

# MICHAEL NEUDER

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## PERSONAL STATEMENT

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I am a Computer Science and Mathematics undergraduate studying abroad at the University of Oxford until June 2018. I am fascinated by the use of machine learning, mathematical models, and computational science to predict and analyze the behavior of complex systems. I have a solid mathematical and computational background, as well as passion for learning and discovery that allows me to adapt quickly to a variety of research areas.

## EDUCATION

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### University of Colorado, Boulder

*Aug 2015-Present*

B.A. in Computer Science

B.A. in Mathematics

Expected Graduation : May 2019

Overall GPA: 3.82 - Computer Science GPA: 3.97

### University of Oxford, Oxford

*Jan 2018-June 2018*

Visiting scholar at Mansfield College

Hilary and Trinity Terms of 2018

Coursework in Statistics, Graph Theory, and Numeric Analysis

## INDUSTRY EXPERIENCE

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### Laboratory for Atmospheric and Space Physics / Lockheed Martin

Feb 2017 - Nov 2017

*Software Engineering Intern*

*Boulder, CO*

- Joint program between the Laboratory of Atmospheric Space Physics and Lockheed Martin where University of Colorado students are trained in the skills necessary to start a career at Lockheed Martin.
- Developed graphical applications using Python and C++ Qt Libraries.
- Wrote interactive terminal applications using Perl and the Curses Module.
- Developed graphical application testing suites using Eggplant Functional and SenseTalk.

### Spire Manufacturing Solutions

May 2014 - Aug 2014

*Manufacturing Intern*

*Colorado Springs, CO*

- Operated CNC lathes and mills to manufacture metal components.
- Inspected parts to verify measurements matched specifications.
- Repaired electric discharge machine and programmed machines to cut a custom part.

## RESEACH EXPERIENCE

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### [Lab of Dr. Elizabeth Bradley](#)

March 2017 - Present

*Research Assistant*

*Boulder, CO*

- Used information theoretic measures to analyze the information produced by the climate system through water isotopic data in ice cores.
- Wrote Python code to compute and visualize the isotope data and the information measures.
- Performed multiple parameter sweeps of weighted permutation entropy to analyze the correlation between the climate's information production and the accumulation rate.
- Used mutual information to explore correspondences between data sets from Greenland and Antarctica

- Developed neural networks using word processing and language analysis to predict reading behavior.
- Synthesized data to train complex networks on a range of tasks.
- Built classifiers and clustering analysis tools to train models on unlabeled data.
- Created several convolutional neural networks to replicate the Structural Similarity (SSIM) score of sets of images in order to embody a more accurate image quality evaluation metric.
- Created visualizations of network parameters and outputs using Python.

## ACADEMIC CLUBS

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### CU Data Science Team

- Participated in and earned credit for being part of the team.
- Worked with a partner on an independent project with guidance from experts in the research areas.
- Built machine learning models to explore a high dimensional embedding space.

## PROJECTS

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### Image Quality Analysis

Code written for machine learning and image analysis research.

### Numerical Experiments

A series of numerical analysis experiments written in Python.

### Rubik's Cube Solver

Wrote a program in C++ that solves a cube from any scrambled position.

### Python vs C++

Created benchmark runtimes of programs in both languages.

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Wrote a web application with Ruby on Rails to simulate a virtual girlfriend.

### Connect Four

Created a graphical implementation of the game in PyQt.

### Hack CU 2017

Took part in hackathon and modeled the spread of infectious disease.

## AWARDS

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- Sewell Esteemed Scholars Award: Scholarship given by CU for academic excellence.
- Dean's List: Recognition given to CU Boulder students who complete a full time academic semester with a GPA of 3.75 or above.
- CU Honors Program: Lived in the Honors Residential Academic Program and participated in the Honors Community events.
- Visiting Scholar Award: Given to students who are selected from application pool to attend Oxford University as visiting scholars.

## TECHNICAL STRENGTHS

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### Programming Languages (Experienced)

Python, C++, Perl

### Programming Languages (Proficient)

Ruby, R, Javascript, Matlab, bash, CSS, HTML

### Libraries

numpy, scipy, matplotlib, tensorflow, scikit-learn, Qt

### Tools

git VCS, LaTeX, Linux, Jupyter Notebooks

## REFERENCES

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### **Dr. Liz Bradley**

- *Professor*, Dept. of Computer Science, University of Colorado, Boulder
- *External Professor*, Sante Fe Institute
- lizb@colorado.edu

### **Dr. Mike Mozer**

- *Professor*, Dept. of Computer Science, University of Colorado, Boulder
- mozer@colorado.edu

### **Dr. Joshua Garland**

- *Omidyar Fellow*, Sante Fe Institute
- joshua@santefe.edu