Albert Gural

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Education

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

- **Relevant Coursework:** EE40 - Semiconductor Sensors and Actuators, APh9 - Solid-State Electronics, CS38 - Intro to Algorithms, CS24 - Intro to Computing Systems, CS21 - Decidability and Tractability, CS11 - ACM Competition, Ma5 - Abstract Algebra, Ma2b - 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 Teams (co-captain, *2010-12*), Varsity Math Team, Botball Robotics, Physics Team
- **Awards:** USACO (1st place average score in silver division, *2010-12*), ACSL (1st place team, *2010*; 1st place individual, *2010-11*), AIME qualifier (*2009-12*), Naval Research Lab (1st 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 images 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 (28 pin VQFN package), capacitive touch sensors, a 3W constant current LED driver, and around 100 other SMD components
- Designed and built the corresponding circuit board, including hot-air reworking SMD parts onto the board
- Programmed the board with a bootloader using V-USB for AVR; designed and 3D-printed prototype case

Naval Research Laboratory, *Intern, High Performance Computing* *Summer 2011, 2012*

- *Summer 2012:* Built a molecular dynamics simulation in C; looked for an optimum integration step algorithm from brute force, linked cell, and MLG (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 1st 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 (658nm 200mW, 532nm 5mW, 405nm 20mW), Flashlights using high power 1W white LEDs with MCU control and various peripherals (IR control, Li-Ion charging, etc), Coilguns

Tools, Software, Libraries, Languages:
Tools: Oscilloscopes, Signal Generators, Soldering (hand, hot air), machine tools, basic laboratory equipment
Software: EAGLE PCB Design, Autodesk Inventor, LT spice, Arduino, some HEX editors
Proficient: C/C++, Java, Python, LaTeX, HTML, CSS, JavaScript, x86 Assembly, OpenCV
Familiar: Mathematica, Ceres Solver, AVR/Arduino C, PIC & MC6800 Assembly, Fortran, 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/).