MATTHEW GROH

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Academic Positions

Kellogg School of Management, Northwestern University
Assistant Professor, Department of Management and Organizations, 2023 –
Assistant Professor (by courtesy), Department of Computer Science, 2024 –
Core Faculty, Northwestern Institute on Complex Systems (NICO), 2023 –

Education

Massachusetts Institute of Technology
Ph.D. Media Arts and Sciences, 2023
M.A., Media Arts and Sciences, 2019

Middlebury College
B.A. Economics with minors in Mathematics and Arabic, 2010

Research Interests

Human-AI Collaboration, Computational Social Science, Affective Computing, Synthetic Media

Peer Reviewed Articles

1. **Groh M**, Badri O, Daneshjou R, Koochek A, Harris C, Soenksen L, Doraiswamy P, Picard R (2024) Deep learning-aided decision support for diagnosis of skin disease across skin tones. *Nature Medicine*
2. Groger F, Lionetti S, Gottfrois P, Gonzalez-Jimenez A, **Groh M**, Daneshjou R, Navarini A, Pouly M (2023) Towards Reliable Dermatology Evaluation Benchmarks. *ML4Health Symposium Proceedings of Machine Learning Research.*
3. Epstein Z, Hertzmann A, Akten M, Farid H, Fjeld J, Frank M, **Groh M**, Herman L, Leach N, Mahari R, Pentland A, Russakovsky O, Schroeder H, Smith A (2023) Art and Science of Generative AI. *Science.*
4. **Groh M**, Ferguson C, Lewis R, Picard R (2022) Computational Empathy Counteracts the Negative Effects of Anger on Creative Problem Solving. *Affective Computing and Intelligent Interactions (ACII).*
5. **Groh M**, Harris C, Daneshjou R, Badri O, Koochek A (2022) Towards Transparency in Dermatology Image Datasets with Skin Tone Annotations by Experts, Crowds, and an Algorithm. *Computer Supported Collaborative Work (CSCW).*
6. Sagers L, Diao J, **Groh M**, Rajpurkar P, Adamson A, Manrai A (2022) Improving Dermatology Classifiers across Populations using Images Generated by Large Diffusion Models. *Neural Information Processing Systems (NeurIPS) Workshop Synthetic Data for Machine Learning.*

7. **Groh M** (2022) Identifying the Context Shift between Test Benchmarks and Production Data. *International Conference on Machine Learning (ICML) Workshop on Principles of Distribution Shift*.
8. **Groh M**, Epstein Z, Firestone C, Picard R (2022) Deepfake Detection by Crowds, Machines, and Machine-Informed Crowds. *Proceedings of the National Academy of Science (PNAS)*.
9. **Groh M,** Picard R (2021) Context in Automated Affect Recognition. *Neural Information Processing Systems (NeurIPS) Workshop Meaning in Context: Pragmatic Communication in Humans and Machines*.
10. **Groh M**, Epstein, Z, Obradovich N, Cebrian M, Rahwan I (2021) Human Detection of Machine-Manipulated Media. *Communications of the ACM*. **Cover Article.**
11. **Groh M**, Harris C, Soenksen L, Lau F, Han R, Kim A, Koochek A, Badri O (2021) Evaluating Deep Neural Networks Trained on Clinical Images in Dermatology with the Fitzpatrick 17k Dataset. *Computer Vision and Pattern Recognition (CVPR) International Skin Imaging Collaboration (ISIC) Workshop 2021*. **Honorable mention for best paper award with $2,000 prize.**
12. Epstein Z, **Groh M**, Dubey A, Pentland A (2021). Social Influence Leads to the Formation of Diverse Local Trends. *Computer Supported Collaborative Work* (*CSCW*).
13. Sankaranarayanan, A, **Groh M**, Picard R, Lippman A (2021) The Presidential Deepfakes Dataset. *International Joint Conference on Artificial Intelligence (IJCAI) Workshop on Adverse Impacts and Collateral Effects of Artificial Intelligence*.
14. Lewis R, Liu Y, **Groh M**, Picard R (2021) Habit Formation Dynamics: Finding Factors Associated with Building Strong Mindfulness Habits. *International Conference on Human-Computer Interaction*.
15. Lewis R, Liu Y, **Groh M**, Picard R (2021) Shaping Habit Formation Insights with Shapley Values: Toward an Explainable AI-System for Self-Understanding and Health Behavior Change. *Computer Human Interaction (CHI) Realizing AI in Healthcare Workshop*.
16. Epstein Z, Boulais O, Gordon S, **Groh M** (2020) Interpolating GANs to Scaffold Autotelic Creativity. *International Conference on Computational Creativity (ICCC) Workshop on Casual Creators*.
17. Frank M, Autor D, Bessen J, Brynjolfsson E, Cebrian M, Deming D, Feldman M, **Groh M**, Lobo J, Moro E, Wang D, Youn H, Rahwan I (2019) Toward Understanding the Impact of Artificial Intelligence on Labor. *Proceedings of National Academy of Science (PNAS)*.
18. O'Brien S, **Groh M**, Dubey A (2018) Evaluating Generative Adversarial Networks on Explicitly Parameterized Distributions. *Neural Information Processing Systems (NeurIPS) Workshop on Critiquing and Correcting Trends in ML*.
19. Epstein Z, Payne B, Shen J, Dubey A, Felbo B, **Groh M**, Obradovich N, Cebrian M, Rahwan I (2018) TuringBox: An Experimental Platform for the Evaluation of AI Systems. *International Joint Conference on Artificial Intelligence (IJCAI)*.
20. **Groh M**, Krishnan N, McKenzie D, Vishwanath T (2016) The Impact of Soft Skills Training on Female Youth Employment: Evidence from a Randomized Experiment in Jordan. *IZA Journal of Labor and Development*.
21. **Groh M**, Krishnan N, McKenzie D, Vishwanath T (2016) Do Wage Subsidies Provide a Stepping-Stone to Employment for Recent College Graduates? Evidence from a Randomized Experiment in Jordan. *Review of Economics and Statistics*.
22. **Groh M**, McKenzie D (2016) Macroinsurance for Microenterprises: A Randomized Experiment in Post-Revolution Egypt. *Journal of Development Economics*.

