

Ryan Bahlous-Boldi

Amherst, MA 01003
(617) 749 5001

RESEARCH INTERESTS I am interested in the study of human intelligence from the perspective of evolving and learning autonomous systems.

EDUCATION	University of Massachusetts Amherst <i>Bachelor of Science, Computer Science</i> GPA: 4.0 Member of the Commonwealth Honors College Minors: Philosophy, Psychology	Amherst, MA May 2025
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RESEARCH *Programs Under Selection and Heredity (PUSH) Lab* Fall 2021–
 EXPERIENCE University of Massachusetts Amherst & Amherst College Amherst, MA
 Advisor: Lee Spector
 ➔ Working on improving selection strategies for evolutionary computation systems
 such as genetic programming.
 ➔ Main focus is on Lexicase selection, a novel selection strategy that has shown
 promise in evolving diverse populations.

Safe, Confident and Aligned Learning + Robotics (SCALAR) lab Fall 2022–
Manning College of Information and Computer Sciences, Amherst, MA
University of Massachusetts Amherst
Advisor: Scott Niekum
➔ Using Multi-Objective Optimization to improve alignment of inverse reinforcement learning from human preferences.

Interactive and Collaborative Autonomous Robotics (ICAROS) lab Summer 2023 -
Viterbi School of Engineering, University of Southern California Los Angeles, CA
Advisor: Stefanos Nikolaidis

- ➔ Part of the REU in Robotics and Autonomous Systems at USC.
- ➔ Worked on integrating Quality Diversity algorithms such as Covariance Matrix Adaptation MAP Annealing with Reinforcement Learning.

Biologically Inspired Neural & Dynamical Systems Lab (BINDs) lab 2021–2022
Manning College of Information and Computer Sciences Amherst, MA
University of Massachusetts Amherst
Advisor: Cooper Sigrist
→ Selected for the [BINDslings](#) program.
→ Advised by a graduate student, explored modularity of neural networks.

WORK EXPERIENCE	<p><i>X-Camp Academy</i> Fall 2021-</p> <p>Teacher</p> <ul style="list-style-type: none"> ➔ Teach computer science to middle- and high-school students aiming to go into competitive programming. ➔ Catered for students to participate in the USA Computing Olympiad (USACO). <p>Teaching Management Team</p> <ul style="list-style-type: none"> ➔ Communicate needs and expectations to and from development and operation teams. ➔ Led the migration to a new teaching platform facilitating effective teaching and scaling of the company.
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LEADERSHIP	President, <i>UMass Machine Learning Club</i> Spring 2023- Team Leader, <i>Team UMass: ProjectX ML Research Competition Winners</i> 2023
PUBLICATIONS	<p><i>Conference and Workshop Papers</i></p> <p>Ryan Boldi, Li Ding and Lee Spector. 2023. Objectives Are All You Need: Solving Deceptive Problems Without Explicit Diversity Maintenance. In the Workshop on Agent Learning in Open-Endedness at NeurIPS.</p> <p>Ryan Boldi and Lee Spector. 2023. Can the Problem-Solving Benefits of Quality Diversity Be Obtained Without Explicit Diversity Maintenance? In Genetic and Evolutionary Computation Conference Companion (GECCO ‘23).</p> <p>Ryan Boldi, Thomas Helmuth, and Lee Spector. 2022. The environmental discontinuity hypothesis for down-sampled lexicase selection. In The 2022 Conference on Artificial Life - Why it Didn’t Work-Shop (ALIFE ‘22)</p> <p>Li Ding, Ryan Boldi, Thomas Helmuth, and Lee Spector. 2022. Lexicase selection at scale. In Proceedings of the Genetic and Evolutionary Computation Conference Companion (GECCO ‘22).</p> <p><i>Book Chapters</i></p> <p>Lee Spector, Li Ding, and Ryan Boldi. 2023. Particularity. In Genetic Programming Theory and Practice XX. New York: Springer. To appear</p> <p><i>Posters and Poster Papers</i></p> <p>Ryan Boldi, Charles Zhang, Lee Spector. 2023. Encouraging Diversity in Reinforcement Learning with Lexicase Selection. RL at Harvard Workshop 2023.</p> <p>Ryan Boldi, Ashley Bao, Martin Briesch, Thomas Helmuth, Dominik Sobania, Lee Spector, Alexander Lalejini. 2023. The Problem Solving Benefits of Down-Sampling Vary by Selection Scheme. In Proceedings of the Genetic and Evolutionary Computation Conference Companion (GECCO ‘23).</p> <p>Ryan Boldi, Alexander Lalejini, Thomas Helmuth, Lee Spector. 2023. A static analysis of informed down-samples. In Proceedings of the Genetic and Evolutionary Computation Conference Companion (GECCO ‘23).</p> <p>Li Ding, Ryan Boldi, Thomas Helmuth, and Lee Spector. 2022. Going faster and hence further with lexicase selection. In Proceedings of the Genetic and Evolutionary Computation Conference Companion (GECCO ‘22).</p> <p>UNDER REVIEW Ryan Boldi*, Martin Briesch*, Dominik Sobania, Alexander Lalejini, Thomas Helmuth, Franz Rothlauf, Charles Ofria, and Lee Spector. 2023. Informed Down-Sampled Lexicase Selection: Identifying productive training cases for efficient problem solving. https://arxiv.org/abs/2301.01488</p> <p>Ryan Boldi*, Aadam Lokhandwala*, Edward Annatone, Yuval Schechter, Alexander Lavrenenko, Cooper Sigrist. 2023. Improving Recommendation System Serendipity Through Lexicase Selection. https://arxiv.org/abs/2305.11044</p> <p>IN PREPARATION Ryan Boldi, Ashley Bao, Martin Briesch, Thomas Helmuth, Dominik Sobania, Lee Spector, Alexander Lalejini. 2023. Analyzing the Interaction Between Down-Sampling</p>

