Katie Shay, and Nathan Colaner. Sponsored by Committee on Professional Ethics (primary), Statistics Without Borders, Committee on Scientific Freedom and Human Rights, and Committee on Funded Research. JSM 2022 Invited Session for ASA COPE, Joint Statistical Meeting 2022. Washington, DC, August 7, 2022.

"When (and why) we shouldn't expect reproducibility in machine learning-based science: Culture, causality, and metrics as estimators" (invited talk). The Reproducibility Crisis in ML-based Science [workshop]. Center for Statistics and Machine Learning, Princeton University. Princeton, NJ [held online], July 28, 2022. https://mominmalik.com/cmls2022.pdf; video at https://youtu.be/7Bxcz7Z_tY0

"Ethical considerations for measuring impact to health care" (invited guest lecture). AIHC 5030: Introduction to Deployment, Adoption & Maintenance of Artificial Intelligence Models/Algorithms, Spring 2022 (Instructors: Dr. Shauna Overgaard, and Dr. Chris Aakre). Artificial Intelligence in Health Care Track, Mayo Clinic Graduate School of Biomedical Sciences. Rochester, MN [remote], June 2, 2022.

"Ethics in the lifecycle of AI: From research and development to clinical implementation" (invited guest lecture). CTSC 5350: Ethical Issues in Artificial Intelligence and Information Technologies, Spring 2022 (Instructors: Dr. Richard Sharp and Dr. Barbara Barry). Clinical and Translational Sciences Track, Mayo Clinic Graduate School of Biomedical Sciences. Rochester, MN [remote], May 31, 2022.

"A critical perspective on measurement in digital trace data and machine learning, and implications for demography" (invited talk). Max Planck Institute for Demographic Research Seminar Series, Rostock, Germany, April 26, 2022. https://mominmalik.com/mpidr2022.pdf

Invited panelist, "Predictive justice." With co-panelist Safiya Noble. AERA Presidential Session, "Expansive futures for disability intersectional learning research: Braiding culture, history, equity, and enabling technologies." 2022 American Educational Research Association Annual Meeting, San Diego, CA, April 23, 2022.

"The technical perspective on ethics: An overview and critique" (invited talk). Center for Digital Ethics and Policy 2022 Annual International Symposium: Digital Ethics for a Sustainable Society. School of Communication, Loyola University Chicago. Chicago, IL [held online], March 29, 2022. https://mominmalik.com/cdep2022.pdf

"Critical approaches to machine learning" (invited session). ICQCM Summit, Institute in Critical Quantitative, Computational, & Mixed Methodologies (ICQCM), Johns Hopkins University. Baltimore, MD, March 21, 2022. https://mominmalik.com/icqcm2022.pdf

Invited panelist, "AI, race, and algorithmic justice in research." Moderated by Ezekiel Dixon-Román, with co-panelists Meredith Broussard and Kadija Ferryman. ICQCM Summit, Institute in Critical Quantitative, Computational, & Mixed Methodologies (ICQCM), Johns Hopkins University. Baltimore, MD, March 22, 2022.

2021 Invited panelist, "Approaches to managing trustworthy AI." Moderated by Maggie Little, with co-panelists Ashley Casovan, Jacob Metcalf, Rayid Ghani, and Ram Kumar. Panel 5 at Kicking off NIST AI Risk Management Framework workshop. National Institutes of Standards and Technology, U.S. Department of Commerce. Washington, DC [held online], October 20, 2021.

"Machine learning in the hierarchy of methodological limitations" (invited talk). TILT Seminar Series 2021, Tilburg Institute for Law, Technology, and Society, Tilburg University. Tilburg, Netherlands [held online], September 21, 2021. https://mominmalik.com/tilt2021.pdf

"Network models and graphical models: A survey." Session S65: Machine Learning, Networks 2021. [held online], July 6, 2021. https://mominmalik.com/networks2021.pdf

"Media Cloud: Massive open source collection of global news on the open Web." Fifteenth International AAAI Conference on Web and Social Media (ICWSM-2021). [held online], June 10, 2021.

