

Education	<b>Massachusetts Institute of Technology (M.I.T.)</b> <i>Candidate for B.S. in Physics and Computer Science</i> Senior 4.9/5.0 Jun 2018 <ul style="list-style-type: none"><li>• Coursework includes: Quantum Field Theory, Atomic &amp; Optical Physics, Experimental Physics, Artificial Intelligence, Quantum Physics III, Constructive Computer Arch, Harvard Law</li><li>• Thesis: Physics Of Artificial Intelligence</li><li>• Advisor: Professor Max Tegmark and Marin Soljacic</li></ul>	<b>Cambridge, MA</b>
Research Experience	<b>Physics of Artificial Intelligence</b> <i>MIT, Department of Physics</i> <ul style="list-style-type: none"><li>• Advisor: Professor Max Tegmark and Professor Marin Soljacic</li><li>• Used physics laws and symmetries to study why current A.I. methods are effective.</li><li>• Demonstrated computers could learn laws of physics – wave equations, ODE’s, numerical simulations</li><li>• Solved physics problems using techniques from Artificial Intelligence (i.e. inverse design problems)</li></ul>	<b>Cambridge, MA</b> Sep 2016 – Present
	<b>Permanent-Magnet Penning Trap Design</b> <i>Imperial College, Department of Physics</i> <ul style="list-style-type: none"><li>• Advisor: Professor Richard Thompson</li><li>• Experimental AMO: Designed and assembled ion traps for UHV trapping single and groups of Ca ions.</li><li>• Built, prepared, and tested individual components of the trap – vacuum mechanisms, Ca production, electronics</li><li>• Modeled and mathematically analyzed the behavior of ions in the trap in Simulon and Mathematica</li></ul>	<b>London, UK</b> Jul 2017 – Aug 2017
	<b>Physically Realizable Neural Networks</b> <i>MIT, Department of Physics</i> <ul style="list-style-type: none"><li>• Advisor: Professor Max Tegmark and Professor Marin Soljacic</li><li>• Mathematical and Computational Experiments: developed a physically realizable unitary neural network.</li><li>• Acquired a patent for the ability to physically build neural networks using this technique.</li><li>• Coded novel Recursive Neural Network architectures in Torch, Theano, Tensorflow</li></ul>	<b>Cambridge, MA</b> Jan 2016 – Dec 2016
	<b>Quantum Computation and Engineering</b> <i>MIT, Department of Physics</i> <ul style="list-style-type: none"><li>• Atomic and Molecular Optics: Experimental realization of improved Grover’s algorithm on a 2 qubit NMR Quantum Computer</li><li>• Sole winner of MIT Pickering Award for Outstanding original project</li></ul>	<b>Cambridge, MA</b> Aug 2015 – Dec 2016
	<b>Human Collaboration in Automated Manufacturing</b> <i>MIT, Computer Science and Artificial Intelligence Laboratory</i> <ul style="list-style-type: none"><li>• Developed a GUI for a simulation of how humans process scheduling, to be analyzed to develop AIs.</li></ul>	<b>Cambridge, MA</b> Sep 2014 – Jun 2015
Honors & Awards	<b>Edward C. Pickering Prize</b> <i>MIT, Department of Physics</i> <ul style="list-style-type: none"><li>• Award given to 2 MIT students for outstanding original research<ul style="list-style-type: none"><li>◦ <a href="https://jlab.mit.edu/wiki/Pickering_Prize">https://jlab.mit.edu/wiki/Pickering_Prize</a></li></ul></li><li>• Honored for work on quantum computation and realization of an improved Grover’s algorithm.</li></ul>	<b>Cambridge, MA</b> Apr 2016
	<b>International Machine Learning Society</b> <i>MIT, Department of Physics</i> <ul style="list-style-type: none"><li>• Award given to top authors of papers and research published at the International Conference on Machine Learning (ICML)</li><li>• Honored for work on developing novel physically realizable recurrent neural network architectures</li></ul>	Aug 2017

