Albert Gural

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Education

California Institute of Technology **Pasadena, CA**
Electrical Engineering with a minor in Computer Science, GPA: 3.8/4.0 *Oct. 2012 - present*

- **Relevant Coursework:** Semiconductor Sensors and Actuators, Solid-State Electronics Laboratory, Intro to Algorithms, Intro to Computing Systems, Decidability and Tractability, Abstract Algebra, Probability and Statistics
- **Activities:** ACM Programming Contest (*2012*), Robotics Team (Electrical) (*2012-13*)
- **Awards:** Top 5 individual in Caltech's ACM team and fastest ACM regional problem solution (*2012*)

Thomas Jefferson High School for Science and Technology **Alexandria, VA**
Senior Research in Computer Science, GPA: 4.45/4.00 *Sept. 2008 - June 2012*

- **Relevant Coursework:** Microprocessor Electronics (including Motorola MC6800 Assembly programming), AP Computer Science, Artificial Intelligence, Single and Multivariable Calculus, Advanced Math Techniques with Linear Algebra, Differential Equations, Complex Analysis
- **Activities:** Computer Team (co-captain, *2010-12*), Varsity Math Team, Botball Robotics, Physics Team
- **Awards:** USACO (top average score in silver division, *2010-12*), ACSL (1^{st} place team, *2010*; 1^{st} place individual, *2010-11*), AIME qualifier (*2009-12*), Naval Research Lab (1^{st} place project in CS, *2011*)

Work and Experience

Google (Research Division), *Software Engineering Intern* *Summer 2013*

- Developed image processing techniques using C++, OpenCV, and Ceres non-linear optimizer to clean a sequence of object photos to QA specifications
- Allows for a much larger class of object image sequences to be processed; currently for Google Shopping

Planning, Design, and Construction of a High Tech Flashlight, *for fun* *2011-13*

- Designed a circuit including an ATmega168 MCU, capacitive touch sensors, a 3W constant current LED driver, and USB connectivity, incorporating around 100 SMD components
- Designed and built the corresponding circuit board, including hot-air reworking SMD parts onto the board
- Programmed the board in Arduino and AVR C; designed and 3D-printed a prototype case

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

Innovative Defence Technologies, *Competitor* *Spring 2011*

- Team of 3; developed client/server XML data communication over TCP/IP sockets in Java; won 1^{st} place

Skills and Interests

Engineering Projects (built from scratch):
Circuit Design and Construction: Designed and etched circuit boards; soldered through-hole and SMD components (down to 0402 size) onto the boards. Also designed, built, and tested 4-layer boards
Electronic Devices: Lasers (solid-state diode, class 3B), flashlights using high power LEDs with MCU control and various peripherals (IR control, Li-Ion charging, etc), coilgun, rudimentary microprocessor oscilloscope

Tools and Languages:
Tools/Software: LaTeX, Git, Mathematica, some Matlab, EAGLE PCB Design, Autodesk Inventor, LT spice, Oscilloscopes, Signal Generators, Soldering (hand, hot air), machine tools, basic laboratory equipment
Languages/Libraries: C/C++, Java, Python, HTML, CSS, JavaScript, x86 Assembly, Arduino/AVR C, OpenCV, Ceres Solver, MPI, some Bash

Hobbies and Interests: Mathematics and Computer Science; Analog and Digital Electronics; Puzzles; Planning, Designing, and Making Electronic Devices (mix of EE, CS, and ME); Graphical Arts
See website for detailed project descriptions (http://www.albertgural.com/projects/).