

NATHAN HATCH

<https://nhatch.github.io> ■ Atlanta, GA, USA ■ nhatch6@gatech.edu ■ +1 970-297-8081

EDUCATION

Georgia Institute of Technology

Ph.D. Machine Learning

Atlanta, GA

August 2017 – expected 2022

University of Chicago

B.S. Mathematics with honors

B.S. Computer Science with honors

GPA: 3.94

Chicago, IL

September 2010 – June 2014

Universitat Pompeu Fabra

Study abroad program

Barcelona, Spain

January – March 2013

AWARDS AND HONORS

Georgia Tech Presidential Fellowship

2017 – 2021

UChicago Dean's List

2010 – 2014

UChicago University Scholarship

2010 – 2014

UChicago National Merit Scholarship

2010 – 2014

UChicago Student Marshal

2013

Phi Beta Kappa

2013

UChicago Fulton Prize for Orchestral Excellence

2012

RESEARCH EXPERIENCE

Dr. Byron Boots, Georgia Institute of Technology

Atlanta, GA

Locomotion project

May 2018 - present

- Mostly on my own, review locomotion literature and invent a new ML-based approach
- Use the DART simulator to implement and iterate on the algorithm
- Gave a two-hour presentation summarizing prior work and explaining my current approach

Bilevel optimization project

January 2018 - present

- With two other students, prove convergence of a new optimization algorithm and test empirically
- Write and revise paper submission text and figures for clarity

Dr. Zsolt Kira, Georgia Institute of Technology

Atlanta, GA

Unsupervised curriculum learning project

September 2017 - December 2017

- Devised and implemented a deep curriculum/transfer learning algorithm for MNIST clustering
- Discovered a statistically significant asymmetry regarding the 'continental' digit 7

Prof. Gregory Shakhnarovich, Toyota Technological Institute Chicago

Chicago, IL

Character recognition project

February 2015 - September 2015

- <https://github.com/nhatch/casia>
 - Built and trained convolutional neural networks for recognizing Chinese characters from CASIA
 - Managed GPU hardware and software using AWS EC2
- <https://github.com/nhatch/mnist>
 - Built a 97%-accurate MNIST classifier in Python with no deep learning library (just NumPy)

Prof. Paul Sally, Dept. Mathematics, U. of Chicago
Congruent numbers seminar

Chicago, IL
June - July 2012

- Worked with Prof. Paul Sally and 7 undergraduates to solve problems and present proofs
- Analyzed and verified results on congruent numbers and their relation to elliptic curves

Prof. Peter May, Dept. Mathematics, U. of Chicago
VIGRE REU Apprentice

Chicago, IL
June - July 2011

- Researched, drafted, revised, and published a 13-page expository paper in mathematics

PUBLICATIONS

A. Shaban, C. Cheng, **N. Hatch**, and B. Boots. *Truncated Back-propagation for Bilevel Optimization*. arXiv preprint; October 2018. <https://arxiv.org/abs/1810.10667>.

N. Hatch. *Group Theory: An Introduction and an Application*. U. of Chicago VIGRE REU; August 2011.
<http://www.math.uchicago.edu/~may/VIGRE/VIGRE2011/REUPapers/Hatch.pdf>.

WORK EXPERIENCE

eSpark Learning
Software engineer

Chicago, IL
June 2014 - July 2017

Full-stack software engineering in a fast-paced startup environment

- Led the annual iOS app release, removing 300ms tap delay and rewriting the video uploader
- Increased sales pipeline by 12% by integrating our product with Airwatch
- Improved academic fidelity metric from 80% to 87% by refining our app deployment system
- Implemented Apple's "Device Assignment" protocol, making our MDM first-to-market (solo project)
- Conducted ~20 interviews and code challenge reviews for recruiting

Dept. Computer Science, U. of Chicago
chiTCP developer

Chicago, IL
October 2013 - June 2014

- Implemented a TCP-over-TCP daemon for use in Borja Sotomayor's networks class
- Earned the position based on outstanding performance in that class the previous year

Mission Street Manufacturing
Software intern

Santa Barbara, CA
June - August 2013

- Developed prototype front- and back-end software for consumer-friendly 3D printing

CLASS PROJECTS

N. Hatch and E. Wijmans. *Probabilistic Graphical Modeling of Data-Dependent Annotator Accuracy for Active Learning*. CS 8803 Probabilistic Graphical Models; Spring 2018.

Paper: https://nhatch.github.io/files/Hatch_Wijmans_final_report.pdf

Slides: https://nhatch.github.io/files/Hatch_Wijmans_presentation_slides_v2.pdf

N. Hatch, A. Sundaresan, M. Dutreix, R. Kuppan, and P. Pattanashetty. *Google Landmark Recognition and Retrieval Challenges*. ECE 6254 Statistical Machine Learning; Spring 2018.

Paper: https://nhatch.github.io/files/landmarks_report.pdf

Poster: https://nhatch.github.io/files/landmarks_poster.pdf

N. Hatch. *Unsupervised Curriculum Learning for Image Clustering*. CS 7643 Deep Learning; Fall 2017.

Poster: <https://nhatch.github.io/files/image-clustering.pdf>

TEACHING EXPERIENCE

Insight Tutoring

Volunteer tutor

Chicago, IL

January 2015 - May 2017

- Reviewed homework and class material for three economically disadvantaged sixth-grade students
- Periodically revisited old material for spaced retrieval practice

Dept. Computer Science, U. of Chicago

Homework grader

Chicago, IL

October - December 2012

- Graded twice-weekly discrete math problem sets for Laszlo Babai's graduate-level class
- Earned the position among 25 students based on outstanding performance on "challenge problems"

Dept. Mathematics, U. of Chicago

SESAME teaching assistant

Chicago, IL

July 2012

- Assisted teaching a class for middle school math teachers on "problem-based learning"

Dept. Mathematics, U. of Chicago

Young Scholars Program Counselor

Chicago, IL

June - July 2012

- Tutored four 9th/10th-grade math students in an advanced summer math program
- Assisted teaching a class in basic computer programming
- Gave weekly reports on student progress, including helping to write a diagnostic exam

TECHNICAL SKILLS

Languages:

Python, Ruby, Javascript/HTML/CSS, Java, C

Deep learning frameworks:

PyTorch, TensorFlow, Keras

Proficient in Spanish

HOBBIES

Georgia Tech Symphony Orchestra

Violist

Atlanta, GA

August 2017 – May 2018

Lakeview Symphony Orchestra

Violist

Chicago, IL

September 2016 - June 2017

Chicago Metropolitan Symphony Orchestra

Violist

Chicago, IL

March 2015 - August 2016

University of Chicago Symphony Orchestra

Principal violist

Chicago, IL

September 2010 - June 2014

Places visited: Spain, United Kingdom, Japan, Argentina, Brazil, Taiwan, Hong Kong, Singapore, China, Peru, South Africa, Namibia, Botswana, Zimbabwe, Turkey

Other interests: rock climbing, salsa dancing