

# MICAH GOLDBLUM

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## EMPLOYMENT

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**New York University** *September 2021 - Present*  
Postdoctoral Researcher (Advised by Professors Yann LeCun and Andrew Gordon Wilson)

## EDUCATION

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**University of Maryland** *September 2014 - May 2020*  
Ph.D. in Mathematics

**University of Maryland** *September 2010 - May 2014*  
B.Sc. in Mathematics

## RESEARCH INTERESTS

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1. **Safe and reasonable AI** - Modern AI systems contain biases, security vulnerabilities, expose users to privacy breaches, and exhibit catastrophic failures of reasoning and generalization. My work aims to detect and close these gaps.
2. **Mathematical and computational tools for understanding and improving neural networks** - Despite rapid advances in capabilities, our understanding of why neural networks work is highly limited. My research focuses on the structures in neural networks and their training procedures that enable them to generalize in practice.

## SELECTED HONORS AND AWARDS

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**Blavatnik Awards for Young Scientists Finalist** *2023*  
**NYU Postdoctoral Research and Professional Development Support Grant** *2023*  
**ICML Outstanding Paper Award** *2022*  
**Seymour Goldberg Gold Medal - Spotlight on Graduate Student Research** *2016*  
**University of Maryland Dean's Fellowship** *2014, 2015*  
**Phi Beta Kappa** *2014*

## SELECTED PREPRINTS

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**Kolmogorov Complexity, the No Free Lunch Theorem, and the Role of Inductive Biases in Machine Learning**  
Micah Goldblum, Marc Anton Finzi, Keefer Rowan, Andrew Gordon Wilson

**A Cookbook of Self-Supervised Learning**  
Randall Balestrieri, Mark Ibrahim, ... , Hamed Pirsiavash, Yann LeCun, Micah Goldblum

## PUBLICATIONS

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**Battle of the Backbones: A Large-Scale Comparison of Pretrained Models across Computer Vision Tasks** *2023*

Micah Goldblum, Hossein Souri, Renkun Ni, Manli Shu, Viraj Uday Prabhu, Gowthami Somepalli, Prithvijit Chattopadhyay, Adrien Bardes, Mark Ibrahim, Judy Hoffman, Rama Chellappa, Andrew Gordon Wilson, Tom Goldstein  
*Advances in Neural Information Processing Systems (NeurIPS) 2023*

**Rethinking Bias Mitigation: Fairer Architectures Make for Fairer Face Recognition** *2023*  
Samuel Dooley, Rhea Sukthanker, John P Dickerson, Colin White, Frank Hutter, Micah Goldblum  
*Advances in Neural Information Processing Systems (NeurIPS) 2023*

**Transfer Learning with Deep Tabular Models** *2023*  
Roman Levin, Valeriia Cherepanova, Avi Schwarzschild, Arpit Bansal, C. Bayan Bruss, Tom Goldstein, Andrew Gordon Wilson, Micah Goldblum  
*International Conference on Learning Representations (ICLR) 2023*

**Simplifying Neural Network Training Under Class Imbalance** *2023*  
Ravid Shwartz-Ziv\*, Micah Goldblum\*, Yucen Lily Li, C. Bayan Bruss, Andrew Gordon Wilson  
*Advances in Neural Information Processing Systems (NeurIPS) 2023*

**A Performance-Driven Benchmark for Feature Selection in Tabular Deep Learning** *2023*  
Valeriia Cherepanova, Gowthami Somepalli, Jonas Geiping, C. Bayan Bruss,