23. **Groh M**, McKenzie D, Shammout N, Vishwanath T (2015) Testing the Importance of Search Frictions and Matching through a Randomized Experiment in Jordan. *IZA Journal of Labor Economics*.

24. **Groh M**, McKenzie D, Vishwanath T (2014) Reducing Information Asymmetries in the Youth Labor Market of Jordan with Pscyhometrics and Skill Based Tests. *World Bank Economic Review*.

25. **Groh M**, Krishnan N, McKenzie D, Vishwanath T (2012) Soft Skills or Hard Cash? The Impact of Training and Wage Subsidy Programs on Female Youth Employment in Jordan. *World Bank Policy Research Working Papers*.

26. **Groh M**, Rothschild C (2012) Oil, Islam, Women, and Geography: A Comment on Ross (2008). *Quarterly Journal of Political Science.*

Preprints

27. Sagers L, Diao J, Melas-Kyriazi L, **Groh M**, Rajpurkar P, Adamson A, Rotemberg V, Daneshjou R, Manrai A. Augmenting Medical Image Classifiers with Synthetic Data from Latent Diffusion Models. *arXiv*.

28. Groger F, Lionetti S, Gottfrois P, Gonzalez-Jimenez A, Amruthalingam L, Amaan V, Goessinger E, Juratli H, Muehleisen B, Mueller A, Schmidt V, **Groh M**, Navarini A, Pouly M (2023) SelfClean: A Self-Supervised Data Cleaning Strategy. *arXiv*.

29. Ramon M, Vowels M, **Groh M** (2023) Deepfake Detection in Super-Recognizers and Police Officers (2024). PsyArXiv.

30. **Groh M**, Sankaranarayanan A, Singh N, Kim D, Lippman A, Picard R (2023) Human Detection of Political Deepfakes across Transcripts, Audio, and Video. *arXiv.*

Papers under Review

1. Danry V, Pataranutaporn P, **Groh M**, Epstein Z, Maes P (under review) Explanations by Large Language Models and Human Decision Making

Teaching and Advising

Instructor

Northwestern Kellogg School of Management

    Human and Machine Intelligence, Winter 2024 (2 sections)

