

OWEN M. DUGAN

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EDUCATION

B.S. Physics , MIT, Cambridge, MA. Unweighted GPA 5.0/5.0	May 2024
High School , Dugan Homeschool, Sleepy Hollow, NY. Weighted GPA 5.66/4.0	May 2021

AWARDS & ACCOMPLISHMENTS

Hertz Fellowship Finalist , Fannie and John Hertz Foundation	2024
Talentplace Network Member , Andreessen Horowitz	2023
Outstanding UROP (Undergraduate Research) Award , MIT School of Science	2023
U.S. Patent Nos. 11,688,045 and 11,756,304 , US Patent & Trademark Office	2023
William Lowell Putnam Mathematical Competition , 164th place (top 5%)	2022
William Lowell Putnam Mathematical Competition , 329th place (top 12%)	2021
MIT Advanced Standing Examinations , Received credit for 8 MIT classes	2021
US Presidential Scholar , US Department of Education	2021
Neo Scholar , Neo Venture Capital Firm	2021
Davidson Fellows Scholar , Davidson Institute	2021
STS Scholar , Regeneron Science Talent Search	2020
ISEF Finalist , International Science and Engineering Fair	2020
DoD Scholar , Department of Defense	2020
RSI Scholar , Research Science Institute	2020
SAT , 1600 (Perfect Score)	2020
National Merit Scholar , National Merit Scholarship Corporation	2019
Caroline D. Bradley Scholar , Institute for Educational Advancement	2016

PUBLICATIONS

Published

- 8) **Owen Dugan**, Peter Lu, Rumen Dangovski, Di Luo, Marin Soljačić
Q-Flow: Generative Modeling for Differential Equations of Open Quantum Dynamics with Normalizing Flows
Proceedings of the 40th International Conference on Machine Learning, Honolulu, Hawaii. PMLR 202, 2023.
[ARXIV:2302.12235](https://arxiv.org/abs/2302.12235).
- 7) **Owen Dugan**, Rumen Dangovski, Allan Costa, Samuel Kim, Pawan Goyal, Joseph Jacobson, Marin Soljačić
OccamNet: A Fast Neural Model for Symbolic Regression at Scale
[ARXIV:2007.10784](https://arxiv.org/abs/2007.10784)
- 6) Julia Balla, Sihao Huang, **Owen Dugan**, Rumen Dangovski, Marin Soljačić
AI-Assisted Discovery of Quantitative and Formal Models in Social Science
[ARXIV:2210.00563](https://arxiv.org/abs/2210.00563)
- 5) **Owen Dugan**
QiskiFT: Quantum Error Correction and Quantum Fault Tolerance Development Kit
[Documentation](#)
- 4) **Owen Dugan**
Astronomy Will Not Trail Off: Novel Methods for Removing Satellite Trails from Celestial Images
Journal of the American Association of Variable Star Observers, vol. 48, no. 2, p. 262, 2020. (Abstract only.)
- 3) Peyton Robertson, Connor Espenshade, Jay Sarva, **Owen Dugan**, Kalée Tock
An Automated Approach to Modeling Jupiter's Synchrotron Radiation from Radio Telescope Observations
Astronomy Theory, Observations and Methods, vol. 1, no. 1, pp. 24-33, 2020.
- 2) **Owen Dugan**, Thomas Robinson, Finnian Carmeci, Kalée Tock
CCD Measurements and Reclassification of WDS 07106 +1543 to an Optical Double
Journal of Double Star Observations, vol. 15, no. 1, pp. 119-129, 2019.
- 1) **Owen Dugan**, James Krasner
Soup, Bones, and Shakespeare: Literary Authorship and Allusion in Middle-earth Mythlore, vol. 40, no. 2, pp. 105-120, 2022.

