

Branton DeMoss

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Summary	<p>Working to understand emergence through complexity, machine learning, and algorithmic information theory.</p>	
Education	<p><i>DPhil Candidate in Artificial Intelligence</i> University of Oxford</p>	2021-
	<p><i>BA Mathematics and Physics</i> University of Colorado Boulder</p>	2018
	<p><i>Visitor Mathematical and Theoretical Physics</i> University of Oxford</p>	2016-17
Experience	<p>Oxford Robotics Institute <i>Graduate Student Researcher</i></p> <ul style="list-style-type: none">• Research in complexity, generalization, reinforcement learning, world models.	2021-
	<p>The Collaboratory <i>Co-founder; Chief Science Officer</i></p> <ul style="list-style-type: none">• Deep learning on language and graphs for knowledge curation.• Led product strategy, design, and ML R&D.	2020-23
	<p>Comma.ai <i>ML Research Intern</i></p> <ul style="list-style-type: none">• Reinforcement learning for self-driving cars.	2020
	<p>Front Range Geosciences <i>Machine Learning Engineer</i></p> <ul style="list-style-type: none">• Developed computer vision system for seismic data.	2017-20
	<p>Center for Theory of Quantum Matter <i>Research Assistant</i></p> <ul style="list-style-type: none">• Studied quantum many-body localization under Floquet conditions.	2017
	<p>Mathematics Department, CU Boulder <i>Research Assistant</i></p> <ul style="list-style-type: none">• Investigated knot-theoretic properties of topological quantum field theories.	2016
	<p>High Energy Particle Physics Group, Physics Department, CU Boulder <i>Research Assistant</i></p> <ul style="list-style-type: none">• Monte Carlo simulations for the Deep Underground Neutrino Experiment.	2014-15
Publications	<p><i>The Complexity Dynamics of Grokking</i> Under submission to ICLR</p>	2024

	<i>The Bias-Variance Tradeoff Revisited</i> Work in progress. To be submitted to ICML 2025. I explain double descent in neural networks from a complexity perspective.	2025
	<i>LUMOS: Language-Conditioned Imitation Learning with World Models</i> Under submission to ICRA	2024
	<i>DITTO: Offline Imitation Learning with World Models</i> Preparing for submission to TMLR arXiv:2302.03086	2023
	<i>Combining physics and deep learning to automatically pick first breaks in the Permian Basin</i> First International Meeting for Applied Geoscience & Energy	2021
	<i>Ein Liebesbrief an KataGo</i> Deutsche Go Zeitung, Ausgabe 4/2020	2020
	<i>Love Letter to KataGo, or: Go AI Past, Present, and Future</i> American Go E-Journal	2020
	<i>DeepTrace: A breakthrough application of deep learning to automate first break picking</i> SEG 2019 Lenovo Thought Leadership Series	2019
	<i>Topology and Knot Theory</i> Course notes for CU Boulder special topics course: “ <i>Topology, Knot Theory, and their applications in Physics and Chemistry</i> ”	2016
	<i>Secondary Particle Showers from Hadron Absorber Interactions</i> Deep Underground Neutrino Experiment (DUNE) Collaboration Documents	2016
Teaching	<i>Physics of Information and Complexity</i> Oxford, HT 24	2024
	<i>Philosophy of Emergence</i> Oxford, HT 24	2024
	<i>Topics in Reinforcement Learning</i> Oxford, MT 23	2023
	<i>Rocket League Behaviour Cloning from Unlabelled Data</i> Supervised Master’s Thesis, Oxford Student obtained highest marks, and secured funded DPhil position in Oxford.	2023
Talks	<i>Oxford, Department of Physics</i> Invited talk on complexity dynamics to Ard Louis’s research group.	2024
	<i>Oxford, Department of Statistics</i> Invited talk on complexity and generalization to the RainML group. Link .	2024
Awards	<i>Research Studentship (fully funded PhD)</i>	Oxford, 2021

Stribic-Martin Scholarship
UROP Fellowship
Dawkins Fund Award
Gilman Scholarship
Esteemed Scholar Award

Boulder, 2017
Boulder, 2017
Oxford, 2016
Oxford, 2016
Boulder, 2014