Benjamin Shih

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EDUCATION

Carnegie Mellon University — Pittsburgh, PA
B.S. in Electrical and Computer Engineering — August 2009 - May 2013
GPA: 3.52/4.00, Major GPA: 3.59/4.00

SKILLS

Software: MATLAB, Eagle, LaTeX, Cadence, ProTools, IgorPro
Electronics: soldering, oscilloscope, function generator, analog/digital multimeter, circuit simulation, pcb board design, sensor design, microcontroller programming
Coding: Java, C, Python, R, x86 Assembly, VBA, HTML, SystemVerilog
Languages: English (proficient), Mandarin Chinese (speaking), Spanish (basic), Japanese (basic)

COURSEWORK

In progress: Mechatronic Design, Gadgetry, Kinematics/Dynamics/Control, Psychology of Music
Completed: Bio-inspired Robotics, Robot Kinematics, Machine Learning, Controls, Welding, Sensor Systems, Data Structures and Algorithms, Computer Systems, Microelectronics, Graph Theory, Electromagnetics, Noisy Signal Processing, Sound Recording

EMPLOYMENT

Signal Processing Department, Carnegie Mellon University — Pittsburgh, PA
Undergraduate Researcher — May 2012 - present

- Apply spectral graph theory to big data. Chunk and process ∼20,000 nodes using MATLAB.
- Analyze Frobenius norms of Laplacians and adjacency matrices and apply error minimization via matrix perturbation theory and approximations. Reduced error by 2 orders of magnitude.

Electrical and Computer Engineering Department, Carnegie Mellon University — Pittsburgh, PA
18-320 Microelectronic Circuits Teaching Assistant — August 2012 - present

- Guide ∼30 students through amplifier design (analog) and transistor layouts in Cadence (digital). Lead two 3 hour/week lab sections.

18-290 Signals and Systems Teaching Assistant — August 2011 - December 2011

- Guided ∼30 students through various MATLAB activities related to introductory signal processing, including audio/speech processing and specgram analysis. Managed one 3 hour/week lab section.

NanoJapan, Rice University — Houston, TX
Undergraduate Researcher — May 2011 - August 2011

- Analyzed the vibrational and rotational modes of C_{60} nanocars via Raman spectroscopy.
- Worked in a cross-cultural research setting alongside ∼40 Japanese graduate students.
- Delivered poster presentation at International Symposium on Terahertz Nanoscience (TeraNano) at Osaka University, Japan in November 2011.

PROJECTS

Fluxgate Magnetometer Sensor — January 2012 - May 2012

- Worked with peer to create MATLAB models to simulate fluctuations in Earth′s magnetic field due to perturbations by objects of varying magnetic strength and position/distance.
- Presented device results as technical report. Performed literature reviews for classmates.

Line-Following Mobile Robot — October 2011 - April 2012

- Worked with peer to create simple scheduler for pulsing motors and reading sensors.
- Handmade components: plexiglass chassis, two-link joint for front wheel steering, wheel encoders using black/white tape and infrared sensors, H-bridge for motor control, infrared sensor array for line detection.
- Programmed PIC18F25K22 using C/assembly in MPLabX for controlling steering and monitoring sensors.

HONORS

Small Undergraduate Research Grant, Carnegie Mellon University ($500) — November 2011
NanoJapan NSF International Research Experience for Undergraduates Program — February 2011
NIST Undergraduate Research Fellowship Program — March 2010
Intel Science Talent Search, Semifinalist — January 2009