"Defining critical quantitative and computational methodologies" (invited session). Moderated by Ezekiel Dixon-Román. William T. Grant AQC SCHOLARS Virtual Seminar Series, Institute in Critical Quantitative, Computational, & Mixed Methodologies (ICQCM). Baltimore, MD [held online], May 27, 2021. https://mominmalik.com/icqcm2021.pdf

"Critical theory and quantification" (invited session). With Ezekiel Dixon-Román and Maya Malik. Seminar Virtual Event, Histories of Artificial Intelligence: A Genealogy of Power. Mellon Sawyer Seminar series, University of Cambridge. Cambridge, UK [held online], January 20, 2021. https://mominmalik.com/hoai2021.pdf

2020 "A hierarchy of limitations in machine learning" (invited talk). Math and Democracy Seminar Series. Center for Data Science, New York University. New York, NY [held online], October 5, 2020. https://mominmalik.com/nyucds2020.pdf

"A hierarchy of limitations in machine learning: Data biases and the social sciences" (invited webinar). Webinar Series: Data Cultures in Higher Education. Faculty of Psychology and Education, Universitat Oberta de Catalunya (Open University of Catalonia). Barcelona, Spain [held online], September 29, 2020. https://mominmalik.com/uoc2020.pdf; video, with Spanish subtitles, "Una jerarquía de limitaciones en el Machine Learning. Sesgos en su uso en investigación social," at https://youtu.be/SSeZlETRb04

"Machine learning won't save us: Dependencies bias cross-validation estimates of model performance." 2020 Virtual Sunbelt Conference of the International Network for Social Network Analysis. July 17, 2020. https://mominmalik.com/sunbelt2020.pdf

"Anti-racism and COVID-19" (invited talk). With Eugene T. Richardson, William A. Darity, Jr., James Holland Jones, A. Kirsten Mullen, and Paul E. Farmer. Global Health and Social Medicine Seminar Series. Department of Global Health & Social Medicine, Harvard Medical School. Cambridge, MA [held online], June 3, 2020.

"Media Cloud and media ecosystem research." Social Science One Researcher Onboarding Training Session lightning talk, May 27, 2020.

"Antiracism and COVID-19" (invited talk). With Eugene T. Richardson. Antiracism & Technology Design Seminar. Space Enabled research group, MIT Media Lab. Cambridge, MA [held online], May 13, 2020.

"Critical technical practice revisited: Towards `analytic actors' in data science" (invited talk). STS Circle. Program on Science, Technology & Society, Harvard Kennedy School. Cambridge, MA, March 5, 2020. https://mominmalik.com/stscircle2020.pdf

"Revisiting 'all models are wrong': Addressing limitations in big data, machine learning, and computational social science" (invited talk). Wednesdays@NICO Seminar Speaker Series. Northwestern Institute for Complex Systems, Northwestern University. Evanston, IL, February 5, 2020. https://mominmalik.com/nico2020.pdf; video at https://youtu.be/HAXFPw9Dj-g

"How STS can improve data science" (invited talk). STS Lunch Seminar Series. Science, Technology, and Society, Tufts University. Medford, MA, January 27, 2020. https://mominmalik.com/tufts2020.pdf

2019 "A hierarchy of limitations in machine learning" (invited talk). Microsoft Research New England. Cambridge, MA, December 3, 2019. https://mominmalik.com/msrne2019.pdf

"Correlates of oppression: Machine learning and society" (invited guest lecture). CMS.701/CMS.901: Current Debates in Media, Fall 2019 (Instructor: Dr. Sasha Costanza-Chock). Comparative Media Studies, MIT. Cambridge, MA, October 30, 2019. https://mominmalik.com/cms2019.pdf

"Statistics and machine learning: Foundations, limitations, and ethics" (invited talk). Mathematics & Statistics Colloquium Fall 2019. Colby College Department of Mathematics and Statistics, Colby College. Waterville, ME, October 7, 2019. https://mominmalik.com/colby2019.pdf

"Three open problems for historians of AI." Towards a History of Artificial Intelligence. Columbia University. New York, NY, May 24, 2019. https://mominmalik.com/three_problems.pdf; video at https://youtu.be/vfrjfVEoMl4

"Interpretability is a red herring: Grappling with 'prediction policy problems'." 17th Annual Information Ethics Roundtable: Justice and Fairness in Data Use and Machine Learning. Northeastern University. Boston, MA, April 5, 2019. https://mominmalik.com/ier2019.pdf

"What can AI do with copyrighted data?" (invited talk). Bracing for Impact–The Artificial Intelligence Challenge: A Roadmap for AI Governance in Canada. Part II: Data, Policy & Innovation. IP Osgoode, Osgoode Hall Law School, York University. Toronto Reference Library, Toronto, Canada, March 21, 2019.

"The ethical implications of technical limitations" (invited talk). Fairness, Accountability & Transparency/Asia. Digital Asia Hub and ACM/FAT*. Shun Hing College, University of Hong Kong, Hong Kong, January 12, 2019.

