

## EDUCATION

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<b>Carnegie Mellon University</b> PhD in Machine Learning. Advisor: <a href="#">Albert Gu</a> GPA: 3.67/4.0	<i>Aug 2024 - May 2030 (Expected)</i>
<b>Massachusetts Institute of Technology</b> Master of Engineering in EECS. Advisor: <a href="#">Max Tegmark</a> GPA: 5.0/5.0	<i>Sep 2023 - May 2024</i>
<b>Massachusetts Institute of Technology</b> Bachelor of Science, Double major in CS and Physics GPA: 5.0/5.0	<i>Sep 2019 - Jun 2023</i>

## RESEARCH EXPERIENCE

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<b>Albert Gu Group</b> Graduate Researcher (PhD). Advising: <a href="#">Albert Gu</a>	<i>Aug 2024 - Present</i>
<ul style="list-style-type: none"> <li>Research on ARC-AGI Without Pretraining: training small models on target puzzles with inference-time-only learning; achieved 20% solve rate on ARC-AGI-1 with a 76k-parameter model.</li> </ul>	
<b>Jane Street</b> Machine Learning Research Intern	<i>May 2025 - Aug 2025</i>
<ul style="list-style-type: none"> <li>Built generative models to infer unseen activity in partially observed markets.</li> <li>Developed ensembling techniques for neural networks trained on market data.</li> </ul>	
<b>Tegmark AI Safety Group</b> Graduate Researcher (MEng). Advising: <a href="#">Max Tegmark</a>	<i>Sep 2023 - May 2024</i>
<ul style="list-style-type: none"> <li>Discovered circular representations of days of the week in Mistral 7B and GPT-2-small.</li> <li>Simplified recurrent neural networks into standard forms using symmetry transformations.</li> </ul>	

## PUBLICATIONS

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<b>ARC-AGI Without Pretraining</b> <i>Isaac Liao, Albert Gu.</i>	<a href="#">Blog post</a> , also submitted to NeurIPS 2025.
<ul style="list-style-type: none"> <li>Solving IQ-test-like visual puzzles by <i>extreme generalization</i>, training only on the target puzzle.</li> <li>20% solve rate on ARC-AGI-1 despite training only at inference time, with a tiny 76K param model.</li> </ul>	
<b>Not All Language Model Features Are One-Dimensionally Linear.</b> <i>Josh Engels, Eric J. Michaud, Isaac Liao, Wes Gurnee, and Max Tegmark.</i>	<a href="#">arXiv</a> 2024.
<ul style="list-style-type: none"> <li>Discovering circular representations of days of the week in Mistral 7B and GPT-2-small.</li> </ul>	
<b>Opening the AI Black Box: Program Synthesis via Mechanistic Interpretability.</b> <i>Eric J. Michaud, Isaac Liao, Vedang Lad, Ziming Liu, Anish Mudide, et al.</i>	<a href="#">arXiv</a> 2024.
<ul style="list-style-type: none"> <li>Reducing RNN weights into interpretable python code through a series of simplifying steps.</li> </ul>	
<b>Learning to Optimize Quasi-Newton Methods.</b> <i>Isaac Liao, Rumen Dangovski, Jakob Nicolaus Foerster, and Marin Soljačić.</i>	<a href="#">TMLR</a> 2023.
<ul style="list-style-type: none"> <li>Online learning a preconditioner for gradient descent; theoretical guarantees on preconditioner behavior.</li> </ul>	
<b>Streamlining Physics Problem Generation to Support Physics Teachers in Using Gen. AI.</b> <i>Shams El-Adawy, Isaac Liao, Vedang Lad, Mohamed Abdelhafez, et al.</i>	<a href="#">The Physics Teacher</a> 2024.
<ul style="list-style-type: none"> <li>Techniques for chain-of-thought prompting an LLM to generate physics problems suitable for teaching.</li> </ul>	
<b>Generating Interpretable Networks Using Hypernetworks.</b> <i>Isaac Liao, Ziming Liu, and Max Tegmark.</i>	<a href="#">arXiv</a> 2023.
<ul style="list-style-type: none"> <li>Designing a graph neural network to generate interpretable good weights for another neural network.</li> </ul>	

## INVITED TALKS

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<b>ARC-AGI Without Pretraining</b>	NVIDIA LLM Reasoning Team, <i>Sept 2025</i>
<b>Generating Interpretable Networks Using Hypernetworks</b>	Stanford Enigma Project, <i>May 2025</i>
<b>ARC-AGI Without Pretraining</b>	Gwangju Institute of Science and Technology, <i>Apr 2025</i>

## AWARDS AND HONORS

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<b>International Physics Olympiad: Silver Medal. 2nd in Canada.</b>	<i>July 2019</i>
<b>International Physics Olympiad: Honorable Mention. 5th in Canada.</b>	<i>July 2018</i>
<b>Citadel Securities PhD Summit Poster Competition: 3rd place, \$5000 prize.</b>	<i>March 2025</i>
<b>MIT Battlecode swarm intelligence competition: 1st place, \$8000 prize.</b>	<i>Jan 2022</i>