

Contact Information	Salvatori Computer Science Center Los Angeles, CA, 90089	✉ <a href="mailto:ollieliu@salvatori.com">ollieliu</a> ✉ <a href="mailto:me@ollieliu.com">me@ollieliu.com</a>
Research Interests	<p>I'm broadly interested in multimodal foundation models. These days, I'm exploring their potential as agents of complex reasoning and scientific discovery. I'm particularly excited about:</p> <ul style="list-style-type: none"> <li>• Designing and understanding architectures and algorithms that are applicable to scientific modalities, such as (meta)genomics, protein, physics, chemistry, and material sciences.</li> <li>• Developing post-training and inference-time methods that enable FMs to solve complex reasoning and decision making problems.</li> </ul>	
Education	<p><b>University of Southern California</b> 08/2022 - Present  <i>Ph.D. in Computer Science</i>            Advisor(s): Dani Yogatama, Willie Neiswanger</p> <p><b>Northwestern University</b> 09/2019 - 06/2021  <i>Master of Science in Industrial Engineering and Management Sciences</i>            Advisor(s): Jorge Nocedal</p> <p><b>Carnegie Mellon University</b> 08/2013 - 08/2019  <i>Master of Science in Machine Learning</i>  <i>Bachelor of Science in Statistics and Mathematics (with Honors)</i></p>	
Preprints	<p>✧: equal contribution; <math>\alpha</math>-<math>\beta</math>: equal contribution, alphabetical order</p> <p><b>Ollie Liu</b><sup>*</sup>, Deqing Fu<sup>*</sup>, Dani Yogatama, Willie Neiswanger “DeLLMa: Decision Making Under Uncertainty with Large Language Models” In: <i>arXiv Preprint</i>. [<a href="#">pdf</a>] [<a href="#">website</a>]</p> <p><b>Ollie Liu</b>, Sami Jaghouar, Johannes Hagemann, Jeff Kaufman, Willie Neiswanger “MGFM: Metagenomic Foundation Model for Pandemic Monitoring” In: <i>Foundation Models for Science Workshop at NeurIPS 2024</i>. [<a href="#">pdf</a>]</p> <p>Jiarui Zhang, <b>Ollie Liu</b>, Tianyu Yu, Jinyi Hu, Willie Neiswanger “<b>Euclid</b>: Supercharging Multimodal LLMs with Synthetic High-Fidelity Visual Descriptions” In: <i>Submission</i>.</p> <p>Wenyue Hua, <b>Ollie Liu</b>, Lingyao Li, Alfonso Amayuelas, Julie Chen, Lucas Jiang, Mingyu Jin, Lizhou Fan, Fei Sun, William Wang, Xintong Wang, Yongfeng Zhang “Game-Theoretic LLM: Agent Workflow for Negotiation Games” In: <i>arXiv Preprint</i>. [<a href="#">pdf</a>]</p> <p>Ghazal Khalighinejad, Sharon Scott, <b>Ollie Liu</b>, Kelly L. Anderson, Rickard Stureborg, Aman Tyagi, Bhuwan Dhingra “MATVIX: Multimodal Information Extraction from Visually Rich Articles” In: <i>arXiv Preprint</i>. [<a href="#">pdf</a>] [<a href="#">website</a>]</p>	
Publications	<p>Deqing Fu<sup><math>\alpha</math>-<math>\beta</math></sup>, Ruohao Guo<sup><math>\alpha</math>-<math>\beta</math></sup>, Ghazal Khalighinejad<sup><math>\alpha</math>-<math>\beta</math></sup>, <b>Ollie Liu</b><sup><math>\alpha</math>-<math>\beta</math></sup>, Bhuwan Dhingra, Dani Yogatama, Robin Jia, Willie Neiswanger “IsoBench: Benchmarking Multimodal Foundation Models on Isomorphic Representations” In: <i>Proceedings of COLM 2024</i>. [<a href="#">pdf</a>] [<a href="#">website</a>]</p> <p>Ting-Rui Chiang, Xinyan Velocity Yu, Joshua Robinson, <b>Ollie Liu</b>, Isabelle Lee, Dani Yogatama “On Retrieval Augmentation and the Limitations of Language Model Training” In: <i>Proceedings of NAACL 2024 (short)</i>. [<a href="#">pdf</a>] [<a href="#">code</a>]</p>	