"Machine learning for social scientists." Fairness, Accountability & Transparency/Asia. Digital Asia Hub and ACM/FAT*. Shun Hing College, University of Hong Kong, Hong Kong, January 11, 2019. https://mominmalik.com/ml_socsci.pdf

2018   "'AI' is a lie: Getting to the real issues." AGTech Forum. Berkman Klein Center for Internet & Society at Harvard University. Cambridge, MA, December 13, 2018. https://mominmalik.com/agtech2018.pdf

"Theorizing sensors for social network research" (invited talk). Computational Social Science Institute, UMass Amherst. Amherst, MA, December 7, 2018. https://mominmalik.com/cssi.pdf

"What everyone needs to know about 'prediction' in machine learning" (invited talk). Leverhulme Centre for the Future of Intelligence, University of Cambridge. Cambridge, UK, December 3, 2018. https://mominmalik.com/cfi.pdf

"Anxiety, crisis, and a computational future for journalism." Philip Merrill College of Journalism / College of Information Studies, University of Maryland. College Park, MD, November 27, 2018.

"Networks, yeah! The representation of relations" (invited talk). Data & Donuts. digital HKS, Harvard Kennedy School. Cambridge, MA, November 2, 2018.

"Demystifying AI: Terms of disservice." AI Working Group, Berkman Klein Center for Internet & Society. Cambridge, MA, October 28, 2018.

"Surprising aspects of 'prediction' in data science." 0213eight, Harvard Alumni Association. Cambridge, MA, October 13, 2018.

"From the forest to the swamp: Modeling vs. implementation in data science" (invited talk). Techtopia @ Harvard University. Cambridge, MA, October 2, 2018.

Thesis defense: "Bias and beyond in digital trace data." Institute for Software Research, School of Computer Science, Carnegie Mellon University. Pittsburgh, PA, August 9, 2018. https://mominmalik.com/defense.pdf

"Friendship and proximity in a fraternity cohort with mobile phone sensors." Modeling network dynamics (ses15.05), XXXVIII Sunbelt Conference of the International Network for Social Network Analysis. Utrecht, Netherlands, July 1, 2018. https://mominmalik.com/sunbelt2018.pdf

2017   "A critical introduction to statistics and machine learning." Cascais Data Science for Social Good Europe Fellowship, Nova School of Business and Economics, Universidade NOVA de Lisboa. Lisbon, Portugal, August 15, 2017. https://mominmalik.com/critical_intro_stats_1.pdf and https://mominmalik.com/critical_intro_stats_2.pdf

2016   "A social scientist's guide to network statistics." Invited guest lecture in 70/73-449: Social, Economic and Information Networks, Fall 2016 (Instructor: Dr. Katharine Anderson). Undergraduate Economics, Carnegie Mellon University. Pittsburgh, PA, November 10, 2016. https://mominmalik.com/network_stats_guide.pdf

"Bias busters @ university workshop: A Carnegie Mellon/Google collaboration to address unconscious bias." With Carol Frieze (Carnegie Mellon University, School of Computer Science), Gerry Katilius (Google Pittsburgh), and Diana Marculescu (Carnegie Mellon University, College of Engineering). 2016 ACM Richard Tapia Celebration of Diversity in Computing Conference (Tapia 2016). Austin, TX, September 15, 2016.

"Platform effects in social media networks." Social Networks 1, 2nd Annual International Conference on Computational Social Science (IC^2S^2). Northwestern University. Evanston, IL, June 24, 2016. https://mominmalik.com/iccss2016.pdf

"A social scientist's guide to network statistics (presented to statisticians)." stat-network seminar, Department of Statistics, Carnegie Mellon University. Pittsburgh, PA, March 25, 2016.

"Bias busting @ university workshop–A Carnegie Mellon/Google collaboration to address unconscious bias." With Carol Frieze (Carnegie Mellon University, School of Computer Science), Gerry Katilius (Google Pittsburgh), and Diana Marculescu (Carnegie Mellon University, College of Engineering). Women in Engineering ProActive Network Change Leader Forum (WEPAN 2016). Broomfield, CO, June 15, 2016.

