Biqi Zhao

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EDUCATION

CARNEGIE MELLON UNIVERSITY, Pittsburgh, PA **Graduation Year: May 2018**

- Bachelor of Science in Electrical and Computer Engineering
- Additional Major in Biomedical Engineering
- Overall GPA: 4.0/4.0

RELEVANT COURSES

- Integrated Circuit: Microelectronic Circuits, Analog Integrated Circuits, Digital Integrated Circuit Design
- Signal/Image Processing: Digital Signal Processing, Computational Bio-modeling and Visualization
- Biomedical Engineering: Neural Technology-Sensing and stimulation, Biomedical Engineering Lab, Medical Devices

RESEARCH EXPERIENCE

SCENE RECOVERY USING POLARIZATION TECHNIQUE **PITTSBURGH, PA**

Advisor: Aswin Sankaranarayanan, CMU *Fall 2016 - Present*

- Design an algorithm for 3D scene reconstruction from 2D images for outdoor scenes
- Combine azimuth angle information from polarization with short-time photometric stereo to reconstruct surface normal of objects
- Run simulation, indoor experiment and real data experiments to test the reliability of algorithm

IMAGING WITH 60 GHZ MICROWAVE **PITTSBURGH, PA**

Advisor: Jeyannandh Paramesh, Aswin Sankaranarayanan, CMU *Summer 2017 - Present*

- Design a system that captures 3D scene with 60GHz microwave.
- Drive antennas with motion stage to scan objects and characterize magnitude and phase measurements of s-parameters with a vector network analyzer.
- Utilize AWR1642BOOST chip from Texas Instrument to conduct measurements

DESIGNING HIGH DENSITY EEG MEASUREMENT SYSTEM **PITTSBURGH, PA**

Advisor: Pulkit Grover, Shawn Kelly, Jeff Weldon, CMU *Fall 2015 – Spring 2016*

- Designed measurement electrodes on a non-invasive EEG cap that can accommodate 10,000 EEG probes while lowering surface impedance
- Tested spherical harmonics algorithm that processes data acquired from the dense EEG measurements

PROJECTS

MEDBOT2GO **PITTSBURGH, PA**

Advisor: Roberts Myer, website: https://www.youtube.com/watch?v=ORXf7_8lE4I *Fall 2016 – Spring 2017*

- Created a medication assistance device to reduce noncompliance with prescription medication
- Soldered pillbox receiver and wristband transmitter circuitry
- Programmed Bluetooth communication between Raspberry pi and Arduino and alarm system
- Programmed device website

DESIGNING NEURAL STIMULATOR WITH MODIFIED HOWLAND CIRCUIT **PITTSBURGH, PA**

Spring 2017

- Designed a neural stimulation circuit that generates digitally controlled biphasic current pulses
- Modified Howland Stimulator Circuit to generate pulses of self-defined duration and magnitude
- Programmed Arduino to control duration and polarity of pulse
- Tested circuit with SIROF electrode

PHANTOM ROBOARM (BUILD18) **PITTSBURGH, PA**

- Created an interface that allows a robotic arm to mimic human arm motion. *Spring 2016*
- Programmed Arduino to receive and process signal from EMG spiker shield, then send instructions to robotic arm
- Processed EMG data to classify arm behavior and instruct robotic arm to move accordingly

PROJECT LASER KEYBOARD (BUILD18) **PITTSBURGH, PA**

- Designed a portable keyboard that allows typing on a piece of paper. *Spring 2015*
- Wrote computer program to process real time video acquired from a video camera taping the motion on keyboard.
- Implemented image processing algorithm to locate the key being pressed

CARTOON SHOP (15-112 TERM PROJECT) **PITTSBURGH, PA**

Website: https://www.youtube.com/watch?v=2gwvTexDaIc *Fall 2014*

- Designed an application for image processing and cartoonization of human figures
- Implemented image processing algorithms
- Programed graphic interface of application

PRESENTATIONS

POSTER PRESENTATION *May 2017*

Meeting of the minds, Carnegie Mellon University

- Medbot2Go – Developed a medication assistance device to reduce noncompliance with prescription medication

PRESENTATION *May 2016*

Computational Bio-modeling and Visualization Course Project, Carnegie Mellon University

- Delaunay Triangulation and Voronoi Diagram and Applications-Implemented Delaunay Triangulation and Voronoi Diagram Algorithms; Studied literature on their applications

POSTER PRESENTATION *December 2015*

Biomedical Engineering Lab Literature Review, Carnegie Mellon University

- Developing Hydrogel-based Electrodes to Improve EEG Measurements-Studied literature on the benefits of hydrogel-based electrodes compared to other materials

WORK EXPERIENCE

SONY CORPORATION SYSTEM R&D GROUP **TOKYO, JAPAN**

Intern at Vision System Technology Development Department *Summer 2016*

- Implemented polarization based depth fusion algorithm
- Evaluated algorithm with Sony products

LEADERSHIP

PRESIDENT OF EAST END YOUTH PROJECTS *Spring 2017 - Fall 2017*

- Joined Higher Achievement to mentor middle school students on weekly basis
- Organized fundraising events such as bake sale and deliveries
- Facilitated the design of a computer science curriculum for middle school students and a pre-college program for high school students from under-served neighborhoods
- Arranged field trips for Higher Achievement scholars to Carnegie Mellon campus

TEACHING EXPERIENCE

EXCEL LEADER FOR 18-290 SIGNALS AND SYSTEMS *Fall 2016 - Spring 2017*

- Taught course content for Signals and Systems, the introductory signal processing course
- Focused EXCEL sessions on interactive learning as well as progressive knowledge acquisition
- Planned course material weekly
- Held midterm and final exam reviews

TEACHING ASSISTANT FOR 18-240 STRUCTURE AND DESIGN OF DIGITAL SYSTEMS *Spring 2017 – Fall 2017*

- Assist in lab sessions weekly to clarify concepts and help debug System Verilog programs
- Hold weekly office hours and grade homework and exams
- Teach recitations and exam reviews

TEACHING ASSISTANT FOR 18-220 ELECTRONIC DEVICES AND ANALOG CIRCUITS *Fall 2016*

- Assisted in lab sessions weekly to clarify concepts and help debug circuits
- Held weekly office hours
- Graded homework and exams

SKILLS

- Programming languages: Python, C, HTML, CSS, Javascript, SystemVerilog
- Software/Hardware: Matlab, Cadence Virtuoso, Arduino, Raspberry Pi
- Spoken Languages: Mandarin, English, Japanese, German, French

HONORS AND AWARDS

- Corporate Relations Coordinator of Eta Kappa Nu, Sigma Chapter *Spring 2017 – Present*
- College of Engineering Dean's List *Fall 2014 – Present*

REFERENCES

- Professor Aswin Sankaranarayanan, Electrical and Computer Engineering, Carnegie Mellon University
  (412) 268-1087, saswin@andrew.cmu.edu
- Professor Jeyanandh Paramesh, Electrical and Computer Engineering, Carnegie Mellon University
  (412) 268-1290, paramesh@ece.cmu.edu
- Professor Lawrence Pileggi, Electrical and Computer Engineering, Carnegie Mellon University
  (412) 268-6774, pileggi@andrew.cmu.edu
- Professor William Nace, Electrical and Computer Engineering, Carnegie Mellon University
  (412) 268-7207, wnace@cmu.edu