MIT Museum

    Make-A-Fake, Winter 2023

MIT Media Lab

    Moving Beyond the Replication Crisis, Winter 2022

Teaching Assistant

MIT Media Lab

Affective Computing and Ethics, Fall 2020

Mentoring

MIT Undergraduate Research Opportunities Program (UROP)
Ruby Adkins (2023)
Anna Murphy (2023)
Dong "Daniel" Kim (2023)
Shreya Kalyan (2023)
Theo Chen (2023)
Almog Hillel (2022-2023)
Renee Ge (2022)
Bruke Wossenseged (2021)
Caleb Harris (2020-2022)
Alicia Guo (2020)

Refereeing

PNAS, Management Science, Science Advances, CHI, FAccT, npj Digital Medicine, IEEE VIS, Royal Society Open Science, PNAS Nexus, Journal of Online Trust and Safety, Journal of Politics, Economic Systems, Medical Image Analysis, Journal of Cybersecurity, IJCAI-ECAI 2022 Scarce Data in Artificial Intelligence for Healthcare

Awards

2023	Harold Horowitz (1951) Student Research Fund Award, $4,000
2022	MIT Prize for Open Data, $2,500
2021	ISIC Honorable Mention Award, $2,000

Grant Support

2024	Laboratory for Analytic Sciences Research Grant, $125,000
2023	Truepic Research Grant, $7,000
2022	National Eye Institute Early Career Scientist Travel Grant, $550
2021	MISTI France Seed Fund, $7,500
2012	World Bank Youth Innovation Fund Grant, $10,500

Presentations and Talks

Invited Talks

1. "Design and Evaluation of Human-AI Collaboration", Northwestern Institute on Complex Systems, Evanston, IL, March 2024
2. "Design and Evaluation of Human-AI Collaboration", Northwestern University Computer Science Department, Evanston, IL, January 2024
3. "Augmenting human problem solving for AI assistance", Northwestern University Cognitive Science Program, Evanston, IL, December 2023
4. "Deepfakes and Synthetic Media", Getting Plurality Research Network, Cambridge, MA (virtual), October 2023
5. "Diagnostic Accuracy across Light and Dark Skin by Specialists, Generalists, and Physician-Machine Partnerships", Department of Informatics and Networked Systems, University of Pittsburgh, March 2023
6. "Deepfake Detection", MIT Media Lab course on Generative AI for Communication, Cambridge, MA, March 2023
7. "Human-AI Collaboration", Technology, Operations, and Statistics at New York University, New York, NY, November, 2022
8. "Human-AI Collaboration", Management and Organizations at Northwestern Kellogg, Evanston, IL, November, 2022
9. "Introduction to Artificial Intelligence for Business", Pienso, Cambridge, MA, October 2022
10. "How to think about Deepfake Detection", Election Misinformation Symposium at Moody College of Communication at the University of Texas at Austin, Austin, TX, September 2022
11. "Computational Empathy and Creative Problem Solving", Multidisciplinary Institute in Artificial Intelligence Grenoble Alpes, Grenoble, France, June 2022
12. "The Future of the Internet", Thorn Corporate Retreat, Falmouth, MA, May 2022
13. "Deepfake Detection by Humans and Machines", Lucerne University Algorithmic Business Research Lab, Lucerne, Switzerland (virtual), May, 2022
14. "Deepfake Detection by Humans and Machines", European Police Conference, Berlin, Germany (virtual), May, 2022
15. "Computational Empathy and Creative Problem Solving", Media Lab Research Seminar, Cambridge, MA, April 2022
16. "Deepfake Detection by Humans and Machines", City College of New York Women in Cybersecurity, New York, New York (virtual), March, 2022
17. "Human Detection of Political Deepfakes across Modalities", MIT Human Cooperation Lab, Cambridge, MA, February 2022
18. "Deepfake Detection by Humans and Machines", University of Chicago Human + AI Lab, Chicago, IL (virtual), February 2022
19. "Deepfake Detection by Humans and Machines", University of Berkeley Hany Farid's Lab, Berkeley, CA (virtual), February 2022
20. "Deepfake Detection by Humans and Machines", MIT Human Dynamics Lab, Cambridge, MA, December 2021
21. "Deepfake Detection by Humans and Machines", MIT Human Cooperation Lab, Cambridge, MA, April 2021
22. "Deepfake Detection by Humans and Machines", Wonderfest, Virtual, January 2021
23. "Deepfake Detection by Humans and Machines", Womxn in Technology Pittsburgh, PA (virtual), January 2021