"Identifying platform effects in social media data." Session I: Biases and Inequalities, Tenth International AAAI Conference on Web and Social Media (ICWSM-2016). Cologne, Germany, May 18, 2016. https://mominmalik.com/icwsm2016slides.pdf

"Social media data and computational models of mobility: A review for demography." 2016 ICWSM Workshop on Social Media and Demographic Research (ICWSM-16 SMDR). Cologne, Germany, May 17, 2016. https://mominmalik.com/smdr2016.pdf

"Platform effects in social media networks." Social Media Networks: Challenges and Solutions (Sunday AM2), XXXVI Sunbelt Conference of the International Network for Social Network Analysis. Newport Beach, CA, April 10, 2016. https://mominmalik.com/sunbelt2016.pdf

"Ethical and policy issues in predictive modeling" (guest lecture). 08-200/08-630/19-211: Ethics and Policy Issues in Computing, Spring 2016 (Instructor: Dr. James Herbsleb). Institute for Software Research, School of Computer Science, Carnegie Mellon University. Pittsburgh, PA, March 1, 2016. https://mominmalik.com/modeling_ethics.pdf

2015 "Population bias in geotagged tweets." 2015 ICWSM Workshop on Standards and Practices in Social Media Research (ICWSM-2015 SPSM), Ninth International AAAI Conference on Web and Social Media (ICWSM-15). University of Oxford. Oxford, UK, May 26, 2015. https://mominmalik.com/malik_spsm2015slides.pdf

2014 "Quick R and `igraph` intro" (guest lecture). 08-302/08-622: Introduction to Network Science, Fall 2014 (Instructor: Dr. Jürgen Pfeffer). Institute for Software Research, School of Computer Science, Carnegie Mellon University. Pittsburgh, PA, March 1, 2016.

"Inferring social networks from sensor data." Network Data Collection (Saturday AM2), XXXIV Sunbelt Conference of the International Network for Social Network Analysis. St Pete Beach, FL, February 22, 2014. https://mominmalik.com/malik_sunbelt2014slides.pdf

Professional Service

Testimony

2024 Expert witness, Standing Committee on Industry and Technology study of "Bill C-27, An Act to enact the Consumer Privacy Protection Act, the Personal Information and Data Protection Tribunal Act and the Artificial Intelligence and Data Act and to make consequential and related amendments to other Acts." 44th Parliament, 1st Session, House of Commons, Canada. [virtual], February 14, 2024. https://www.ourcommons.ca/DocumentViewer/en/44-1/INDU/meeting-111/notice

Event organizing

2019 **Momin M. Malik**, Katja Mayer, Hemank Lamba, and Claudia Müller-Brin (co-organizers). Workshop on critical data science. The 13th International Conference on Web and Social Media (ICWSM-19). Munich, Germany, June 11, 2019. https://critical-data-science.github.io/

2016 Logistics, communication, materials, and tabling for "Train the Trainer workshop," by Bias Busters @ Carnegie Mellon University. Google Pittsburgh, November 1–2, 2016. Pittsburgh, PA.

Volunteering/Community

2015–2018 Facilitator, Bias Busters @ CMU.

Committee service

2022– Board member, Institute for Experiential AI Ethics Board. Institute for Experiential AI (IEAI), Northeastern University, Boston, MA. https://ai.northeastern.edu/ai-ethics-board/

Member, Enterprise AI Translation Advisory Board. Mayo Clinic, Rochester, MN.

Working group member, Coalition for Healthcare AI (CHAI). Gordon and Betty Moore Foundation, The MITRE Corporation, and Partnership on AI (PAI). https://www.coalitionforhealthai.org/

Member, Mayo Clinic Biomedical Ethics & Artificial Intelligence Advisory Council. Mayo Clinic, Rochester, MN.

2020– Senior program committee member, International AAAI Conference on Web and Social Media (ICWSM).

2020 Sponsorship chair, 14th International AAAI Conference on Web and Social Media (ICWSM-2020). Atlanta, GA, June 8–June 11, 2020.

2019–2020 Steering committee member, Annotation and Benchmarking on Understanding and Transparency of Machine learning Lifecycles (ABOUT ML). Partnership on AI (PAI).

2019 Posters co-chair, 11th International ACM Web Science Conference 2019 (WebSci '19). Boston, MA, June 30–July 3, 2019.

Peer review

2023 *ACM Journal on Responsible Computing* (Association for Computing Machinery)

ACM Conference on Fairness, Accountability, and Transparency (FAccT) (Association for Computing Machinery)

2022 International World Wide Web Conference (TheWebConf) Fairness, Accountability, Transparency and Ethics on the Web track

American Medical Informatics Association (AMIA)

2021 *Communications of the ACM* (Association for Computing Machinery)

2018–2021 International AAAI Conference on Web and Social Media (ICWSM)

2020 *Sociological Methods & Research* (SAGE Journals)

Big Data & Society (SAGE Journals)

2018–2020 *EPJ Data Science* (Springer)

2019–2020 *Frontiers in Big Data, Data Mining and Management* (Frontiers Media S.A.)

