

# CATHERINE ZENG

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## EDUCATION

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**Massachusetts Institute of Technology** Cambridge, MA  
Master of Engineering in Electrical Engineering and Computer Science June 2021  
*5.0/5.0 GPA; Concentration in Applied Physics*

Bachelor of Science in Electrical Engineering & Computer Science June 2020  
*4.4/5.0 GPA; Humanities concentration in Music*

**Alexander W. Dreyfoos School of the Arts** June 2016  
*High School Diploma in Piano Performance*  
*4.0/4.0 GPA; Florida State AP Scholar (Passed 22 AP classes)*

## EXPERIENCE

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**MIT CSAIL** September 2017 - June 2020  
*Undergraduate Researcher* Cambridge, MA

- *High-Dimensional Word Embeddings using the Quantum Mechanics Analogy.* Undergraduate thesis exploring how the word embedding and symbolic approaches in linguistics can be represented in a single data structure through borrowing concepts from quantum mechanics.
- *Semantic Compositions Using Sparse Encoding.* Showed how the sparse distributed approach of using high dimensional vectors and random indexing is capable of encoding hierarchical relationships in semantic vector compositions in an online fashion. Accepted to CULC13.
- *3D Reconstruction of Camera Positions and Sparse Geometry in Filmography.* Analyzed 3D reconstruction of camera positions and sparse geometry using the structure from motion algorithm and deep learning.

**Lambda Tea Corporation** August 2016 - June 2017  
*Founder, Chief Executive Officer* Cambridge, MA

- *Automatic self-serve boba machine.* Built an automatic boba machine in our dorm room that sold a lot of boba for \$3.50 / cup. Funded by Y Combinator Winter 2018 batch for \$120,000 in exchange for 7% equity. I took a leave from MIT, spent 8 months in San Francisco to develop Lambda Tea.
- *Applihood.com, college consulting.* When we pivoted away from the boba machine idea while in San Francisco, my friend and I built a college consulting business that further made several thousand dollars and served hundreds of high school students.

**MIT Media Lab** August 2016 - June 2017  
*Undergraduate Researcher* Cambridge, MA

- *Extreme Sound Stretch.* Contributed to a program that uses digital signal processing and Paul's Extreme Sound Stretch algorithm to produce high quality audio stretching on the scale of up to 10e18 times slower.

**Dell EMC** June 2017 - August 2017  
*Systems Engineering Intern* Cambridge, MA

- *Benchmarking GPU Framework.* Wrote software for benchmarking deep learning on Dell server setups containing Nvidia Tesla P4 & P40 GPUs using caffe inference models AlexNet, GoogLeNet. Created a Machine Learning 101 class for Dell's internal employee training.

## TECHNICAL STRENGTHS

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<b>Programming</b>	Python, Java, C, Linux, Scripting
<b>Full-stack Web Development</b>	Javascript, HTML/CSS, Node.js, React.js
<b>Machine Learning</b>	Specialty in NLP
<b>Mobile App Development</b>	Android Studio

## AWARDS AND RECOGNITIONS

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**Peter J. Eloranta Research Fellowships** Summer 2020  
*3D Volumetric Display: Helical Swept-Volume Display*

Built a prototype 3D volumetric display using a helical swept-volume technique. Awarded \$7,000 to pursue research project fulltime during the summer of 2020.

**Neo Scholar** Summer 2019 - Present  
*Talent scout based VC fund*

Founded by Ali and Hadi Partovi, angel investors in Dropbox, Facebook and Zappos and founders of Code.org. Given commitment of funding for any company I start.  
<https://techcrunch.com/2018/08/21/ali-partovi-neo/>

**Various Hackathon Prizes** 2016-2020  
*HackMIT(3x), HackPrinceton, HackBrown, MedHacks, HackHarvard*

- *Top 10 at HackMIT (3x)*. Out of over 200 teams every year.
- *\$4,000 Niantic AR Prize at HackMIT*. Built a computer vision app that teaches you how to dance based on feedback from music videos.
- *Best Internet of Things Prize at HackMIT*. Building a Harry Potter style sorting hat that places you into a MIT dorm based on tailored questions and sentiment analysis.

**Various Classical Piano Awards** Fall 2015  
*Nationally acclaimed classical pianist*

Won multiple scholarships at local to national levels. Studied with some of the best concert pianists in the world. <http://sepf.music.sc.edu/study/participants/2015/#zeng>

## OTHER ACTIVITIES

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**6.004 Computer Architecture** Fall 2020 - Spring 2021  
*Teaching Assistant*

Fully funds my MEng education tuition and provides a monthly stipend. I run weekly recitations for 60 students and am in charge of maintaining full-stack web infrastructure.

**Student Information Processing Board** Fall 2020 - Spring 2021  
*Keyholder, Vice Chair*

SIPB is a volunteer student computing group, improving computing at MIT since 1969. SIPB projects provide innovative services and special expertise to the MIT community, Worked on an open source level three network load balancer using the kernel-bypass technique and consistent hashing.

**Steinway Project** Fall 2015  
*Founder*

Raised \$150,000 for my high school to purchase a Steinway Model D Concert grand and Steinway Model L baby grands. My project target was met by playing piano for various events and pitching the project.

## RELEVANT COURSEWORK

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### COMPUTER SCIENCE

<i>Machine Learning</i>	6.036
<i>Structure &amp; Interpret. Computer Programs</i>	6.037
<i>Human Computational Intelligence</i>	6.S081
<i>Algorithms</i>	6.006
<i>Fundamentals of Programming</i>	6.009
<i>Foundations of Information Policy</i>	6.805
<i>Emergent Comput. Distrib. Neural Circuits</i>	9.53

### MATHEMATICS

<i>Multivariable Calculus</i>	18.02
<i>Differential Equations</i>	18.03
<i>Nonlinear Dynamics: Continuum Systems</i>	18.354
<i>Mathematics for Computer Science</i>	18.062

### ELECTRICAL ENGINEERING

<i>Computer Architecture</i>	6.004
<i>Nanoelectronics and Computing Systems</i>	6.012
<i>Optical Signals Devices Systems</i>	6.637
<i>Solid State Circuits</i>	6.321
<i>EECS by Robot Sensing</i>	6.01
<i>Applied Quantum &amp; Statistical Physics</i>	6.728

### PHYSICS

<i>Classical Mechanics</i>	8.01
<i>Electricity &amp; Magnetism</i>	8.02
<i>Quantum Physics I</i>	8.04
<i>Quantum Physics II</i>	8.051