

# EMILY WENGER

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## RESEARCH OVERVIEW

My research goals are twofold: to **make machine learning models safer** and to **give individuals agency to choose how or if they use these models in their daily life**. To accomplish these, I identify security and privacy risks in or caused by ML models and build practical tools that mitigate these vulnerabilities and empower users.

## EDUCATION

**Ph.D. in Computer Science**, The University of Chicago Expected 2023

*Thesis*: Reclaiming Data Agency in the Age of Ubiquitous Machine Learning

*Advisors*: Ben Y. Zhao and Heather Zheng

**M.S. in Computer Science**, University of Chicago 2020

*Thesis*: Backdoor Attacks Against Facial Recognition in the Physical World

**B.S. in Math and Physics**, Wheaton College (IL) 2012-2016

## EMPLOYMENT

<b>Research Assistant</b>	The University of Chicago	2018 - Present
<b>Researcher</b>	Meta AI Research	Spring 2022
<b>Research Intern</b>	Meta AI Research	Fall 2021
<b>Researcher</b>	Institute for Defense Analysis (IDA)	Summer 2019
<b>Mathematician</b>	Department of Defense	2016-2018
<b>Research Assistant</b>	Wheaton College Physics Department	2013-2016

## AWARDS AND FELLOWSHIPS

Siebel Scholarship	2022
Rising Stars in EECS, UT Austin	2022
University of Chicago Harper Dissertation Fellowship	2022
Harvey Fellowship	2021
Graduate Fellowship for Stem Diversity (GFSD)	2018
University of Chicago Neubauer Fellowship	2018
Wheaton College Chase Senior Merit Scholarship	2016
National Merit Scholar Finalist	2012

## CONFERENCE PUBLICATIONS

**Emily Wenger**, Shawn Shan, Haitao Zheng, Ben Y. Zhao. *SoK: Anti-Facial Recognition Technology*. Proceedings of the 44th IEEE Symposium on Security & Privacy, May 2023 (to appear).

**Emily Wenger\***, Mingjie Chen\*, Francois Charton, Kristin Lauter. *SALSA: Attacking Lattice Cryptography with Transformers*. Proceedings of the 36th Conference on Neural Information Processing Systems (NeurIPS), November 2022 (to appear).

**Emily Wenger\***, Roma Bhattacharjee\*, Arjun Nitin Bhagoji, Josephine Passananti, Emi Andere. *Finding Naturally Occuring Physical Backdoors in Image Datasets*. Proceedings of the 36th Conference on Neural Information Processing Systems (NeurIPS), November 2022 (to appear).

Shawn Shan, Wenxin Ding, **Emily Wenger**, Haitao Zheng, Ben Y. Zhao. *Post-breach Recovery: Protection against White-Box Adversarial Examples for Leaked DNN Models*. Proceedings of the ACM Conference on Computer and Communications Security (CCS), November 2022 (to appear).

Huiying Li, Shawn Shan, **Emily Wenger**, Jiayun Zhang, Yuanshun Yao, Haitao Zheng, Ben Y. Zhao. *Blacklight: Scalable Defense for Neural Networks against Query-Based Black-Box Attacks*. Proceedings of the 31st USENIX Security Symposium, August 2022.

**Emily Wenger**, Max Bronckers, Christian Cianfarani, Jenna Cryan, Angela Sha, Haitao Zheng, Ben Y. Zhao. *“Hello, It’s Me”: Deep Learning-based Speech Synthesis Attacks in the Real World*. Proceedings of the ACM Conference on Computer and Communications Security (CCS), November 2021.

**Emily Wenger**, Josephine Passananti, Arjun Bhagoji, Yuanshun Yao, Haitao Zheng, Ben Y. Zhao. *Backdoor Attacks Against Deep Learning Systems in the Physical World*. Proceedings of the IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR), June 2021.

Shawn Shawn\*, **Emily Wenger\*** (co-first authors), Jiayun Zhang, Huiying Li, Haitao Zheng, Ben Y. Zhao. *Fawkes: Protecting Personal Privacy against Unauthorized Deep Learning Models*. Proceedings of the 29th USENIX Security Symposium, August 2020.

Shawn Shan, **Emily Wenger**, Bolun Wang, Bo Li, Haitao Zheng, Ben Y. Zhao. *Gotta Catch ’Em All: Using Honeypots to Catch Adversarial Attacks on Neural Networks*. Proceedings of the ACM Conference on Computer and Communications Security (CCS), November 2020.

## PREPRINTS

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**Emily Wenger**, Xiuyu Li, Ben Y. Zhao, Vitaly Shmatikov. *Data Isotopes for Data Provenance in DNNs*. In Submission.