2018–2020 International World Wide Web Conference (WWW/TheWebConf) Web and Society track

2019 Editorial Board member for special issue on "Critical Data and Algorithms Studies," *Frontiers in Big Data, Data Mining and Management* (Frontiers Media S.A.)

2016–2019 *Digital Journalism* (Taylor & Francis)

2017–2019 International Conference on Computational Social Science (IC^{2}S^2)

2017–2018 *Journal of Medical Internet Research* (JMIR Publications)

Other invited participation

2019 Leading thinker session on "Life in the Age of Algorithms." Project Information Literacy, Harvard Graduate School of Education. Cambridge, MA, November 7, 2019. Reported about in: Alison J. Head, Barbara Fister, and Margy MacMillan. 2020, January 15. *Information literacy in the age of algorithms: Student experiences with news and information, and the need for change.* Cambridge, MA: Project Information Research Institute. https://projectinfolit.org/publications/algorithm-study/

International Expert Workshop on Automated Decision-Making. Center for Information Technology, Society, and Law (ITSL), University of Zurich. Lavin, Switzerland, September 12–14, 2019.

Workshop attendance

2023 Educating at the Intersection of Data Science and Social Justice. Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University. Providence, RI, July 17–21, 2023. https://icerm.brown.edu/programs/ep-23-dssj/w2/

Privacy and Ethics in Pandemic Data Collection and Processing. Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University. Providence, RI, January 17–20, 2023. https://icerm.brown.edu/topical_workshops/tw-23-pep/

2022 Algorithmic Reparation Workshop. Digital Studies Institute and the Center for Ethics, Society, & Computing, University of Michigan. Ann Arbor, MI, September 30–October 1, 2022. https://sites.lsa.umich.edu/arw/

Press

Interviews and quotes

2022   Will Knight. 2022. Sloppy use of machine learning is causing a 'reproducibility crisis' in science. *Wired*, August 10. https://www.wired.com/story/machine-learning-reproducibility-crisis

Elizabeth Gibney. 2022. Could machine learning fuel a reproducibility crisis in science? 'Data leakage' threatens the reliability of machine-learning use across disciplines, researchers warn. *Nature* 608: 250–251. doi:10.1038/d41586-022-02035-w

Coverage of research

2021   Scottie Andrew. 2021. Reparations for slavery could have reduced Covid-19 transmission and deaths in the US, Harvard study says. *CNN*, February 16. https://www.cnn.com/2021/02/16/us/reparations-covid-black-americans-disparity-trnd/index.html

2015   Deborah M. Todd. 2015. Does Twitter outrage lead to tangible action? CMU study fails to find link. *Pittsburgh Post-Gazette*, August 11. https://www.post-gazette.com/business/tech-news/2015/07/17/CMU-studies-fails-to-find-like-between-Twitter-outrage-and- tangible-action/stories/201507170141

Internal coverage

2023   Mayo Clinic News Center. 2023. Mayo experts present on detecting bias in artificial intelligence tools at national healthcare webinar. https://newscenter.mayo.edu/2023/07/10/mayo-experts-presented-on-detecting-bias-in-artificial-intelligence-tools-at-national-healthcare-webinar/

2018   Siobhán Grayson and Michelle Quin. 2018. Get to know Berkman Klein fellow Momin Malik: A spotlight on one of our 2018-2019 BKC fellows. December 14. https://cyber.harvard.edu/story/2018-12/get-know-berkman-klein-fellow-momin-malik

Discussion of research in commentaries/editorials

2021   Susan Cassels and Sigrid Van Den Abbeele. 2021. A call for epidemic modeling to examine historical and structural drivers of racial disparities in infectious disease [Commentary on "Reparations for Black American descendants of persons enslaved in the U.S. and their potential impact on SARS-CoV-2 transmission"]. *Social Science & Medicine* 276: 113833. doi:10.1016/j.socscimed.2021.113833

2016   Bob Franklin. 2016. The future of journalism: Risks, threats, and opportunities [Mention of "A macroscopic analysis of news content on Twitter"]. *Journalism Practice* 10 (7): 805–807. doi:10.1080/17512786.2016.1197640

Acknowledged in

2024   Angelina Wang, Sayash Kapoor, Solon Barocas, and Arvind Narayanan. 2024. Against predictive optimization: On the legitimacy of decision-making algorithms that optimize predictive accuracy. *ACM Journal on Responsible Computing* 1 (1): 1–45. doi:10.1145/3636509

Apryl Williams. 2024. *Not my type: Automating sexual racism in online dating*. Stanford, CA: Stanford University Press.

