Albert Gural

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Education

California Institute of Technology **Pasadena, CA**
Electrical Engineering with a minor in Computer Science, GPA: 4.0 *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 (3^{rd} place at regionals, *2013*; 4^{th} place at regionals, *2014*)

Thomas Jefferson High School for Science and Technology **Alexandria, VA**
Senior Research in Computer Science, GPA: 4.45 *Sept. 2008 - June 2012*

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

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

Projects

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*
Robotrike 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