Xianghao Kong\*, **Ollie Liu**\*, Han Li, Dani Yogatama, Greg Ver Steeg “Interpretable Diffusion via Information Decomposition” In: *Proceedings of ICLR 2024*. [[pdf](#)] [[code](#)]

Ghazal Khalighinejad , **Ollie Liu**, Sam Wiseman “Approximating CKY with Transformers” In: *Proceedings of Findings of EMNLP 2023*. [[pdf](#)] [[code](#)]

Michael Hanna, **Ollie Liu**, Alexandre Variengien “How Does GPT-2 Compute Greater-Than?: Interpreting Mathematical Abilities in a Pre-Trained Language Model” In: *Proceedings of NeurIPS 2023*. [[pdf](#)]

In Progress	<b>Multimodal Foundation Model for Physical Sciences</b> , Core Contributor, with Polymathic AI <b>Self-Improving LM with Textual Feedback</b> , Lead, with Microsoft Research	
Positions	<b>New York University &amp; Polymathic AI</b> , Research Scientist	Fall 2024
	<b>Microsoft Research, AI Frontiers</b> , Research intern	Summer 2024
	<b>Reka AI</b> , Research intern	Summer 2023
	<b>Redwood Research</b> , Research Resident	Winter 2023
	<b>Meta Reality Labs, Assistant Technologies</b> , Applied Research Intern	Summer 2022
	<b>You.com</b> , Software Engineer Intern	Spring 2022
	<b>Amazon Web Services, GenAI Innovation Center</b> , Applied Scientist Intern	2021
Honors and Awards	<b>University Organizer Fellowship</b> , Open Philanthropy, 2024 <b>Provost’s Fellowship</b> , University of Southern California, 2022 <b>Data Science Fellowship</b> , Northwestern University, 2019 <b>Royal E. Cabell Fellowship</b> , Northwestern University, 2019 <b>Senior Leadership Recognition</b> , Carnegie Mellon University, 2018	
Invited Talks	<b>USC Information Science Institute NLG Seminar</b> , DeLLMa: A Framework for Decision Making Under Uncertainty with Large Language Models, [ <a href="#">vi</a> ] [ <a href="#">deo</a> ]	
Teaching Experiences	<b>TA</b> , Machine Learning (Master), University of Southern California, Fall 2023 <b>Co-Instructor</b> , Machine Learning (Ph.D Elective), Northwestern University, Fall 2021 <b>Co-Instructor</b> , Mathematical Statistics (Ph.D Core), Northwestern University, Fall 2020 <b>TA</b> , Introduction to Machine Learning (Master), Carnegie Mellon University, 2 Semesters. <b>TA</b> , Principles of Computing (Undergraduate), Carnegie Mellon University, 4 Semesters.	
Doctoral Courseworks	Machine Learning, Natural Language Processing, Computer Vision, Learning Theory, Scalable Learning Systems, Theoretical Optimization	
Services and Activities	<b>Reviewer</b> , ICML (2023, 2024); NeurIPS (2024); ICLR (2025); ACL Rolling Review (2024) <b>President</b> , <a href="#">AI Safety Group</a> , University of Southern California <b>Student organizer</b> , <a href="#">Center for Optimization and Statistical Learning</a> , Northwestern University	
Skills	<b>Software</b> : Python (JAX, PyTorch, Hugging Face), Linux, R, $\LaTeX$ <b>Language</b> : Chinese ( <i>native</i> ), English ( <i>proficient</i> , GRE V169+Q168)	