Benjamin Shih

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http://benshih.github.io

United States Citizen
https://github.com/benshih

Education

University of California, San Diego (UCSD)
Ph.D. Mechanical and Aerospace Engineering

San Diego, CA
August 2015 - present

Carnegie Mellon University
M.S. Electrical and Computer Engineering
B.S. Electrical and Computer Engineering

Pittsburgh, PA
August 2013 - December 2013
August 2009 - May 2013

Montgomery Blair High School
Math, Science, and Computer Science Program

Silver Spring, MD
August 2005 - June 2009

Skills

Software: MATLAB, Eagle, SolidWorks, LaTeX, Git, Cadence, ProTools
Electronics: soldering, oscilloscope, function generator, multimeter, circuit simulation, PCB board design, microcontroller programming
Coding: C++, Python, Java, C, HTML
Languages: English (proficient), Mandarin Chinese (speaking), Spanish (basic)

Experiences

Bioinspired Robotics and Design Lab, UCSD
Graduate Research Assistant

San Diego, California
September 2015 - present

- Soft robotics.
- Advised by: Prof. Michael Tolley

Momentum Machines
Embedded Software Engineering Intern

San Francisco, California
May 2015 - August 2015

- Food technology startup using robotics and automation to produce gourmet food.
- Requirements gathering and electronics interfacing of dozens of sensors and actuators. Used an ARM-based microcontroller.
- Lead engineer for PCB fabrication of 6 unique boards with a design firm.
- Statecharts (finite state machine) software architecture for embedded control. Used a web-based graphical user interface to facilitate rapid prototyping and fast system bringup.
- Prototyped and tested various subsystem mechanisms for mechanical engineering team.
- Advised by: Jeff Jensen, Ali Rathore.

Reconfigurable Robotics Lab, EPFL
Research Assistant, École Polytechnique Fédérale de Lausanne

Lausanne, Switzerland
May 2014 - April 2015

- Built untethered, locomotive robot using soft pneumatic actuators (SPAs).
- Experimented with actuator frames to improve actuation consistency.
- Automated SPA testing using computer vision.
- Advised by: Prof. Jamie Paik, Dr. Juan Manuel Florez.

MIT Lincoln Laboratory
Graduate Intern

Lexington, MA
May 2013 - August 2013

- Worked with mechanical engineering intern to equip plane with visible spectrum vision capabilities.
- Created user interface using Qt for streaming video from camera and toggling individual frame recording.
- Designed software architecture using UML diagrams to describe how camera interacts with system.
- Team: Adith Subramanian. Advised by: Dr. Jon Watson, Dr. Seth Trotz, Dr. Jim Truitt.

NanoJapan, Rice University
Undergraduate Researcher

Houston, TX
May 2011 - August 2011

- Analyzed vibrational and rotational modes of C_{60} nanocars via Raman spectroscopy.

- Delivered poster presentation at International Symposium on Terahertz Nanoscience (TeraNano) at Osaka University, Japan in November 2011.

- Worked in cross-cultural research setting alongside ∼40 Japanese graduate students.

- Advised by: Prof. Kevin Kelly.

Projects

Dekoboko   Berlin, Germany
Intel IoT Hackathon 2015   *April 2015*

- Combined GPS and accelerometer sensor for mapping vibration+location data while riding bike. LED bar sensor for displaying vibration intensity. Data logged to internet-connected Intel Edison board, pulled using Javascript, and displayed on Heroku page using Ruby on Rails.

- Award: First prize, $1500 euro.

- Semifinalist, Hackaday Prize 2015. Featured on Hackaday blog.

- Team: Daniel Rojas, Maxim Lapis.

Your Augmented Reality Notes   Zurich, Switzerland
HackZurich 2014   *October 2014*

- Augmented reality system using Leap Motion and Oculus Rift for viewing Evernote notes. Also with android and iOS mobile app. Incomplete project integration.

- Award: Finalist (top 25 of 101).

- Team: Brian Zhenbang Li, Diego Alfonso Ballesteros, Cifong Kang.

Real-Time Mosaicking and Tracking on UAV   September 2013 - April 2014

- Implemented computer vision algorithms using Node.js, OpenCV, and MATLAB for use on Parrot ARDrone.

- Conducted market research to identify clients. Met with companies and startup incubators to refine idea.

- Team: Rentaro Matsukata

Roof-Shingling Robot   January 2013 - May 2013

- Managed four person team to design and construct roof-shinging robot from scratch, budget of $1000.

