

# Li Ding

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CONTACT	<i>Email:</i> <code>liding@{umass.edu, mit.edu}</code>	<i>Website:</i> <code>https://liding.info</code>
RESEARCH INTERESTS	My research focus is <b>optimization algorithms</b> and <b>metaheuristics</b> as they apply to: <ul style="list-style-type: none"><li>• <b>Deep learning</b>, meta-learning, architecture search, and knowledge distillation of foundation models and RL policies in single- and multi-objective scenarios.</li><li>• <b>Open-ended learning</b> of large generative models and generally-capable agents.</li><li>• <b>Preference-based learning</b> from human feedback and human-AI alignment.</li><li>• Interdisciplinary machine learning for quantum computing and HCI.</li></ul>	
EDUCATION	<b>University of Massachusetts Amherst</b>	Amherst, MA
	<i>Ph.D. in Computer Science</i>	2020.9 - (expected) 2024.9
	<ul style="list-style-type: none"><li>• Principal area: artificial intelligence.</li><li>• Advisor: Lee Spector.</li><li>• Mentors and collaborators: Scott Niekum (UMass), Joel Lehman (OpenAI), Jeff Clune (Univ. British Columbia), Masrour Zoghi (Google Research), Bryan Reimer (MIT)</li></ul>	
	<b>Massachusetts Institute of Technology</b>	Cambridge, MA
	<i>Graduate Study in Computer Science (non-degree)</i>	2019.9 - 2020.1
RESEARCH EXPERIENCE	<b>University of Rochester</b>	Rochester, NY
	<i>M.S. in Data Science</i>	2016.6 - 2017.5
	<ul style="list-style-type: none"><li>• Advisor: Chenliang Xu.</li></ul>	
	<b>Central University of Finance and Economics</b>	Beijing, China
	<i>B.S. in Statistics</i>	2012.9 - 2016.6
RESEARCH EXPERIENCE	<b>Google Research</b>	Mountain View, CA
	<i>Research Intern</i>	2023.6 - present
	<ul style="list-style-type: none"><li>• Project: Meta-optimization for knowledge distillation.</li><li>• Hosts: Masrour Zoghi &amp; Maryam Karimzadehgan.</li></ul>	
	<b>Meta Reality Labs</b>	Burlingame, CA
	<i>Research Scientist Intern</i>	2022.5 - 2022.8
RESEARCH EXPERIENCE	<ul style="list-style-type: none"><li>• Project: Image segmentation for AR/VR.</li><li>• Hosts: Wenliang Zhao &amp; Hang Zhang.</li></ul>	
	<b>Massachusetts Institute of Technology</b>	Cambridge, MA
	<i>Research Affiliate</i>	2020.7 - 2021.6
	<i>Research Engineer</i>	2017.9 - 2020.6
	<ul style="list-style-type: none"><li>• Project: Deep learning for driving scene perception and driver monitoring systems.</li><li>• PIs: Lex Fridman &amp; Bryan Reimer.</li></ul>	

## PUBLICATIONS PREPRINTS

- [21] **L. Ding**, J. Zhang, J. Clune, L. Spector, and J. Lehman, “Quality diversity through human feedback,” *arXiv preprint arXiv:2310.12103*, 2023
- [20] L. Spector, **L. Ding**, and R. Boldi, “Particularity,” *arXiv preprint arXiv:2306.06812*, to appear in *Genetic Programming Theory and Practice XX*, 2023

## PEER-REVIEWED JOURNAL AND CONFERENCE PUBLICATIONS

- [19] **L. Ding**, E. Pantridge, and L. Spector, “Probabilistic lexibase selection,” in *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)*, 2023
- [18] **L. Ding**, J. Terwilliger, A. Parab, M. Wang, L. Fridman, B. Mehler, and B. Reimer, “CLERA: A unified model for joint cognitive load and eye region analysis in the wild,” *ACM Transactions on Computer-Human Interaction*, vol. 30, no. 6, 2023
- [17] **L. Ding** and L. Spector, “Multi-objective evolutionary architecture search for parameterized quantum circuits,” *Entropy*, 2023
- [16] **L. Ding** and L. Spector, “Optimizing neural networks with gradient lexibase selection,” in *International Conference on Learning Representations (ICLR)*, 2022
- [15] **L. Ding**, J. Terwilliger, R. Sherony, B. Reimer, and L. Fridman, “Value of temporal dynamics information in driving scene segmentation,” *IEEE Transactions on Intelligent Vehicles*, 2021
- [14] **L. Ding**, R. Sherony, B. Mehler, and B. Reimer, “Perceptual evaluation of driving scene segmentation,” in *IEEE Intelligent Vehicles Symposium (IV)*, 2021
- [13] **L. Ding**, M. Glazer, M. Wang, B. Mehler, B. Reimer, and L. Fridman, “MIT-AVT clustered driving scene dataset: Evaluating perception systems in real-world naturalistic driving scenarios,” in *IEEE Intelligent Vehicles Symposium (IV)*, 2020
- [12] L. Fridman, D. E. Brown, M. Glazer, W. Angell, S. Dodd, B. Jenik, J. Terwilliger, A. Patsekin, J. Kindelsberger, **L. Ding**, *et al.*, “MIT advanced vehicle technology study: Large-scale naturalistic driving study of driver behavior and interaction with automation,” *IEEE Access*, 2019
- [11] **L. Ding** and C. Xu, “Weakly-supervised action segmentation with iterative soft boundary assignment,” in *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018