and Selection. <https://arxiv.org/abs/2304.07089>

PRESENTATION

Conference	Encouraging Diversity in Reinforcement Learning with Lexicase Selection Poster: RL at Harvard Workshop 2023	Cambridge, MA
	Think Before You Act: Generating High-Quality Diverse Reasoning Policies Poster: SoCal Undergraduate Research Symposium 2023	Los Angeles, CA
	The Emergence of Diversity Emerging Researchers in Artificial Life Lightning Talk 2023 Conference on Artificial Life	Sapporo, Japan
	Can the Problem-Solving Benefits of Quality Diversity Be Obtained Without Explicit Diversity Maintenance? Genetic and Evolutionary Computation Conference 2023	Lisbon, Portugal
	A static analysis of informed down-samples Poster: Genetic and Evolutionary Computation Conference 2023	Lisbon, Portugal
	The Problem Solving Benefits of Down-Sampling Vary by Selection Scheme Poster: Genetic and Evolutionary Computation Conference 2023	Lisbon, Portugal
	The Environmental Discontinuity Hypothesis for Down-Sampled Lexicase Selection Why it Didn't Work-Shop 2022 Conference on Artificial Life	Trento, Italy
	Going Faster and Hence Further with Lexicase Selection Poster: Genetic and Evolutionary Computation Conference 2022	Boston, MA
	Evolutionary Computation UMass Amherst Guest Lecture COMPSCI 389 - Introduction to Machine Learning	Spring 2023 Amherst, MA
	Lexicase Selection and Reinforcement Learning Personal Autonomous Robotics Lab (PeARL), UT Austin Autonomous Learning Laboratory, UMass Amherst	Fall 2022 Austin, Texas Amherst, MA
Invited	Lexicase Selection and the Diversity of Quality Adaptive and Intelligent Robotics Lab, Imperial College London	Summer 2022 London, UK
	Evolutionary Algorithms United Arab Emirates Ministry of Artificial Intelligence	Fall 2020 Dubai, UAE
AWARDS	<i>ProjectX ML Research Competition Winner</i> University of Toronto, 2023	\$20,000

Dean's Merit Scholarship \$1,500
Manning College of Information and Computer Sciences, 2022

John E. and Alice M. Flynn Scholarship \$3,300
University of Massachusetts Amherst, 2022

Imagine Cup Junior Winner
Microsoft, 2020

MEMBERSHIP *International Society for Artificial Life*
ACM SIGEVO, Special Interest Group for Genetic and Evolutionary Computation

COMPUTER *Languages & Frameworks*
SKILLS Python, Clojure, C++, Java, JavaScript, R, Numpy, PyTorch, Jax, Flax