- Designed robot base, dropping, feeding, and dispensing mechanisms in SolidWorks CAD. PID controller programmed and tuned using Arduino. 3rd place in class competition, $200 prize.

- Team: Ram Muthiam, Mark Erazo, Hao Wang. Advised by: Prof. John Dolan.

Human-Computer Interaction Institute, Carnegie Mellon University   Pittsburgh, PA
Undergraduate Researcher   August 2012 - December 2012

- Designed wearable wristband using vibrational microphones, which sent the on-body signals through an amplifier and to a computer as a stereo audio signal.

- Classified the training data responses obtained from the microphones by recording select locations on the arm and generating spectral features, including spectral density, spectral centroid, and band energy ratio, based on individual and cross-correlation of the audio channels using Weka. Obtained ∼95% accuracy.

- Team: Murium Iqbal, Robert Xiao. Advised by: Chris Harrison, Prof. Bhiksha Raj.

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.

- Team: Rentaro Matsukata.

Honors

Semifinalist, Hackaday Prize 2015	August 2015
UCSD Departmental Fellowship	February 2015
Winner, Intel Internet of Things Hackathon, Berlin (1500 euros)	April 2015
Finalist (top 25 out of 101 projects), HackZurich Hackathon	October 2014
Honorable Mention, National Science Foundation (NSF) Graduate Research Fellowship Program	April 2014
Scholarship of Excellence in Research at EPFL (20k CHF)	February 2014
Small Undergraduate Research Grant, Carnegie Mellon University (500 USD)	November 2011
NanoJapan NSF International Research Experience for Undergraduates Program	February 2011
Intel Science Talent Search, Semifinalist (1000 USD)	January 2009

Conference Publications

J. M. Florez, **B. Shih**, Y. Bai, J. Paik. "Soft Pneumatic Actuators for Legged Locomotion". IEEE International Conference on Robotics and Biomimetics (ROBIO 2014), Bali, Indonesia. December 2014. Acceptance rate: 58.6% (374 of 638).

Academic Presentations, Lectures, Talks

Swiss National Centres of Competence in Research (NCCR) Annual Review Nov 2014
- Presented EPFL SPA crawler robot, along with RRL's soft rat exoskeleton, to Swiss funding agencies.

Carnegie Mellon CIT Dean's Council Presentation November 2012
- Presented Hand Input project to the dean's council.
- Received positive feedback about project concept from audience.

International Symposium on Terahertz Nanoscience November 22, 2011
- Presented poster: Temperature-Dependent Raman Spectroscopy of Fullerene Nanocar Wheels by Benjamin Shih, Chad Byers, Albert Chang, Corey Slavonic, Dr. Kevin Kelly.
- Conference held at Osaka University in Osaka, Japan.

25th Annual Rice University Quantum Institute Summer Colloquium August 2011
- Presented poster: Temperature-Dependent Raman Spectroscopy of Fullerene Nanocar Wheels by Benjamin Shih, Chad Byers, Albert Chang, Corey Slavonic, Dr. Kevin Kelly.
- Conference held at Osaka University in Osaka, Japan.

Academic Mentoring

Basile Audergon. EPFL B.S. Soft Pneumatic Actuator Frame Fabrication. Dec 2014 - Apr 2015.
Nicolas Besuchet. EPFL B.S. Soft Pneumatic Actuator Frame Fabrication. Jan 2015 - Apr 2015.

Teaching

Graduate
Electrical and Computer Engineering Department, Carnegie Mellon University Pittsburgh, PA
18-202 Mathematical Foundations of Electrical Engineering Teaching Assistant August 2013 - December 2013
- Weekly office hours to review math topics.
- Course by: Prof. Tom Sullivan.

Undergraduate
Electrical and Computer Engineering Department, Carnegie Mellon University Pittsburgh, PA
18-320 Microelectronic Circuits Teaching Assistant August 2012 - December 2012
- Guide ~30 students through amplifier design (analog) and transistor layouts in Cadence (digital). Lead two 3 hour/week lab sections.
- Course by: Prof. Jeyanandh Paramesh.

Electrical and Computer Engineering Department, Carnegie Mellon University Pittsburgh, PA
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.
- Course by: Prof. Bruce Krogh.

Outreach

CMU ECE Outreach August 2013 - Apr 2014
- Host lab sessions in various ECE topics for high school kids.

Professional Activities and Service

Eta Kappa Nu, Carnegie Mellon University August 2013 - Apr 2014
- ECE Honor Society.