24. "Deepfake Detection", MIT Media Lab course on Experiments on Deepfakes, Cambridge, MA, November 2020
25. "AI-Powered Media Manipulation and its Consequences", South by Southwest (SXSW), Austin, TX, March 2019

Conference Talks

26. "Human-Machine Interaction in Detection", DeCenter Workshop Discussion Facilitation, Princeton, New Jersey, December 2023
27. "Computational Empathy and Creative Problem Solving", Affective Computing and Intelligent Interactions (ACII) Conference, Nara, Japan (virtual), October 2022
28. "Human Detection of Political Deepfakes across Modalities", Conference on Digital Experimentation (CODE), Virtual, November 2021
29. "Context in Automated Affect Recognition", Affective Cognition Workshop at Cognitive Science Society, Virtual, July 2021
30. "Deepfake Detection by Humans and Machines", Vision Science Society (VSS), Virtual, May 2021
31. "Deepfake Detection by Humans and Machines", Conference on Digital Experimentation (CODE), Virtual, November 2020
32. "Human Detection of Machine Manipulated Media", International Conference on Computational Social Science (IC2S2), Virtual, July 2020
33. "Evaluating Active Labor Market Policies in Jordan with Randomized Experiments", Arab Youth Employment Conference, Amman, Jordan, April 2015
34. "Evaluating Active Labor Market Policies in Jordan with Randomized Experiments", Arab Youth Entrepreneurship Conference, Doha, Qatar, February 2013

Conference Tutorials

35. "Computational Social Science Tools for High Throughput Digital Experimentation", International Conference on Computational Social Science (IC2S2), Chicago, IL, July 2022

Conference Posters

1. "Deep learning-aided decision support for diagnosis of skin disease across skin tones", Society for Judgment and Decision Making, San Francisco, CA, October 2023
2. "Deep learning-aided decision support for diagnosis of skin disease across skin tones", Symposium on Human+AI at the University of Chicago, Chicago, IL, September 2023
3. "Computational Empathy and Creative Problem Solving", Conference on Digital Experimentation (CODE), Cambridge, MA, October 2022
4. "Computational Empathy and Creative Problem Solving", Technology in Psychiatry Summit (TIPS), Virtual, October 2022
5. "Identifying the Context Shift between Test Benchmarks and Production Data", International Conference for Machine Learning (ICML) Workshop on Principles of Distribution Shift, Baltimore, MD, July 2022
6. "Human Detection of Political Deepfakes across Modalities", International Conference on Computational Social Science (IC2S2), Chicago, IL, July 2022

7. "Do Super Recognizers Excel at Deepfake Detection", Vision Science Society (VSS), St. Petersburg, FL, May 2022
8. "Context in Automated Affect Recognition", Meaning in Context Workshop at Neural Information Processing Symposium (NeurIPS), Virtual, December 2021

Art Exhibits based on Research in Computer Vision

1. Detect Fakes, MIT Museum, 2022-2025
2. Deep Angel, MIT Museum, 2022-2025
3. Shadows Sans Substance, Museum of Newfangled Art Biennial, 2021
4. Ganimals, Technisches Museum Wien, 2020
5. Shadows Left Behind, Ars Electronica, 2019
6. AI Spirits, Neural Information Processing Symposium (NeurIPS) Workshop on Machine Learning for Creativity and Design, 2019
7. The Broken Flaneur, European Conference on Computer Vision (ECCV) Workshop on Machine Learning for Creativity and Design, 2018

Professional Experience

Consulting (Outside Activities)

OpenAI, 2022-2024
Kneupper & Covey PC (Consumer Protection Law Firm), 2023-2024
IDEO, 2022
World Bank, 2016

Employment

Lead Data Scientist, Raise Me, 2017
Co-founder, Proprio Labs, 2016
Lead Data Scientist and Co-PI on DARPA's Memex program, Qadium, 2014-2016
Data Scientist on DARPA's Xdata program, Caerus Associates, 2013-2014
Research Assistant, World Bank, 2011-2014
Project Associate, Innovations for Poverty Action, 2010-2011

Languages

English (native), Arabic (proficient), French (dormant), Python