

# Alexander J. Federici

Expected Graduation Date: Spring 2021

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## Work Experience

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### MIT Lincoln Laboratory | *Teaching Assistant*

Cambridge, MA | Summer 2018

- Lectured on converting an analog signal to digital through manipulating bit depth and sampling rates.
- Developed Jupyter Notebook tutorials for a sentiment analysis CNN rivaling the top submission of Kaggle's twitter data competition.
- Optimized an autograd library's matrix multiplication method by determining an optimal parenthetical ordering for the operations in Python.

### TransMarket Group | *Quantitative Trading Intern*

Chicago, IL | Fall 2017 – Spring 2018

- Created a predictive model for off-the-run 3s5s US Bonds using PCA and regression tools within the Python SciKitLearn library.
- Analyzed data via Numpy, Pandas, and Matplotlib to determine optimal machine learning techniques.
- Wrote a script to both update the company database with improved data formats and to send weekly email updates.

## Education

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B.S. in Computer Science | University of Illinois at Urbana-Champaign | 4.0 / 4.0 GPA

Fall 2018 - Spring 2021

High School Diploma | Illinois Mathematics and Science Academy

Graduated Spring 2018

- Received college credit for 3 Math and 2 CS courses on top of receiving credit for 6 AP exams.
- Captain of the varsity basketball team and member of the 2017 Illinois State Championship chess team.

## Projects

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### High Frequency Trading Bot

March 2018 - Present

- Used Amazon Relational Database services to create and connect to a MySQL database instance to query and modify data using Python (mysql.connector and sqlalchemy).
- Created a crypto currency and stock trading bot that uses webscraping to fetch live feed data.
- Implemented volume analysis and simple technical indicators (e.g. moving averages, RSI) for plots.
- Currently implementing a Support Vector Machine Model for making trade decisions.

### Flameless | Illinois Mathematics and Science Academy

September 2017 - April 2018

- Wrote code in C, utilizing Arduinos and custom parts, to create a miniature device that extinguishes kitchen fires.
- Won 2nd place at PowerPitch and 3rd place at NextLaunch, both pitching competitions, for the novel idea and prototype.
- Featured for our work in this article: <https://chicagoventuremagazine.com/2018/06/15/top-of-the-list>.
- Founded this safety product startup with two other high school students at IN2, an innovation center in Aurora, IL.

### C++ Tower Defense Game

November 2017 - May 2018

- Used Direct2D API to develop a graphics library for the program.
- Created a path finding intelligence for both the enemies and defensive units.
- Acquired code organization skills by using appropriate OOP design patterns.

## Languages and Technologies

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Languages - Python; C++; Java; C#; JavaScript; PHP; MySQL; HTML/CSS

Technologies - Amazon Web Services(RDS); Git Bash; GitHub; SolidWorks

## Awards

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**DRW Data Science Finalist:** Placed in the top 5 out of 83 competitors on the coding site, Camelot.ai, sponsored by DRW.

**#1 Midwest Team, Cyber Forensics:** Invited to compete nationally in NYU's High School Forensics Challenge.

**Google FooBar Challenge:** Reached stage 3/5 on Google's invitation-based coding competition.

**2<sup>nd</sup> Place at MIT BWSI Showcase:** Developed and presented Alexa Skills for voice and face recognition on the Amazon Echo.