Dominic Carrano

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Education

University of California, Berkeley **08/2016 - 05/2020**
B.S. Electrical Engineering and Computer Science **GPA:** 3.83 (Major) • 3.78 (Cum.)

Coursework: Error Correcting Codes†, 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:** Computer Graphics and Imaging, Statistical Signal Processing†

†Graduate-level course

Experience

Undergraduate Research Assistant • Berkeley Laboratory for Information Systems and Sciences **01/2019 - Present**

- Studying the use of codes in massive-scale distributed linear algebra algorithms under Professor Kannan Ramchandran.
- Developed and proved performance bounds on coding scheme for distributed matrix multiplication; tested in AWS Lambda.

Signal Processing and Laser Systems Intern • Lawrence Livermore National Laboratory **05/2019 - 08/2019**

- Developed new algorithm for deconvolving clipped data; demonstrated a 5x lower mean squared error compared to the existing method on a full offline replica of a laser diagnostic. New algorithm saved $2 million per year in impulse response acquisitions.
- Implemented and deployed Matlab tool to internal diagnostic system for software-based calibration of 48 laser diagnostics.

Signal Processing and Laser Systems Intern • Lawrence Livermore National Laboratory **05/2018 - 08/2018**

- Implemented and deployed Monte Carlo simulation in Matlab to quantify previously unknown laser diagnostic error bars.
- Developed improvements to existing deconvolution algorithm; demonstrated a 2x reduction in percent error on laser measurements.
- 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)

- Lead 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)

- Lead 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.
- Led effort to create 13 new worksheets each with 3-4 practice problems for weekly TA-led discussion sections.

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, Markdown