In Preparation

- 7) **Owen Dugan**, Gopal Goel, Hong Liu
Effective Field Theory for Dissipative Superfluid Hydrodynamics
- 6) **Owen Dugan**, Zhuo Chen, Peter Lu, Rumen Dangovski, Di Luo, Marin Soljačić
Q-Function and Wigner Function Quantum Tomography
- 5) **Owen Dugan**, Varun Hariprasad, Rumen Dangovski, Marin Soljačić
Efficient and Performant Language Modeling with Linear Recurrences
- 4) **Owen Dugan**, Georgia Karagiorgi
Determination of the Expected Neutrino Signal from Kilonovae in the Deep Underground Neutrino Experiment Using Data from Simulations Employing M1 and Monte Carlo Schemes
- 3) Rayhan Tanudjaja, **Owen Dugan**, Rumen Dangovski, Marin Soljačić
Symbolic Regression through Pretrained Transformers
- 2) Viggo Moro, **Owen Dugan**, Rumen Dangovski, Momchil Tomov, Marin Soljačić, Sam Gershman
Applications of Machine Learning to Neuroscience
- 1) Eegan Ram, Zhuo Chen, **Owen Dugan**, Rumen Dangovski, Di Luo, Marin Soljačić
Quantum Simulation with Reinforcement Learning

PRESENTATIONS

6) Q-Flow: Generative Modeling for Differential Equations of Open Quantum Dynamics with Normalizing Flows <i>American Physical Society (APS) March Meeting</i>	March 2024
5) Q-Flow: Generative Modeling for Differential Equations of Open Quantum Dynamics with Normalizing Flows <i>International Conference on Machine Learning</i>	July 2023
4) OccamNet: A Feed-Forward Neural Model for Symbolic Regression <i>MIT Conference on Mechanistic Interpretability</i>	May 2023
3) Q-Flow: Generative Modeling for Differential Equations of Open Quantum Dynamics with Normalizing Flows <i>Institute for AI and Fundamental Interactions – External Advisory Board Review</i>	May 2023
2) Q-Flow: Generative Modeling for Differential Equations of Open Quantum Dynamics with Normalizing Flows <i>Institute for AI and Fundamental Interactions – Mini Symposium</i>	April 2023
1) Astronomy Will Not Trail Off: Novel Methods for Removing Satellite Trails from Celestial Images <i>Joint Meeting of the Society for Astronomical Sciences (SAS) and the American Association of Variable Star Observers (AAVSO 108th Spring Meeting)</i>	May 2020

RELEVANT COURSEWORK

Physics

Graduate Level: Quantum Theory, Quantum Field Theory 1 & 2, Statistical Mechanics, Solid-State Physics.
Undergraduate Level: Quantum Computing, Classical Mechanics, Experimental Physics, Physics Thesis.

Mathematics

Undergraduate Level: Calculus, Multivariable Calculus, Counting and Probability 1 & 2, Number Theory 1 & 2, Linear Algebra, Differential Equations, Real Analysis, Complex Analysis, Abstract Algebra 1 & 2.

Computer science

Graduate Level: Reinforcement Learning.
Undergraduate Level: Algorithms 1 & 2, Automata Theory & Decidability, Computer Vision.

Economics

Undergraduate Level: Microeconomics, Macroeconomics, Psychology and Economics.

COMPUTER SCIENCE SKILLS

Python, Java, Mathematica, Swift, Dart; PyTorch, JAX, NumPy, SkLearn, Pandas; Unix, Linux; LaTeX.

TEACHING AND MENTORING

Tutor for Graduate Quantum Theory 1 – selected by MIT Physics department	2023 – Present
Lecture Transcriber for Quantum Field Theory 1 – selected by MIT Physics department, for use on MIT OpenCourseWare website	2023 – Present
IAIFI Summer School and Workshop Committee Member – invited by the Institute for Artificial Intelligence and Fundamental Interactions	2023 – Present
Research Mentor at the Research Science Institute – mentor for three students	2023
Teaching Assistant for Six Classes – Stanford Online High School	2018 – 2021
Peer Tutor for Ten Classes – Stanford Online High School	2018 – 2021

LEADERSHIP, SERVICE, AND OUTREACH

Lector , MIT Catholic Community	2023 – Present
Cofounder , Stanford Online High School Advanced Math Theoretical Physics Club	2019 – 2021
Instructor , RSHM Life Center Robotics Program	2015 – 2021
Leader , RSHM Life Center Coding Program	2014 – 2015