

# NATALIE CYGAN



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## PROGRAMMING LANGUAGES

Extensive programming experience in C++, C, Python, and Java. Project experience with Swift, React Native, and HTML/CSS.

## TOOLS/LIBRARIES

PyTorch, NumPy, Jupyter Notebook, OpenCV, LaTeX, Unix, Google Cloud Platform

Visualization: Plotly, Dash, Streamlit

## LANGUAGES

Working proficiency in French

## VOLUNTEER/OUTREACH

**Stanford Society of Women Engineers**  
**Outreach Intern:** Organized outreach events directed at young girls K-12 to increase female representation in STEM.

**Denton Girls + Code:** Created an organization to introduce local middle school girls to computer science skills through after school workshops in my hometown.

**Code in Place:** Worked with a team of Stanford professors and section leaders to launch a 5-week MOOC version of Stanford's introductory computer science class to 10,000 students during the COVID-19 lockdown. Taught a weekly discussion section over zoom as a part of the teaching team.

## EDUCATION

### Stanford University, Stanford, CA

#### B.S Computer Science

SEPTEMBER 2017 - DECEMBER 2021

**Relevant completed coursework:** Computer Systems, Linear Algebra, Computer Vision, Artificial Intelligence, Deep Generative Models, Neural Networks, Digital Systems Architecture, Operating Systems, Human-Computer interaction, Electronics.

**Upcoming 2020-2021:** Natural Language Processing, Information Theory, Introduction to Neuroelectrical Engineering, Machine Learning, Visual Computing Systems.

## EXPERIENCE

### Software Engineering Intern

#### Red Leader Technologies, Palo Alto, CA

JUNE 2020 - MARCH 2021

- Interned full-time for 6 months (June - December 2020) and part-time for 3 months (January - March 2021) at an automotive lidar startup.
- Overhauled the 3D visualization stack by designing custom point cloud visualization software with Open3D. Broke out lower-level data from the processing pipeline to the visualizer. Used in live visualization, analysis, and as a critical debugging tool by the entire team.
- Built an end-to-end computer vision application using OpenCV and Plotly Dash to empirically characterize transmitted laser patterns in the far-field from an image. Used in calibration and optics development.
- Used Python and Streamlit to develop upon a lidar system control dashboard, adding logging, interactive plots, and statistics for live telemetry data.
- Assisted in writing device firmware in C to report telemetry data and interact with various sensors.
- Led research effort into characterizing point cloud rotational aberrations, built optimizers for correcting these errors in software.
- Responsible for developing point cloud visualizations and perception tasks for future company demos.

### Software Engineering Intern

#### Google, Sunnyvale, CA

JUNE 2019 - SEPTEMBER 2019

- Intern on the Visual Semantic Service team, providing computer vision for all Google products.
- I modernized heavily used face feature landmarking software by researching active shape models, and rewriting the pipeline with optimized math libraries (C++, Eigen) and standardized programming style.
- Introduced unit tests, wrote testing tools, and created documentation for further developing the FaceSDK pipeline.

### CS 106 Section Leader

#### Stanford University, Stanford, CA

APRIL 2018 - JANUARY 2020

- Taught weekly discussion sections for students in CS 106A, CS 106B, and CS 106X in Java, Python, and C++.
- Graded student homework assignments with extensive feedback on code functionality and style, and held 15-minute code individual code review sessions with them.
- Held weekly office hour shifts to help students debug their code and understand course material. Helped with preflighting new assignments and maintaining internal documentation for other section leaders.
- Held review sessions for student exams, and gave a guest lecture in class.
- Led workshops and evaluations involved in the training of new section leaders.

## PROJECTS

### SBERT for Interpretable Topic Modeling in Web Browsing Data

JANUARY 2021 - MARCH 2021

- Capstone project for CS 224N: Natural Language Processing with Deep Learning. Built a pipeline to leverage the expressive potential of BERT for topic modeling within a diverse set of documents (browsing data). Demonstrated this method's superiority to traditional document embedding and topic modeling techniques.

### Learning to Groove: Conditional Melody Generation from Authentic Basslines

OCTOBER 2019 - DECEMBER 2019

- Final project for CS 236: Deep Generative Models. Generated artificial music tracks with a dual LSTM model: a bassline model that is trained first and provides rich encodings, and a melody model that conditions generation upon those bass encodings. We also present a novel encoding scheme for representing polyphonic music.

### Facial and Portrait Aware Artistic Style Transfer

APRIL 2019 - JUNE 2019

- Capstone project for CS 231N: Convolutional Neural Networks for Visual Recognition. Improved upon canonical artistic style transfer implementations by introducing a subject-background segmentation step and additional training loss term that emphasizes style in the background in order to preserve the integrity of facial characteristics.