

JONATHAN WAPMAN

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RESEARCH INTERESTS

Parallel Computer Architectures, GPU Programming, Graph Analytics, Machine Learning,
Autonomous Systems, Robotics, Control Systems

EDUCATION

University of California, Davis

Expected Jun. 2020

Master of Science, Electrical Engineering

Advisor: Professor John Owens

Research Focus: GPU-Accelerated Graph Algorithms on a Streaming Architecture

GPA: 4.00/4.00

University of California, Davis

Mar. 2018

Bachelor of Science, Electrical Engineering

GPA: 3.96/4.00

RESEARCH EXPERIENCE

Owens Research Group – University of California, Davis

Dec. 2018 – Present

Graduate Student Researcher

PI: Professor John Owens (Dept. of Electrical and Computer Engineering)

- Currently researching methods to map GPU graph algorithms and load-balancing methods to a dataflow programming model in collaboration with Nvidia as part of DARPA's Software-Defined Hardware program.
- Implemented the HITS graph ranking algorithm in the Gunrock open-source parallel graph analytics library.

NASA Jet Propulsion Laboratory

Jun. 2018 – Sept. 2018

Guidance & Control Intern

- Developed control algorithms and software drivers to enable automated position and attitude control of a planar air-bearing platform used for CubeSat formation flying, pointing, and rendezvous experiments.
- Formulated and executed a series of laboratory tests to fully characterize the planar platform's physical properties, software performance, and position-control capabilities. Extensive data analysis performed using MATLAB.
- Planned publication covering the platform's design, performance capabilities, and applications to future CubeSat missions.

Lawrence Livermore National Laboratory**Mar. 2018 – Jun. 2018***Computational Engineering Intern*

- Researched and simulated decentralized signal detection algorithms, information-exchange schemes, and motion strategies for chemical plume identification and localization using fully-autonomous robotic swarms.
- Created a Python module to enable development and analysis of collaborative, autonomous swarm scenarios, which was used by LLNL scientists and for a 3D visualization collaboration with UCSD.

Yankelevich Laboratory – University of California, Davis**Jan. 2017 – Mar. 2018***Research Assistant**PI: Professor Diego Yankelevich (Dept. of Electrical Engineering)*

- Developed low-cost, automated hardware and software systems to capture, analyze, and display data for fluorescence lifetime imaging applications to guided surgery, using C++ and Python on a Raspberry Pi.
- Presented at the 2018 Undergraduate Student Research Showcase to UC Regents, CA lawmakers, CEOs, and alumni.

PROFESSIONAL EXPERIENCE

Eclipse Rocketry Design Team – University of California, Davis**Nov. 2017 – Mar. 2018***Software Developer*

- Designed object-detection algorithms to identify ground-level targets from onboard a rocket during launch. Algorithm executed using C++, OpenCV, and the Yolo v2 neural network running on an Nvidia TX1.
- Worked with a team of seven other students to set project goals, coordinate logistics, and prepare regular presentations and reports.

Silva Laboratory – University of California, Davis**Sept. 2016 – Jun. 2017***Software Developer*

- Designed circuitry and programmed an Arduino for a digitally-controlled syringe with a team of three students. Used as a low-cost alternative for microfluidic educational and research projects.
- Achieved performance comparable to a \$2000 industrial digitally-controlled syringe for less than \$150.

Lawrence Livermore National Laboratory – National Ignition Facility**Jun. 2017 – Sept. 2017***Intern*

- Created a sensor and LabView virtual instrument used to measure and track the capacitance of over 4000 high energy density capacitors for preventative maintenance. Achieved accuracy within 3% and repeatability within 1%.

Varian Medical Systems**Jun. 2016 – Sept. 2016***Intern*

- Designed PCBs and software used to validate Multi-Leaved Collimator motors for radiation therapy machines.

- Programmed a GUI-based application to allow engineers to interface with MLC motor test equipment. Features include telemetry data visualizations, command sequence entry, and debugging tools.

UC Davis C-STEM Center**Jan. 2016 – Jun. 2016***Technical Volunteer*

- Developed code examples for Arduino robotic platforms such as line-following and maze-solving procedures.
- Created teaching materials for middle-school students to learn basic coding and robotics concepts.

TEACHING EXPERIENCE

University of California, Davis**Mar. 2018 – Sept. 2019***Teaching Assistant – Senior Capstone Design (EEC 136 A/B)*

- Assisted students and project teams with circuit design/layout, embedded device programming, project management, and quarterly written reports.

CONFERENCES

"Gunrock GPU Graph Analytics", UC Davis Industrial Affiliates Conference, May 2019.

Poster

May 2019

"Chemical Plume Detection with Collaborative, Autonomous Sensor Networks," 2018 Signal and Image Sciences Workshop at the Lawrence Livermore National Laboratory.

Poster

May 2018

"Rocket Imaging Payload: Identification of Ground-Based Targets using Contour Detection and Neural Networks with Bluetooth-Enabled Inertial Measurement Unit", UC Davis Industrial Affiliates Conference.

Award: Best Undergraduate Poster

Poster

May 2018

"Multichannel solid state photodetection system for low-cost fluorescence lifetime spectroscopy", Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XVI.

Contributed Slides, Presentation by Dr. Diego Yankelevich

Apr. 2018

"Low-Cost Data Collection Systems for Fluorescence Lifetime Spectroscopy Imaging", *UC Undergraduate Research Ambassador Showcase*.

Presentation

Feb. 2018

AWARDS

Outstanding Senior in Electrical Engineering (1 per year)

2018

Fred Fuchslin Memorial Scholarship

2017

Robert Murdoch Memorial Scholarship

2017

Dean's List – 10 Quarters

2014 – 2018

Pedrozzi Scholarship

2014

Eagle Scout with Bronze Palm

2013

SKILLS

Programming Languages

C, C++, CUDA, Python, MATLAB, LaTeX, Verilog, Bash

Tools & Frameworks

OpenCV, NumPy, Numba, Git, Gunrock, Googletest, Jekyll

Programs

LabView, Simulink, Eagle, Linux, MacOS, Windows, Microsoft Office

COURSEWORK

Graduate

Embedded Computing Systems (EEC 284), Linear Systems (EEC 250), Nonlinear Systems (EEC 251), Optimal Control (MAE 298), Reinforcement Learning (EEC 289A), VLSI Digital Signal Processing (EEC 281)

Undergraduate

Computer Architecture (EEC 170), Control Systems (EEC 157A), Design of Coffee (ECM 1), Differential Equations (MAT 22B), Digital Systems I/II (EEC 180 A/B), Discrete Math (ECS 20), Electromagnetics I/II (EEC 130 A/B), Linear Algebra (MAT 22A), Parallel Computer Architectures (EEC 171), Probabilistic Analysis (EEC 161), Signals & Systems (EEC 150A)