

RESEARCH FOCUS *Machine learning for reasoning and decision-making under uncertainty.*

EDUCATION

2026 **Cornell University | New York, NY**
Doctor of Philosophy in Computer Science

2024 MS in Computer Science, conferred on PhD candidacy | GPA 4.04
Areas: AI / ML, Scientific Computing, Applied Probability & Statistics
NSF Graduate Research Fellow | Presidential Life Science Fellow

2021 **University of Pennsylvania | Philadelphia, PA**
Master of Computer & Information Technology | GPA 3.97
Interdisciplinary Innovation Fellow | Reproducible Research Fellow

2016 **Smith College | Northampton, MA**
BA Anthropology (Biological, Medical), Environmental Science | GPA 3.97
Summa Cum Laude – Top 1% of class | Phi Beta Kappa | Sigma Xi

EXPERIENCE

03.2026 – **Visitor**
06.2026 *Isaac Newton Institute for Mathematical Sciences | Cambridge, UK*
Invited **long-residency program** at the University of Cambridge on the theory and methods of causal inference.

05.2025 – **Research Intern**
08.2025 *YRIKKA | New York, NY*
PI: Dr. Kia Khezeli. Test-time adaptation and world modeling for abstract, causal, and logical reasoning in large language models.
Outcomes: NeurIPS LAW 2025 (spotlight), Amazon Trusted AI (poster).

05.2024 – **Research Intern**
08.2024 *Microsoft Research (MSR), Machine Intelligence Group | Cambridge, UK*
PI: Dr. Aditya Nori, Dr. Javier González. Methods for evaluating and improving LLM performance on causal and compositional reasoning tasks.
Outcomes: ICML 2025, ICLR 2025, pending patent, 2.5k+ HF downloads.

05.2022 – **Clinical Data Science Intern**
08.2022 *Boehringer Ingelheim, Biostatistics & Data Sciences | Ridgefield, CT*
PI: Dr. Yi Liu. Internal research on multimodal deep learning for survival analysis in pharmaceutical development.

08.2021 – **PhD Student Researcher**
05.2026 *Weill Cornell Medicine, Institute of AI for Digital Health | New York, NY*
PI: Dr. Fei Wang. ML and causal inference for computational biomedicine.

Cornell Tech Computer Science | New York, NY
PI: Dr. Volodymyr Kuleshov. Deep generative and probabilistic modeling.

Cornell Tech Operations Research | New York, NY
PI: Dr. Kyra Gan. Robust and efficient statistical inference, scalable causal discovery, and causal fairness in healthcare.

05.2020 – **Master’s Student Researcher**
07.2021 *University of Pennsylvania Bioengineering | Philadelphia, PA*
PI: Dr. César de la Fuente. New paradigms for ML-based drug discovery.
Outcomes: Thesis coined the new field of *molecular de-extinction*, published in *Cell Host & Microbe* and covered by *NPR, Nature News, and CNN.*

LANGUAGES		<i>Proficient:</i> Python; R; L ^A T _E X; shell. <i>Prior experience:</i> Stan; Java; C; MATLAB.
FRAMEWORKS		PyTorch; NumPy; sklearn; tidyverse; Git; Claude Code; AWS; Slurm-based HPC.
SKILLS & INTERESTS		<i>2019 – Present:</i> Probabilistic graphical models; generative models; AI reasoning; reinforcement learning; world models; causal inference; causal discovery; causal fairness; AI evaluation; test-time adaptation; graph theory; applied probability; statistics; logic; AI safety; trustworthiness; computational biomedicine; drug discovery. <i>Pre-2019:</i> Molecular genetics, molecular diagnostics, epidemiology.
UNDER REVIEW	2026	Xu, J; Maasch, J ; Gan, K. <i>Integrating Causal DAGs in Deep RL: Activating Minimal Markovian States with Multi-Order Exposure</i> . [ARXIV]
	2025	Maasch, J ; Neiswanger, W; Kuleshov, V; Ermon, S. <i>Probabilistic Graphical Models: A Concise Tutorial</i> . [ARXIV] [WEBSITE]
SELECT PEER-REVIEWED PUBLICATIONS (GOOGLE SCHOLAR)	2026	[ICML] Lawrence, R*; Maasch, J *. <i>Position: Reasoning is a Learnable Rule-Based Process</i> . *Equal contribution. 43 rd International Conference on Machine Learning. [WEBSITE] [SLIDES] [POSTER] [CODE]
	2025	[ICML] Maasch, J ; Hüyük, A; Xu, X; Nori A; González J. <i>Compositional Causal Reasoning Evaluation in Language Models</i> . 42 nd International Conference on Machine Learning. [WEBSITE] [ARXIV] [SLIDES] [POSTER]
	2025	[ICLR - ORAL - TOP 1.8%] Hüyük, A; Xu, X; Maasch, J ; et al. <i>Reasoning Elicitation in Language Models via Counterfactual Feedback</i> . 13 th International Conference on Learning Representations. [ARXIV]
	2025	[AAAI] Maasch, J ; et al. <i>Local Causal Discovery for Structural Evidence of Direct Discrimination</i> . 39 th Annual AAAI Conference on Artificial Intelligence. [ARXIV] [SLIDES] [POSTER]
	2024	[NEURIPS] Hiremath, S; Maasch, J ; et al. <i>Hybrid Top-Down Global Causal Discovery with Local Search for Linear and Nonlinear Additive Noise Models</i> . 38 th Annual Conference on Neural Information Processing Systems. [ARXIV]
	2024	[UAI] Maasch, J ; et al. <i>Local Discovery by Partitioning: Polynomial-Time Causal Discovery Around Exposure-Outcome Pairs</i> . 40 th Conference on Uncertainty in Artificial Intelligence. [ARXIV] [SLIDES] [POSTER]
	2023	[CELL HOST & MICROBE] Maasch, J *; Torres, M*; et al. <i>Molecular de-extinction of ancient antimicrobial peptides enabled by machine learning</i> . Cell Host & Microbe. 31. 8. 1260-1274. e6. 2023. *Equal contribution. [CELL]
PEER-REVIEWED WORKSHOP PRESENTATIONS	2026	[ICML] Xu, J; Maasch, J ; Gan, K. <i>Integrating Causal DAGs in Deep RL: Activating Minimal Markovian States with Multi-Order Exposure</i> . ICML 2026 Workshop on Structured Probabilistic Inference & Generative Modeling. [WORKSHOP] [ARXIV]
	2026	[ICML] Lawrence, R*; Maasch, J *. <i>What is AI Reasoning?</i> *Equal contribution. ICML 2026 Women in ML Symposium. [WORKSHOP] [ABSTRACT]
	2026	[ICLR] Lawrence, R*; Maasch, J *. <i>Position: Beyond Reasoning Zombies — AI Reasoning Requires Process Validity</i> . *Equal contribution. ICLR Workshop on Logical Reasoning of Large Language Models and ICLR Workshop on Principled Design for Trustworthy AI – Interpretability, Robustness, and Safety across Modalities. [WORKSHOP 1] [WORKSHOP 2] [WEBSITE]
	2025	[NEURIPS - SPOTLIGHT] Maasch, J ; Kalantari, J; Khezeli, K. <i>CausalARC: Abstract Reasoning with Causal World Models</i> . NeurIPS LAW: Bridging Language, Agent, and World Models. [WORKSHOP] [ARXIV] [WEBSITE]
	2023	[NEURIPS] Maasch, J ; et al. <i>Local Discovery by Partitioning: Polynomial-Time Causal Discovery Around Exposure-Outcome Pairs</i> . NeurIPS Causal Representation Learning Workshop. [WORKSHOP] [ARXIV]
	2023	[ICML] Maasch, J ; et al. <i>Regularized Data Programming with Automated Bayesian Prior Selection</i> . ICML Workshop on Structured Probabilistic Inference & Generative Modeling. [WORKSHOP] [ARXIV]

