

ALBERT GURAL

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MSC #466, Pasadena, CA 91126-0466

Education

California Institute of Technology

Electrical Engineering with a minor in Computer Science, GPA: 4.0

Pasadena, CA

Oct. 2012 - present

- **Current Coursework:** Mixed-mode Integrated Circuits Research (with Professor Emami)
- **Past Coursework:** Machine Learning and Data Mining, Algorithms, Computing Systems, Embedded Systems (FPGA Oscilloscope), Advanced Digital Systems Design (AVR Processor in VHDL), Mixed-mode Integrated Circuits, Feedback and Control Circuits, Signal-Processing Systems, Combinatorial Analysis, Stochastic Processes, Discrete Differential Geometry, Quantum Computation
- **Activities/Awards:** ACM-ICPC (3rd place at regionals, 2013; 4th place at regionals, 2014)

Thomas Jefferson High School for Science and Technology

Senior Research in Computer Science, GPA: 4.45

Alexandria, VA

Sept. 2008 - June 2012

- **Activities/Awards:** Computer Team (co-captain, 2010-12), USACO (algorithmic coding, gold division), ACSL (CS topics, 1st place individual, 2010-11), Naval Research Lab (1st place project in CS, 2011)

Work and Experience

Summer Undergraduate Research Fellowship, *Named fellow*

Summer 2015

- Designed and simulated a novel PLL-based potentiostat for measuring dopamine concentrations *in vivo*.
- Used Cadence Virtuoso with 45nm CMOS model libraries.

Jane Street Capital, *Software Developer Intern*

Summer 2014

- Completed two projects - (1) fault-tolerant distributed lock server to replace NFS locks; (2) plugin support for the internal trader tool as well as a plugin ecosystem for trader developers with version control.
- Used OCaml (including the Async monad, RPCs, DynLoader).

Google (Research Division), *Software Engineering Intern*

Summer 2013

- Developed image processing techniques to clean a sequence of object photos to QA specifications, allowing for a much larger class of object image sequences to be processed; currently for Google Shopping.
- Used C++, OpenCV, and the Ceres non-linear solver library.

Naval Research Laboratory, *Intern, High Performance Computing*

Summer 2011, 2012

- *Summer 2012:* Built a molecular dynamics simulation in C; compared different integration step algorithms including brute force, linked cell, and monotonic Lagrangian grid.
- *Summer 2011:* Created an MPI (Message Passing Interface) library for parallel operations on a grid in C++, tested on a wave propagation simulation, then analyzed its efficiency.

California Institute of Technology, *Teaching Assistant*

CS 38 (Algorithms; Spring 2014, Spring 2015) and EE 45 (Electronics Laboratory; Winter 2015)

- Conducted weekly office hours; provided intuition for problem solving as well as concrete examples and big picture overviews. Graded assignments. Received extremely positive reviews from students.

Projects

Potentiostat utilizing an all-digital phase-locked loop in 45nm CMOS technology

Summer 2015

Solid-state Tesla coil, built from scratch

Summer 2015

Electronic automatic dog food dispenser

Spring 2015

6-8 GHz all-digital delay-locked loop in 45nm CMOS technology, *group project*

Spring 2015

8-bit AVR-compatible processor in VHDL for a Xilinx FPGA, *group project*

Winter 2015

Differential geometry algorithms: mesh smoothing, flattening, surface flow

Fall 2014

3-stage BJT amplifier with flat 40dB gain from 10Hz to 200kHz, *group project*

Spring 2014

FPGA-based oscilloscope, designed and built from scratch

Spring 2014

Robotribe firmware (interrupt-based OS written exclusively in x86 assembly)

Fall 2013

Tools and Languages

C/C++, Java, Python, OCaml, Haskell, VHDL/Verilog, x86 Assembly, \LaTeX , Mathematica, Git, Bash, OpenCV, MPI (parallelization platform), Altium, Altera and Xilinx toolchains, Cadence Virtuoso