

Branton DeMoss

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Education	<i>DPhil Candidate in Artificial Intelligence</i> University of Oxford	2021-25 (expected)
	<i>BA Mathematics and Physics</i> University of Colorado Boulder	2018
	<i>Visitor Mathematical and Theoretical Physics</i> University of Oxford	2016-17
Experience	Mathematical Institute, University of Oxford <i>Postdoctoral Research Associate</i> <ul style="list-style-type: none">Research on the mathematical and computational foundations of AI.	2025-27
	Oxford Robotics Institute <i>Graduate Student Researcher</i> <ul style="list-style-type: none">Research in complexity, generalization, reinforcement learning, world models.	2021-25
	The Collaboratory <i>Co-founder; Chief Science Officer</i> <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
	Comma.ai <i>ML Research Intern</i> <ul style="list-style-type: none">Reinforcement learning for self-driving cars.	2020
	Front Range Geosciences <i>Machine Learning Engineer</i> <ul style="list-style-type: none">Developed computer vision system for seismic data.	2017-20
	Center for Theory of Quantum Matter <i>Research Assistant</i> <ul style="list-style-type: none">Studied quantum many-body localization under Floquet conditions.	2017
	Mathematics Department, CU Boulder <i>Research Assistant</i> <ul style="list-style-type: none">Investigated knot-theoretic properties of topological quantum field theories.	2016
	High Energy Particle Physics Group, Physics Department, CU Boulder <i>Research Assistant</i> <ul style="list-style-type: none">Monte Carlo simulations for the Deep Underground Neutrino Experiment.	2014-15
Publications	<i>The Complexity Dynamics of Grokking</i> Under submission to Physica D	2024

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

<i>Oxford, Department of Physics</i>	2025
Invited talk on complexity dynamics to the cosmology group.	

<i>Oxford, Department of Physics</i>	2024
Invited talk on complexity dynamics to Ard Louis's research group.	

<i>Oxford, Department of Statistics</i>	2024
Invited talk on complexity and generalization to the RainML group.	

Awards

<i>Research Studentship (fully funded PhD)</i>	Oxford, 2021
<i>Stribic-Martin Scholarship</i>	Boulder, 2017
<i>UROP Fellowship</i>	Boulder, 2017
<i>Dawkins Fund Award</i>	Oxford, 2016
<i>Gilman Scholarship</i>	Oxford, 2016
<i>Esteemed Scholar Award</i>	Boulder, 2014