

# OWEN M. DUGAN

(914)841-0007 | [odugan@mit.edu](mailto:odugan@mit.edu) | [linkedin.com/in/owen-m-dugan](https://www.linkedin.com/in/owen-m-dugan) | [github.com/druidowm](https://github.com/druidowm)

## EDUCATION

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

## AWARDS & ACCOMPLISHMENTS

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

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 Artificial Neuroscience</i>	April 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>	April 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>	February 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

<b>Tutor for Graduate Quantum Theory 1</b> – selected by MIT Physics department	2023 – Present
<b>Lecture Transcriber for Quantum Field Theory 1</b> – selected by MIT Physics department, for use on MIT OpenCourseWare website	2023 – Present
<b>IAIFI Summer School and Workshop Committee Member</b> – invited by the Institute for Artificial Intelligence and Fundamental Interactions	2023 – Present
<b>Research Mentor at the Research Science Institute</b> – mentor for three students	2023

## LEADERSHIP, SERVICE, AND OUTREACH

<b>Presentation:</b> Philosophy and Morality of Artificial Intelligence <i>Religious of the Sacred Heart of Mary Convent</i>	2023
<b>Lector</b> , MIT Catholic Community	2023 – Present
<b>Cofounder</b> , Stanford Online High School Advanced Math Theoretical Physics Club	2019 – 2021
<b>Instructor</b> , RSHM Life Center Robotics Program	2015 – 2021
<b>Leader</b> , RSHM Life Center Coding Program	2014 – 2015