2023   Sireesh Gururaja, Amanda Bertsch, Clara Na, David Gray Widder, and Emma Strubell. 2023. To build our future, we must know our past: Contextualizing paradigm shifts in Natural Language Processing. arXiv:2310.07715

Barbara Kiviat. 2023. The moral affordances of construing people as cases: How algorithms and the data they depend on obscure narrative and noncomparative justice. *Sociological Theory* 41 (3). doi:10.1177/07352751231186797

2021   Ben Green. 2021. Data science as political action: Grounding data science in a politics of justice. *Journal of Social Computing* 2 (3): 249–265. doi:10.23919/JSC.2021.0029

Jonnie Penn. 2021. Algorithmic silence: A call to decomputerize. *Journal of Social Computing* 2 (4): 337–356. doi:10.23919/JSC.2021.0023

2020   Richardson, Eugene T. 2020. *Epidemic illusions: On the coloniality of global public health.* Cambridge, MA: The MIT Press. doi:10.7551/mitpress/12550.001.0001

Chelsea Barabas, Audrey Beard, Theodora Dryer, Beth Semel, and Sonja Solomun. 2020. Abolish the #TechToPrisonPipeline. Coalition for Critical Technology, June 22. https://forcriticaltech.github.io/#abolish-the-techtoprisonpipeline

D'Ignazio, Catherine, and Lauren F. Klein, 2020. *Data feminism.* Cambridge, MA: The MIT Press. doi:10.7551/mitpress/11805.001.0001

2019   Dariusz Jemielniak. 2019. *Socjologia Internetu* [Polish]. Warszawa: Wydawnictwo Naukowe Scholar.

Keiki Hinami, Michael J. Ray, Kruti Doshi, Maria Torres, Steven Aks, John J. Shannon, and William E. Trick. 2019. Prescribing associated with high-risk opioid exposures among non-cancer chronic users of opioid analgesics: A social network analysis. *Journal of General Internal Medicine* 34: 2443–2450. doi:10.1007/s11606-019-05114-3

2013   Viktor Mayer-Schönberger and Kenneth Cukier. 2013. *Big Data: A revolution that will transform how we live, work, and think.* Boston and New York: Eamon Dolan/Houghton Mifflin Harcourt.

Mary Madden, Amanda Lenhart, Sandra Cortesi, Urs Gasser, Maeve Duggan, Aaron Smith, and Meredith Beaton. 2013. *Teens, social media, and privacy.* Pew Internet & American Life Project, May 21. https://www.pewresearch.org/internet/2013/05/21/teens-social-media-and-privacy/

Other mentions

2020   Wendy Hui Kyong Chun and Jorge Cottemay. 2020. Reimagining Networks: An interview with Wendy Hui Kyong Chun. *The New Inquiry*, May 12. https://thenewinquiry.com/reimagining-networks/

Skills

14 years   R (`igraph`, `statnet`, `spdep`)

13 years   Python (`pandas`, `scikitlearn`, `networkx`)

13 years   Graphical network analysis/visualization packages (Gephi, Pajek, Cytoscape)

11 years   LaTeX, BibTeX

9 years   SQL (PostgreSQL, MySQL)

23 years   Adobe (Illustrator, Photoshop, InDesign)

Hobbies

18 years   Sitar and Hindustani music

23 years   Graphic design

Profiles

https://scholar.google.com/citations?user=i5GIxY4AAAAJ

https://github.com/momin-malik

https://arxiv.org/a/malik_m_2.html

https://orcid.org/0000-0002-4871-0429

https://mastodon.social/@mominmalik

https://www.linkedin.com/in/momin-malik/

https://www.ncbi.nlm.nih.gov/myncbi/momin.malik.1/bibliography/public/

https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=2526923

https://www.webofscience.com/wos/author/record/AAC-9404-2020

- https://loop.frontiersin.org/people/672765/overview
- A https://mayoclinic.academia.edu/MominMMalik/
- https://dblp.uni-trier.de/pid/171/2245.html
- https://dl.acm.org/profile/99658764564