- Publications
- Nanophotonic Particle Simulation and Inverse Design Using Artificial Neural Networks***  
*MIT, Department of Physics* Sep 2017
- Journal paper under review at *Sciences Advances*
  - John Peurifoy, Yichen Shen, Li Jing, Yi Yang, Fidel Cano-Reneria, Brendan Delacy, Max Tegmark, John Joannopoulos, and Marin Soljacic
    - <https://arxiv.org/abs/1712.03222>
- FiO: *Nanophotonic Inverse Design Using Artificial Neural Network***  
*MIT, Department of Physics* Aug 2017
- Conference Paper in *Optical Society of America*,
  - John Peurifoy, Yichen Shen, Li Jing, Fidel Cano-Reneria, Yi Yang, John Joannopoulos, Max Tegmark, and Marin Soljacic
    - <https://www.osapublishing.org/abstract.cfm?uri=FiO-2017-FTh4A.4>
- SPIE: *Nanophotonic Inverse Design Using Artificial Neural Networks***  
*MIT, Department of Physics* Oct 2017
- Proceedings Paper at *Society of Photo-Optical Instrumentation Engineers*
  - John Peurifoy, Yichen Shen, Li Jing, Yi Yang, Fidel Cano-Reneria, Max Tegmark, John Joannopoulos, and Marin Soljacic
    - <https://spie.org/Publications/Proceedings/Paper/10.1117/12.2289195>
- NIPS: *Nanophotonic inverse design using artificial neural networks***  
*MIT, Department of Physics* Nov 2017
- Workshop Paper at Deep Learning Physical Sciences at the Conference on Neural Information Processing Systems
  - John Peurifoy, Yichen Shen, Li Jing, Yi Yang, Fidel Cano-Reneria, Brendan Delacy, Max Tegmark, John Joannopoulos, and Marin Soljacic
- NIPS: *Gated Orthogonal Recurrent Units***  
*MIT, Department of Physics* Nov 2017
- Workshop Paper in Differentiable Inter-Agent Learning at the Conference on Neural Information Processing Systems
  - Li Jing, Caglar Gulcehre, John Peurifoy, Yichen Shen, Max Tegmark, Marin Soljacic, and Yoshua Bengio
    - <https://arxiv.org/abs/1706.02761>
- ICML: *Tunable Efficient Unitary Neural Networks (EUNN) and their application to RNNs***  
*MIT, Department of Physics* Apr 2017
- Conference paper at International Conference on Machine Learning.
  - Li Jing, Yichen Shen, Tena Dubcek, John Peurifoy, Scott Skirlo, Yann LeCun, Max Tegmark, Marin Soljacic
    - <https://arxiv.org/abs/1612.05231>
- Invited Talks
- Frontiers in Optics (FiO)**  
*Washington D.C, USA* Nov 2017
- *Postdeadline: Nanophotonic Inverse Design Using Artificial Neural Networks*
- Society of Photo-Optical Instrumentation Engineers (SPIE)**  
*Seattle, Oregon* Jan 2018
- *Simulation of Optoelectronic Devices XXVI: Nanophotonic Inverse Design Using Artificial Neural Networks*
- Massachusetts Institute of Technology Visiting Weekend**  
*Cambridge, MA* Oct 2017
- *Student Research: Nanophotonic Inverse Design Using Artificial Neural Networks*
- TedX BeaconStreet Exhibitor**  
*Boston, MA* Nov 2017
- Invited to present on science, mechanical engineering, and entrepreneurship, and why young entrepreneurs fail.
    - <http://www.tedxbeaconstreet.com/speakers/john-peurifoy/>

Teaching	<b>MIT Experimental Physics (I and II)</b> <i>Teaching Assistant</i>	<b>Cambridge, MA</b> Sep 2016 – Jun 2017
	<ul style="list-style-type: none"><li>• Instructed 20 Junior/Senior physics majors at MIT in physics experiments, to test and develop new experiments</li><li>• Experiments worked on include:<ul style="list-style-type: none"><li>◦ Doppler-Free Spectroscopy, Hydrogen Spectroscopy, NMR Spin Echos, Quantum Information Processing, Superconducting and Josephine-Junctions</li></ul></li></ul>	
	<b>MIT Entrepreneurship and Maker Skills Integrator</b> <i>Teaching Assistant for MIT's Hong Kong Innovation Node</i>	<b>Hong Kong, China</b> Sep 2016 – Jan 2017
	<ul style="list-style-type: none"><li>• Machine Shop Instructor and Mentor for 30 Master Students, PhD candidates, and undergraduates.</li><li>• Taught students to use Makerspace tools (mills, Bandsaws, lasercutters, 3D Printers)</li></ul>	
	<b>MIT Makerlodge</b> <i>Teaching Assistant</i>	<b>Cambridge, MA</b> Feb 2017 – Present
	<ul style="list-style-type: none"><li>• Machine Shop Instructor and Mentor for MIT students.</li><li>• Routinely train and oversee the use of Mills, Lathes, PCB Fabrication, and stress testing</li></ul>	
	<b>MIT 6.042 – Mathematics for Computer Science</b> <i>Teaching Assistant and Webmaster</i>	<b>Cambridge, MA</b> Jan 2017 – May 2017
	<ul style="list-style-type: none"><li>• Class for Computer Science or Math majors at MIT, holds 150 students.</li><li>• Helped draft content for the textbook, homework assignments, and exams.</li></ul>	
	<b>MIT Physics Peer Tutor</b> <i>Peer Tutor</i>	<b>Cambridge, MA</b> Jan 2016 – Dec 2016
	<ul style="list-style-type: none"><li>• Helped tutor students in Quantum Mechanics I, and Waves and Oscillations.</li></ul>	
Service	<b>Committee On Academic Performance</b> <i>MIT</i>	<b>Cambridge, MA</b> Jun 2017 – Present
	<ul style="list-style-type: none"><li>• Serve on the Committee on Academic Performance with faculty at MIT.</li><li>• Oversee petitions for students in special cases of academic performance, and approve diplomas and returns.</li></ul>	
	<b>Eagle Scout</b>	<b>Springfield, MO</b> Mar 2014
	<ul style="list-style-type: none"><li>• Eagle Project: Garden and Botanic Center Construction and Restoration</li><li>• Patrol Leader, Chaplin's Aid for Troop 235, Den Chief</li></ul>	
	<b>MIT Orientation Leader, Associate Advisor, and IFC Chair</b> <i>Speaker, Kickoff Coordinator, Counselor, IFC Chair</i>	<b>Cambridge, MA</b> Mar 2016 - Dec 2018
	<ul style="list-style-type: none"><li>• One of 60 students to lead MIT's orientation for 1,113 incoming students</li><li>• Serve on the Inter-Fraternity Council Executive Board for 1,000 fraternity members across MIT</li></ul>	
	<b>MakeMIT</b> <i>Directing Committee and Development Lead</i>	<b>Cambridge, MA</b> Aug 2014 - Present
	<ul style="list-style-type: none"><li>• Led one of the largest hardware hackathons in the world (over 250 people, two weekends)</li><li>• Handled Logistics and developed/maintained the front-end interfaces for (registration/day-of/queue systems).</li></ul>	