Benjamin Shih

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Education

University of California, San Diego — San Diego, CA
Ph.D. Mechanical and Aerospace Engineering — August 2015 - present
MicroMBA, Rady School of Management — June 2016 - July 2016

Carnegie Mellon University — Pittsburgh, PA
M.S. Electrical and Computer Engineering — August 2013 - December 2013
B.S. Electrical and Computer Engineering — August 2009 - May 2013

Skills

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

Experiences

Bioinspired Robotics and Design Lab, UC San Diego — San Diego, California
Graduate Research Assistant — September 2015 - present

- Soft actuation and sensing: hands, skin, and touch. Applications to human-robot interaction, assistive and wearable robots, and virtual reality.
- Advised by: Prof. Michael T. Tolley

Momentum Machines — San Francisco, California
Embedded Software Engineering Intern — May 2015 - August 2015

- Food technology startup using robotics and automation to produce gourmet food.
- 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.
- Advised by: Jeff Jensen, Ali Rathore.

Reconfigurable Robotics Lab, EPFL — Lausanne, Switzerland
Research Assistant, École Polytechnique Fédérale de Lausanne — 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 — Lexington, MA
Graduate Intern — May 2013 - August 2013

- Worked with mechanical engineer 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 — Houston, TX
Undergraduate Researcher — 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 $\sim$40 Japanese graduate students.
- Advised by: Prof. Kevin Kelly.

Publications

B. Shih, D. Drotman, C. Christianson, T. Kalisky, Y. Wang, K. Otani, P. deZonia, M. T. Tolley. "Tactile Object Modeling with a Soft Pneumatic Gripper Capable of Grasping, Rotating, and Sensing Objects ". Submitted to journal.

Y.-S. Kim, J. Lu, **B. Shih**, A. Gharibans, Z. Zou, R. Aguilera, K. Matsuno, Y. Han, A. Meek, J. Xiao, M. T. Tolley, and T. P. Coleman. "Microfabrication strategy that enables scalable manufacturing of heterogeneous soft adhesive electronics". Submitted to journal.

B. Shih, J. M. Florez, J. Paik. "An Untethered, Modular Soft Robot For Multi-Legged Locomotion". In preparation.

P. Tandon, S. Lam, **B. Shih**, T. Mehta, A. Mitev, Z. Ong. "Quantum Robotics: A Primer on Current Science and Future Perspectives ". Published as book chapter in Synthesis Lectures on Quantum Computing by Morgan Claypool Publishers, Jan 2017.

A. Minori, **B. Shih**, C. Christianson, M. T. Tolley. "3D Printed Shape Memory Polymer Composite for Fabric Actuation". Robot Makers Workshop at Robotics: Science and Systems (RSS), Michigan, USA. June 2016.

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.

Honors

Semifinalist, Hackaday Prize 2015	August 2015
UC San Diego Irwin Jacobs School of Engineering Fellowship (154k USD)	February 2015
Winner, Intel Internet of Things Hackathon, Berlin (1.5k EUR)	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

Teaching Experience

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.

Professional Activities and Service

Association of Robotics Graduate Students at UC San Diego
Co-founder and Co-organizer September 2016 - present

- Build multi-disciplinary community for graduate students to connect and learn about each others' work.
- Organize weekly seminar series consisting of both graduate students and industry guests. Secure funding for food from UCSD Graduate Student Association.

OpenWorm
Community Manager October 2015 - October 2016

- Volunteer coordinator for open source neuroscience project creating virtual simulation of C. elegans. Wrote Javascript-based form to improve subproject introductions for volunteers.
- Organized online series of OpenWorm Journal Clubs. Five archived YouTube videos with ∼1300 views.
- Advised by: Dr. Stephen Larson

Ad-hoc Journal/Conference Reviewer

- RAS, HRI, ICRA, IROS, RA-L.