**Emily Wenger\***, Francesca Falzon\*, Josephine Passananti, Haitao Zheng, Ben Y. Zhao. *Assessing Privacy Risks from Feature Vector Reconstruction Attacks*. In Submission.

Huiying Li, **Emily Wenger**, Ben Y. Zhao, Haitao Zheng. *Piracy Resistant Watermarks for Deep Neural Networks*.

## MEDIA COVERAGE

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Fawkes: Image Cloaking for Personal Privacy

- Covered by the **MIT Tech Review**: [How to stop AI from recognizing your selfies](#)
- Covered by the **New York Times**: [This Tool Could Protect Your Photos From Facial Recognition](#)
- Covered by **Nature Communications**: [Resisting the Rise of Facial Recognition](#)
- Covered by the **Verge**: [Cloak your photos with this AI privacy tool to fool facial recognition](#)
- Covered by **The Register (UK)**: [Sick of AI engines scraping your pics for facial recognition? Here’s a way to Fawkes them right up](#)
- Covered by **Die Zeit (Germany)**: [Die unsichtbare Maske \(The Invisible Mask\)](#)
- And many more (see [here](#) for a full list)

Deep-Learning Based Speech Synthesis Attacks

- Covered by the **New Scientist**: [AI-generated deepfake voices can fool both humans and smart assistants](#)

## INVITED TALKS

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“Towards More Realistic Threat Models in Adversarial Machine Learning”

**SPML Seminar**, September 2022

**Duke University**, April 2022

**University of Wisconsin - Madison**, April 2022

**Northeastern University**, May 2022

“Hello, It’s Me: Deep Learning-based Speech Synthesis Attacks in the Real World”

**“Speech as PII” Lorentz Center Workshop**, November 2021

**Facebook**, October 2021

“Fawkes: Protecting Personal Privacy against Unauthorized Deep Learning Models”

**Royal Holloway, University of London**, February 2022

**Microsoft Research Privacy & Cryptography Group**, June 2021

**Facebook**, October 2020

**“Are You a Robot?” Podcast** October 2020

**The Brave Foundation**, August 2020

**Boehringer-Ingelheim**, August 2020

**Infosec Podcast**, July 2020

“Piracy Resistant Watermarks for Deep Neural Networks,” EE380, **Stanford University**, November 2019

Plenary speaker, **Beyond the Binary Conference** at The University of Hartford, April 2019

## TEACHING

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<b>Cryptocurrencies</b> (TA)	University of Chicago	Winter 2019
<b>Introductory Cryptography</b> (TA)	WAM Program at the Institute for Advanced Studies	May 2018

## WORKSHOPS

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<b>Private AI Bootcamp</b>	Microsoft Research	November 2019
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## STUDENT RESEARCH ADVISING

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Emilio Andere	B.S. Computer Science, University of Chicago (exp. 2022)	2022-
William Zhu	B.S. Computer Science, Yale (exp. 2026)	Summer 2022
Irene Liu	Illinois Math and Science Academy	Summer 2022
Josephine Passananti	B.S. Computer Science, University of Chicago → Ph.D., Columbia	2018-22
Roma Bhattacharjee	B.S. Computer Science, Princeton University (exp. 2025)	2021-22
Angela Sha	B.S. Computer Science, University of Chicago → Apple	2020-21
Maximiliaan Bronckers	B.S. Computer Science, University of Chicago → M.S., Cambridge	2020-21
Talia Gifford	B.S. Physics, University of Chicago (exp. 2023)	2019-21
Esin Onal	B.S. Computer Science, University of Chicago → Deloitte	2020-21

## CONFERENCE AND WORKSHOP COMMITTEES

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PC Member, <i>NeurIPS Workshop on Trustworthy and Socially Responsible Machine Learning (TSRML)</i>	2022
Reviewer, <i>Neural Information Processing Systems (NeurIPS)</i> , <i>Datasets and Benchmarks Track</i>	2022
External Reviewer, <i>ACM Conference on Computer and Communications Security (CCS)</i>	2022
PC Member, <i>Workshop on Dependable and Secure Machine Learning (DSML)</i> (co-located with DSN)	2022
Reviewer, <i>IEEE Transactions on Pattern Analysis and Machine Intelligence</i>	2021

## LEADERSHIP

Founding Member and acting Senior Editor, [AI & Faith](#) (2020-present)

Curatorial team member for “Traced & Traced” exhibit, [Science Gallery Detroit](#) (2020-2021)

Student Organizer, Graduate Research Opportunities for Women (GROW) Conference (2020)

Member of UChicago CS student leadership team (2020-2021)

Student representative for UChicago CS graduate admissions committee (2019-2020)

## **OUTREACH AND VOLUNTEERISM**

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Elementary school visit host (University of Chicago Computer Science Department)

Math tutor for Hope Scholars after-school program (Woodlawn, Chicago)