

# Dominic Carrano

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## Education

### University of California, Berkeley

B.S. Electrical Engineering and Computer Science

08/2016 - 05/2020 (MS: 2021)

GPA: 3.83 (Major) • 3.78 (Cum.)

**Coursework:** Error Correcting Codes<sup>†</sup>, Optimization, Probability and Random Processes, Digital Signal Processing, Signals and Systems, Operating Systems, Computer Architecture, Algorithms, Data Structures, Discrete Math, Multivariable Calculus, Linear Algebra

**In Progress:** Machine Learning, Quantum Mechanics • **Planned Spring 2020:** Database Systems, Computer Graphics and Imaging

<sup>†</sup>Graduate-level course

## Experience

### Undergraduate Research Assistant • Berkeley Laboratory for Information Systems and Sciences

01/2019 - Present

- Researching the use of error correcting codes in speeding up distributed linear algebra algorithms under Professor Kannan Ramchandran.
- Developed a coding scheme for Alternating Least Squares used for matrix completion in recommender systems; proved bounds on the code's I/O costs and straggler tolerance; demonstrated a ~30% runtime reduction over speculative execution in AWS Lambda in Python.

### Signal Processing and Laser Systems Intern • Lawrence Livermore National Laboratory

05/2019 - 08/2019

- Reduced mean squared error by 5x and saved \$2 million per year in data acquisition over previously proposed method with new algorithm for post-processing of laser signal measurements. Demonstrated performance on experimental hardware setup.
- Developed and deployed new software tool to calibrate raw data from the 48 total 3w laser diagnostics via parametric fits in Matlab.

### Signal Processing and Laser Systems Intern • Lawrence Livermore National Laboratory

05/2018 - 08/2018

- Quantified previously unknown errors for laser diagnostics using a Monte Carlo simulation based on empirical noise variance.
- Achieved 2x reduction in percent error on laser measurements via modifications to deconvolution algorithm that improved robustness.
- Presented work at SPIE Photonics West 2019 with first author publication in conference proceedings.

## Teaching

### EE 120 (Signals and Systems) Teaching Assistant • UC Berkeley EECS Department

08/2018 - Present

Taught weekly 30-40 student sections each semester on class topics: LTI system theory, signal processing, and applications.

Fall 2019 Semester (Head TA)

- Managed a class of 113 students and a 6 person staff, coordinating logistics with the instructor, Professor Murat Arcak.
- Served on the EECS Undergraduate Teaching Task Force, collaboratively solving problems facing the 3900+ student EECS department.
- Spent 30+ hours adding new content to Python labs, including acoustic echo cancellation and touch-free heart rate monitoring.

Spring 2019 Semester (Head TA)

- Managed a class of 131 students and a 5 person staff, coordinating logistics with the instructor, Professor Babak Ayazifar.
- Spent 100+ hours creating five new applications-based iPython notebook labs for students: applications of LTI filters, the fast Fourier transform, 1D and 2D deconvolution, orthogonal signaling and signal noise models, and PID control of an inverted pendulum.
- Created 13 new worksheets each with 3-4 practice problems for weekly TA-led discussion sections in collaboration with other TAs.

### EE 16A (Intro to Electrical Engineering) Coordinator and Mentor • Computer Science Mentors

01/2018 - Present

- Recruited, interviewed and selected 25 new EE 16A mentors from 80+ student applicant pool.
- Managed a cohort of 33 mentors, running weekly meetings to discuss club matters and organizing group social events.
- Served as a voting member of the 24-person executive board to guide the direction of the 400+ student club.
- Taught weekly 6-student sections on EE 16A topics: linear algebra, design and circuit analysis, and supervised machine learning.

## Publications

**Dominic Carrano**, Ryan Muir. *Deconvolution uncertainty for power sensors at the National Ignition Facility*. Proc. SPIE 10898, High Power Lasers for Fusion Research V, 108980Q (4 March 2019); doi: 10.1117/12.2511521; <https://doi.org/10.1117/12.2511521>.

Presented at SPIE LASE High Power Lasers For Fusion Research V (February 2019).

## Skills and Tools

**Proficient:** Matlab, Python, numpy, scipy, matplotlib, iPython Notebook

**Familiar:** Unix/Linux, LaTeX, Java, C, HTML, Git, GitHub, Eclipse, IntelliJ