- Andrew Gordon Wilson, Tom Goldstein, **Micah Goldblum**  
*Advances in Neural Information Processing Systems (NeurIPS) 2023*
- Gradient-based optimization is not necessary for generalization in neural networks** 2023  
Ping-yeh Chiang, Renkun Ni, David Yu Miller, Arpit Bansal, Jonas Geiping,  
**Micah Goldblum**, Tom Goldstein  
*International Conference on Learning Representations (ICLR) 2023*
- Cold Diffusion: Inverting Arbitrary Image Transforms Without Noise** 2023  
Arpit Bansal, Eitan Borgnia, Hong-Min Chu, Jie S. Li, Hamid Kazemi, Furong Huang,  
**Micah Goldblum**, Jonas Geiping, Tom Goldstein  
*Advances in Neural Information Processing Systems (NeurIPS) 2023*
- Why Diffusion Models Memorize and How to Mitigate Copying** 2023  
Gowthami Somepalli, Vasu Singla, **Micah Goldblum**,  
Jonas Geiping, Tom Goldstein  
*Advances in Neural Information Processing Systems (NeurIPS) 2023*
- Hard Prompts Made Easy: Gradient-Based Discrete Optimization for Prompt Tuning and Discovery** 2023  
Yuxin Wen, Neel Jain, John Kirchenbauer, **Micah Goldblum**, Jonas Geiping, Tom Goldstein  
*Advances in Neural Information Processing Systems (NeurIPS) 2023*
- When Do Neural Nets Outperform Boosted Trees on Tabular Data?** 2023  
Duncan C. McElfresh, Sujay Khandagale, Jonathan Valverde, Vishak Prasad C,  
Ganesh Ramakrishnan, **Micah Goldblum**, Colin White  
*Advances in Neural Information Processing Systems (NeurIPS) 2023*
- What Can We Learn from Unlearnable Datasets?** 2023  
Pedro Sandoval-Segura, Vasu Singla, Jonas Geiping, **Micah Goldblum**, Tom Goldstein  
*Advances in Neural Information Processing Systems (NeurIPS) 2023*
- Diffusion Art or Digital Forgery? Investigating Data Replication in Diffusion Models** 2023  
Gowthami Somepalli, Vasu Singla, **Micah Goldblum**, Jonas Geiping, Tom Goldstein  
*Computer Vision and Pattern Recognition Conference (CVPR) 2023*
- The Lie Derivative for Measuring Learned Equivariance** 2023  
Nate Gruver, Marc Anton Finzi, **Micah Goldblum**, Andrew Gordon Wilson  
*International Conference on Learning Representations (ICLR) 2023*
- Exploring and Exploiting Decision Boundary Dynamics for Adversarial Robustness** 2023  
Yuancheng Xu, Yanchao Sun, **Micah Goldblum**, Tom Goldstein, Furong Huang  
*International Conference on Learning Representations (ICLR) 2023*
- Canary in a Coalmine: Better Membership Inference with Ensembled Adversarial Queries** 2023  
Yuxin Wen, Arpit Bansal, Hamid Kazemi, Eitan Borgnia,  
**Micah Goldblum**, Jonas Geiping, Tom Goldstein  
*International Conference on Learning Representations (ICLR) 2023*
- Panning for Gold in Federated Learning: Targeted Text Extraction under Arbitrarily Large-Scale Aggregation** 2023  
Hong-Min Chu, Jonas Geiping, Liam Fowl, **Micah Goldblum**, Tom Goldstein  
*International Conference on Learning Representations (ICLR) 2023*
- How Much Data Are Augmentations Worth? An Investigation into Scaling Laws, Invariance, and Implicit Regularization** 2023  
Jonas Geiping, **Micah Goldblum**, Gowthami Somepalli, Ravid Shwartz-Ziv,  
Tom Goldstein, Andrew Gordon Wilson  
*International Conference on Learning Representations (ICLR) 2023*
- Decepticons: Corrupted Transformers Breach Privacy in Federated Learning for Language Models** 2023  
Liam Fowl, Jonas Geiping, Steven Reich, Yuxin Wen, Wojciech Czaja,  
**Micah Goldblum**, Tom Goldstein  
*International Conference on Learning Representations (ICLR) 2023*