PENDING PATENTS	2026	González J; Nori A; Hüyük, A; Xu, X; Maasch, J. <i>Fine-Tuning Language Models for Reasoning with Counterfactual Feedback</i> . App no: 63/699,777.
FELLOWSHIPS	2025	Doctoral Fellowship Cornell Tech Digital Life Initiative
	2021	NSF Graduate Research Fellowship US National Science Foundation
	2021	Presidential Life Science Fellowship Cornell University
	2021	Reproducible Research Fellowship OKFN, Alfred P. Sloan Foundation
	2020	Interdisciplinary Innovation Fellowship University of Pennsylvania
AWARDS	2026	Gold Reviewer Award (top 25%) ICML 2026 Area Chairs
	2023	Outstanding Service and Community Award Cornell Tech
INVITED PRESENTATIONS	02.26	TALK <i>What is reasoning?</i> [SLIDES] Cornell Tech Digital Life Initiative New York, NY
	01.26	POSTER <i>Stress-Testing Reasoning with Causal World Models.</i> [WEBSITE] Amazon AGI Trusted AI Symposium New York, NY
	07.25	TALK <i>Compositional Causal Reasoning Evaluation.</i> Microsoft Expo Booth, ICML Vancouver, BC
	04.25	TALK <i>Graphical Perspectives on Causal Reasoning.</i> [SLIDES] Flatiron Institute , Simons Foundation New York, NY
	03.25	TALK <i>A brief introduction to causal inference.</i> [SLIDES] Cornell INFO5375: Machine Learning for Health New York, NY
	10.24	TALK <i>Local discovery for causal fairness analysis.</i> [SLIDES] INFORMS Annual Meeting Seattle, WA
	07.24	TALK <i>Compositional Causal Reasoning.</i> Microsoft Research Machine Intelligence Core Cambridge, UK
	06.24	TALK <i>Local causal discovery for causal effect estimation.</i> University of Cambridge Statistical Laboratory Cambridge, UK
	04.24	TALK <i>Local Discovery by Partitioning.</i> [SLIDES] 34th Annual POMS Conference Minneapolis, MN
PROFESSIONAL ACTIVITIES	24-25	Co-organizer, NYC Learning on Graphs Workshop
	24-25	PhD Application Reviewer, Cornell Computer Science Graduate Admissions
	23-25	Student leader, Cornell CS PhD Visit Days
	2023	Co-developer, Cornell CS 6006: Succeeding in the Graduate Environment
	2023	Founder / organizer, Cornell Causal Reading Group
TRAVEL & CONFERENCE SCHOLARSHIPS	2026	Research Travel Grant Cornell Graduate School
	2025	ICML, Vancouver, BC International Conference on Machine Learning
	2025	AAAI, Philadelphia, PA Association for the Advancement of AI
	2023	NeurIPS, New Orleans, LA Neural Information Processing Systems
	2020	Grace Hopper Celebration Scholarship University of Pennsylvania
PEER REVIEW		<i>AI/ML</i> : ICML (main track, position track, SPIGM); UAI (main track); AISTATS (main track); ACL (main track); NeurIPS (WiML). <i>Biology</i> : Communications Biology (Nature Portfolio); Journal of Biomedical Informatics (Elsevier); Bioinformatics (Oxford Academic); ACS Infectious Diseases.