

Julia Balla

julballa.github.io | jballa@mit.edu

EDUCATION	Massachusetts Institute of Technology Sep 2023 – Present Ph.D. in Electrical Engineering and Computer Science Advisors: Tess Smidt and Tommi Jaakkola
	University of Oxford, Exeter College Oct 2022 – Aug 2023 M.Sc. in Advanced Computer Science Advisor: Michael Bronstein Thesis: Graph-Informed Symbolic Regression
	Massachusetts Institute of Technology Sep 2018 – May 2022 B.Sc. in Mathematics with Computer Science, Minor in Economics
SCHOLARSHIPS & AWARDS	Robert M. (1941) and Jacqueline M. Fano Fellowship 2023 – 2024 DeepMind Scholarship 2022 – 2023
	PUBLICATIONS & PREPRINTS Balla, J. (2023). Over-squashing in Riemannian Graph Neural Networks. <i>Extended Abstract. Presented at Second Learning on Graphs Conference (LoG 2023), Virtual Event, November 27–30, 2023.</i>
	Balla, J. , Huang, S., Dugan, O., Dangovski, R., Soljagic, M. (2023). AI-Assisted Discovery of Quantitative and Formal Models in Social Science. <i>arXiv:2210.0056. In review.</i>
	Vepakomma, P., Balla, J. , Raskar, R. (2022). PrivateMail: Supervised Manifold Learning of Deep Features with Privacy for Image Retrieval. <i>Proceedings of the AAAI Conference on Artificial Intelligence</i> , 36(8), 8503-8511. Oral presentation at AAAI-22
	Vepakomma, P., Balla, J. , Raskar, R. (2020). Splintering with distributions: A stochastic decoy scheme for private computation. <i>arXiv:2007.02719.</i>
RESEARCH EXPERIENCE	Harvard Medical School Jun 2022 – Sep 2022 Supervisor: Marinka Zitnik Combining symbolic regression with graph neural networks for the discovery of fundamental drug interaction laws.
	Institute for AI and Fundamental Interactions, MIT Jun 2021 – Aug 2022 Supervisor: Marin Soljačić Designed a neural symbolic regression system for the discovery of universal laws in social science and dynamical systems.
	London Geometry and Machine Learning Summer School Jul 2022 Supervisor: Francesco di Giovanni Surveyed techniques for graph-rewiring in graph neural networks from a geometric perspective.
	MIT Computer Science and Artificial Intelligence Lab Feb 2021 – May 2021 Supervisors: Octavian Ganea and Tommi Jaakkola Explored computationally tractable methods to learn Riemannian manifolds as geometric priors for graph representation learning.
	MIT Media Lab Feb 2020 – May 2021 Supervisors: Praneeth Vepakomma and Ramesh Raskar

Developed algorithms for privacy-preserving machine learning with applications in distributed learning and private image retrieval.

INDUSTRY EXPERIENCE

Wellington Management Jun 2021 – Aug 2021
Data Science Intern Boston, MA

Designed a text classification algorithm to identify job postings indicating company growth.

Meta Jun 2020 – Aug 2020
Data Engineering Intern New York, NY

Created a data pipeline and dashboard for sentiment analysis of Messenger app reviews using Presto and HiveQL.

Predata Jun 2019 – Aug 2019
Data Visualization Intern New York, NY

Developed a web app using ReactJS and Django for predicting geopolitical risk by visualizing page activity for geotagged Wikipedia pages on a 3D map.

R3 Jan 2019 – Feb 2019
Research and Education Intern New York, NY

Analyzed challenges within the automotive, aerospace, and agriculture industries caused by Brexit and mapped them to potential blockchain solutions.

TEACHING

MIT High School Studies Program Jul 2022 – Aug 2022
Instructor

[C15061: The Mathematics of Multi-Agent Systems](#)

MIT Splash Nov 2020
Instructor

C14311: Minecraft Fires, Social Networks, and Quantum Complexity

OUTREACH

MIT EECS Graduate Application Assistance Program Oct 2023 – Dec 2023
Mentor

MIT Undergraduate Society of Women in Math Feb 2022 – May 2022
Mentor

REVIEWING

NeurIPS AI4Science Workshop 2023

SKILLS

Programming languages: Python, Javascript, R, Julia, SQL

Deep learning: PyTorch (PyG), TensorFlow, Jax (Jraph)

Miscellaneous: Fluent in Russian