- A Deep Dive into Dataset Imbalance and Bias in Face Identification** 2023  
Valeriia Cherepanova, Steven Reich, Samuel Dooley, Hossein Souri,  
**Micah Goldblum**, Tom Goldstein  
*Proceedings of the 2023 AAAI/ACM Conference on AI, Ethics, and Society (AIES)*
- Bayesian Model Selection, the Marginal Likelihood, and Generalization** 2022  
Sanae Lotfi, Pavel Izmailov, Gregory Benton, **Micah Goldblum**, Andrew Gordon Wilson  
*International Conference on Machine Learning (ICML) 2022 (Outstanding Paper Award)*
- Pre-Train Your Loss: Easy Bayesian Transfer Learning with Informative Priors** 2022  
Ravid Shwartz-Ziv\*, **Micah Goldblum\***, Hossein Souri, Sanyam Kapoor, Chen Zhu,  
Yann LeCun, Andrew Gordon Wilson  
*Advances in Neural Information Processing Systems (NeurIPS) 2022*
- Scalable Algorithm Synthesis with Recurrent Networks: Extrapolation without Overthinking** 2022  
Arpit Bansal, Avi Schwarzschild, Eitan Borgnia, Zeyad Emam,  
Furong Huang, **Micah Goldblum**, Tom Goldstein  
*Advances in Neural Information Processing Systems (NeurIPS) 2022*
- PAC-Bayes Compression Bounds So Tight That They Can Explain Generalization** 2022  
Sanae Lotfi, Sanyam Kapoor, Marc Anton Finzi, Andres Potapczynski,  
**Micah Goldblum**, Andrew Gordon Wilson  
*Advances in Neural Information Processing Systems (NeurIPS) 2022*
- Where do Models go Wrong? Parameter-Space Saliency Maps for Explainability** 2022  
Roman Levin, Manli Shu, Eitan Borgnia, Furong Huang, **Micah Goldblum**, Tom Goldstein  
*Advances in Neural Information Processing Systems (NeurIPS) 2022*
- Sleeper Agent: Scalable Hidden Trigger Backdoors for Neural Networks Trained from Scratch** 2022  
Hossein Souri, Liam H Fowl, Rama Chellappa, **Micah Goldblum**, Tom Goldstein  
*Advances in Neural Information Processing Systems (NeurIPS) 2022*
- Chroma-VAE: Mitigating Shortcut Learning with Generative Classifiers** 2022  
Wanqian Yang, Polina Kirichenko, **Micah Goldblum**, Andrew Gordon Wilson  
*Advances in Neural Information Processing Systems (NeurIPS) 2022*
- Autoregressive Perturbations for Data Poisoning** 2022  
Pedro Sandoval-Segura, Vasu Singla, Jonas Geiping,  
**Micah Goldblum**, Tom Goldstein, David W. Jacobs  
*Advances in Neural Information Processing Systems (NeurIPS) 2022*
- Fishing for User Data in Large-Batch Federated Learning via Gradient Magnification** 2022  
Yuxin Wen, Jonas Geiping, Liam Fowl, **Micah Goldblum**, Tom Goldstein  
*International Conference on Machine Learning (ICML) 2022*
- Plug-In Inversion: Model-Agnostic Inversion for Vision with Data Augmentations** 2022  
Amin Ghiasi, Hamid Kazemi, Steven Reich, Chen Zhu, **Micah Goldblum**, Tom Goldstein  
*International Conference on Machine Learning (ICML) 2022*
- Dataset Security for Machine Learning: Data Poisoning, Backdoor Attacks, and Defenses** 2022  
**Micah Goldblum**, Dimitris Tsipras, Chulin Xie, Xinyun Chen, Avi Schwarzschild,  
Dawn Song, Aleksander Madry, Bo Li, Tom Goldstein  
*IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 2022*
- Can You Learn the Same Model Twice? Investigating Reproducibility and Double Descent from the Decision Boundary Perspective** 2022  
Gowthami Somepalli, Liam Fowl, Arpit Bansal, Ping Yeh-Chiang, Yehuda Dar, Richard Baraniuk,  
**Micah Goldblum**, Tom Goldstein  
*Conference on Computer Vision and Pattern Recognition (CVPR) 2022*
- Contrastive Learning is Just Meta-Learning** 2022  
Renkun Ni, Manli Shu, Hossein Souri, **Micah Goldblum**, Tom Goldstein  
*International Conference on Learning Representations (ICLR) 2022*

- Stochastic Training is Not Necessary for Generalization** 2022  
Jonas Geiping, **Micah Goldblum**, Phil Pope, Michael Moeller, Tom Goldstein  
*International Conference on Learning Representations (ICLR) 2022*
- Robbing the Fed: Directly Obtaining Private Data in Federated Learning with Modified Models** 2022  
Liam H Fowl, Jonas Geiping, Wojciech Czaja, **Micah Goldblum**, Tom Goldstein  
*International Conference on Learning Representations (ICLR) 2022*
- The Uncanny Similarity of Recurrence and Depth** 2022  
Avi Schwarzschild, Arjun Gupta, Amin Ghiasi, **Micah Goldblum**, Tom Goldstein  
*International Conference on Learning Representations (ICLR) 2022*
- Towards Transferable Adversarial Attacks on Vision Transformers** 2022  
Zhipeng Wei, Jingjing Chen, **Micah Goldblum**, Zuxuan Wu, Tom Goldstein, Yu-Gang Jiang  
*AAAI Conference on Artificial Intelligence (AAAI) 2022*
- Adversarial Examples Make Strong Poisons** 2021  
Liam Fowl\*, **Micah Goldblum\***, Ping-yeh Chiang, Jonas Geiping, Wojtek Czaja, Tom Goldstein  
*Advances in Neural Information Processing Systems (NeurIPS) 2021*
- Can You Learn an Algorithm? Generalizing from Easy to Hard Problems with Recurrent Networks** 2021  
Avi Schwarzschild, Eitan Borgnia, Arjun Gupta, Furong Huang, Uzi Vishkin, **Micah Goldblum**, Tom Goldstein  
*Advances in Neural Information Processing Systems (NeurIPS) 2021*
- Prepare for the Worst: Generalizing across Domain Shifts with Adversarial Batch Normalization** 2021  
Manli Shu, Zuxuan Wu, **Micah Goldblum**, Tom Goldstein  
*Advances in Neural Information Processing Systems (NeurIPS) 2021*
- Adversarial Attacks on Machine Learning Systems for High-Frequency Trading** 2021  
**Micah Goldblum**, Avi Schwarzschild, Naftali Cohen, Tucker Balch, Ankit B. Patel, Tom Goldstein  
*ACM International Conference on AI in Finance (ICAIF) 2021*
- Just How Toxic is Data Poisoning? A Unified Benchmark for Backdoor and Data Poisoning Attacks** 2021  
Avi Schwarzschild\*, **Micah Goldblum\***, Arjun Gupta, John P Dickerson, Tom Goldstein  
*International Conference on Machine Learning (ICML) 2021*
- Data Augmentation for Meta-Learning** 2021  
Renkun Ni, **Micah Goldblum**, Amr Sharaf, Kezhi Kong, Tom Goldstein  
*International Conference on Machine Learning (ICML) 2021*
- The Intrinsic Dimension of Images and Its Impact on Learning** 2021  
Phil Pope, Chen Zhu, Ahmed Abdelkader, **Micah Goldblum**, Tom Goldstein  
*International Conference on Learning Representations (ICLR) 2021*
- LowKey: Leveraging Adversarial Attacks to Protect Social Media Users from Facial Recognition** 2021  
Valeriia Cherepanova, **Micah Goldblum**, Harrison Foley, Shiyuan Duan, John P Dickerson, Gavin Taylor, Tom Goldstein  
*International Conference on Learning Representations (ICLR) 2021*
- Strong Data Augmentation Sanitizes Poisoning and Backdoor Attacks Without an Accuracy Tradeoff** 2021  
Eitan Borgnia, Valeriia Cherepanova, Liam Fowl, Amin Ghiasi, Jonas Geiping, **Micah Goldblum**, Tom Goldstein, Arjun Gupta  
*International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2021*
- Robust Few-Shot Learning: A Meta-Learning Approach** 2020  
**Micah Goldblum**, Liam Fowl, Tom Goldstein  
*Advances in Neural Information Processing Systems (NeurIPS) 2020*