## PEER-REVIEWED WORKSHOP PAPERS AND POSTERS

- [10] **L. Ding**, M. Zoghi, G. Tennenholtz, and M. Karimzadehgan, “Ever evolving evaluator: Towards flexible and reliable meta-optimization for knowledge distillation,” in *NeurIPS: Workshop on Adaptive Experimental Design and Active Learning in the Real World*, 2023
- [9] R. Boldi, **L. Ding**, and L. Spector, “Objectives are all you need: Solving deceptive problems without explicit diversity maintenance,” in *NeurIPS: Workshop on Agent Learning in Open-Endedness*, 2023
- [8] **L. Ding** and L. Spector, “Evolutionary quantum architecture search for parametrized quantum circuits,” in *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO) Companion*, 2022

- [7] **L. Ding**, R. Boldi, T. Helmuth, and L. Spector, “Going faster and hence further with lexicase selection,” in *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO) Companion*, 2022
- [6] **L. Ding**, R. Boldi, T. Helmuth, and L. Spector, “Lexicase selection at scale,” in *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO) Companion*, 2022
- [5] **L. Ding** and L. Spector, “Evolving neural selection with adaptive regularization,” in *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO) Companion*, 2021
- [4] L. Fridman, **L. Ding**, B. Jenik, and B. Reimer, “Arguing machines: Human supervision of black box AI systems that make life-critical decisions,” in *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, 2019
- [3] L. Fridman, H. Schmidt, J. Terwilliger, and **L. Ding**, “Human interaction with deep reinforcement learning agents in virtual reality,” in *NeurIPS: Deep Reinforcement Learning Workshop*, 2018

#### TECHNICAL REPORTS

- [2] **L. Ding**, J. Terwilliger, R. Sherony, B. Reimer, and L. Fridman, “MIT DriveSeg (manual) dataset for dynamic driving scene segmentation,” *Massachusetts Institute of Technology AgeLab Technical Report 2020-1*, 2020
- [1] **L. Ding**, M. Glazer, J. Terwilliger, B. Reimer, and L. Fridman, “MIT DriveSeg (semi-auto) dataset: Large-scale semi-automated annotation of semantic driving scenes,” *Massachusetts Institute of Technology AgeLab Technical Report 2020-2*, 2020

INVITED TALKS	Towards flexible and reliable meta-optimization for efficient knowledge distillation.	
	<i>Google Research.</i>	2023.9
	Particularity.	
	<i>Genetic Programming Theory &amp; Practice 2023. (Joint talk w/ Lee Spector)</i>	2023.6
	High-capacity image segmentation for AR/VR applications.	
	<i>Meta Reality Labs.</i>	2022.8
	Optimizing neural networks with gradient lexicase selection.	
	<i>UMass Amherst CICS (Autonomous Learning Lab).</i>	2022.3
	MIT DriveSeg dataset for dynamic driving scene segmentation.	
	<i>Ford Research &amp; Advanced Engineering.</i>	2020.11
	<i>AutoSens 2020.</i>	2020.9
	<i>MIT Advanced Vehicle Technology (AVT) Consortium.</i>	2020.5
	<i>Toyota Motor North America.</i>	2020.3
	Data-driven computer vision research for human-centered autonomous vehicles.	
	<i>UMass Amherst ECE (Software System Research Lab).</i>	2021.6
	<i>Affectiva.</i>	2020.3
	<i>MIT CSAIL (Data Systems Group).</i>	2019.10

HONORS AND AWARDS	SOAR (Supporting Open Access Research) Fund (\$1,200), <i>UMass Amherst</i> .	2023
	4th Place (among 150 teams, top 3%), <i>MIT Miniplaces Challenge</i> .	2019
	Graduate Tuition Scholarship (\$20,000), <i>University of Rochester</i> .	2016
	Excellent Youth of the Year (top 2%), <i>Central Univ. of Finance and Economics</i> .	2015
	Meritorious Winner (top 5%), <i>COMAP's Mathematical Contest In Modeling</i> .	2015
TEACHING EXPERIENCE	<i>University of Massachusetts Amherst</i>	
	• TA for COMPSCI 230: Computer Systems Principles.	2021
	<i>Massachusetts Institute of Technology</i>	
	• TA for 6.S094: Deep Learning for Self-Driving Cars.	2018 - 2019
	• TA for 6.S093: Human-Centered Artificial Intelligence.	2019
SERVICES	• TA for 6.S099: Artificial General Intelligence.	2018
	• Co-instructor (w/ Tom Bertalan) for MIT Robocar Workshop.	2018
	CONFERENCE REVIEWER / PROGRAM COMMITTEE	
	• International Conference on Learning Representations (ICLR)	2024
	• AAAI Conference on Artificial Intelligence (AAAI)	2024
	• Conference on Neural Information Processing Systems (NeurIPS)	2023
	• International Conference on Computer Vision (ICCV)	2023
	• Conference on Computer Vision and Pattern Recognition (CVPR)	2023
	• International Joint Conference on Neural Networks (IJCNN)	2022
	• Intelligent Vehicles Symposium (IV)	2021 - 2023
	• British Machine Vision Conference (BMVC)	2020 - 2021, 2023
	• Conference on Automotive User Interfaces (AutoUI)	2020
	• GECCO: Quantum Optimization Workshop	2022 - 2023
	JOURNAL REVIEWER	
	• IEEE Transactions on Intelligent Vehicles	
	• Quantum Machine Intelligence	
	• Pattern Recognition	
	• IEEE Access	
	• IEEE Transactions on Circuits and Systems for Video Technology	
OPEN SOURCE PROJECTS	• mit-deep-learning: Created open-access tutorials and coding assignments for MIT Deep Learning courses (9k+ stars on Github).	
	• facebookresearch/d2go: Contributed to D2Go (a system from Meta Research for model training and deployment for mobile platforms).	
	• MIT AI Podcast: Prepared interview materials for an open-access podcast hosted by Lex Fridman (now the <i>Lex Fridman Podcast</i> , ranked #1 on Apple Podcasts technology category).	