<b>Unraveling Meta-Learning: Understanding Feature Representations for Few-Shot Tasks</b> Micah Goldblum, Steven Reich, Liam Fowl, Renkun Ni, Valeriia Cherepanova, Tom Goldstein <i>International Conference on Machine Learning (ICML) 2020.</i>	2020
<b>Truth or backpropaganda? An empirical investigation of deep learning theory</b> Micah Goldblum, Jonas Geiping, Avi Schwarzschild, Michael Moeller, Tom Goldstein <i>International Conference on Learning Representations (ICLR) 2020.</i>	2020
<b>WITCHcraft: Efficient PGD attacks with random step size</b> Ping-Yeh Chiang, Jonas Geiping, Micah Goldblum, Tom Goldstein, Renkun Ni, Steven Reich, Ali Shafahi <i>International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2020.</i>	2020
<b>Adversarially Robust Distillation</b> Micah Goldblum, Liam Fowl, Soheil Feizi, Tom Goldstein <i>Proceedings of the AAAI Conference on Artificial Intelligence. Vol. 34.</i>	2020

## SELECT INVITED TALKS

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<b>Chalmers AI Research Center Workshop for Structured Learning</b>	2023
<b>UCLA + MPI MIS Math Machine Learning Seminar</b>	2023
<b>Vanderbilt Machine Learning Seminar</b>	2023
<b>CISPA Helmholtz Center for Information Security</b>	2023
<b>University of California Los Angeles Department of Mathematics</b>	2023
<b>ML Collective</b>	2023
<b>École Polytechnique Fdrale de Lausanne (EPFL)</b>	2022
<b>C3.ai Digital Transformation Institute: Open Problems in Robustness</b>	2020

## MEDIA COVERAGE

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<b>AI and the future of work</b> <i>Daily Maverick</i>	2023
<b>Image-generating AI can copy and paste from training data, raising IP concerns</b> <i>TechCrunch</i>	2022
<b>How I Lost Control Over My Own Face</b> <i>Der Spiegel Magazine</i>	2021
<b>Cómo evitar que los sistemas de reconocimiento facial descifren las fotos de tus redes</b> <i>El País</i>	2021
<b>LowKey cool: This web app will tweak your photos to flummox facial-recognition systems, apparently</b> <i>The Register</i>	2021

## COMMUNITY SERVICE

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- Chair of the organizing committee for the NeurIPS 2020 Workshop on Dataset Curation and Security.
- Organizer of the NeurIPS 2023 Workshop on Backdoors in Deep Learning.
- Served as an Area Chair or Reviewer for conferences and journals including NeurIPS, ICML, ICLR, CVPR, and TPAMI.

## TEACHING EXPERIENCE

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### Primary Instructor:

- Differential Equations
- Statistics
- Probability Theory

### Teaching Assistant:

- Linear Algebra
- Calculus