Alex Xu

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EDUCATION

Duke University, Pratt School of Engineering — Durham, NC
Bachelor of Science in Engineering (BSE) — Aug 2018 – May 2022
Majors: Electrical and Computer Engineering; Computer Science — *GPA: 3.78 / 4.0*
Certificate: Innovation and Entrepreneurship

RESEARCH EXPERIENCE

Intelligent Interactive Internet of Things (I^3T) Lab, Duke University — Durham, NC
Undergraduate Researcher - *Advisor: Dr. Maria Gorlatova* — Jan 2021 – Present

- Conducting research on user fatigue detection in head-mounted augmented reality (AR) via eye tracking metrics on the MagicLeap 1 platform. Investigating how to adapt AR content according to the cognitive state of the user.
- Implementing a user study to measure task performance and fatigue in a practical warehouse-like AR application.

Dig@Lab, Duke University — Durham, NC
Bass Connections Research Fellow - *Advisor: Dr. Maurizio Forte* — Aug 2019 – May 2021

- Developed an analysis technique/tool for visualizing 2.5D geospatial data collected from archaeological dig sites, enabling faster research workflows on-site (reducing time from hours to minutes).
- Demoed tool to researchers and public, using data from an Etruscan archaeological site at Vulci, Italy.

Ecophysiology Laboratory, Radford University — Radford, VA
Summer Research Intern - *Advisor: Dr. Jason Davis* — Jun 2016 – Aug 2016

- Designed, prototyped, and deployed computer-enabled, solar-powered bird feeders for ecological research.
- Used Fusion360, AutoCAD, 3D printing, and CNC milling to develop solutions for enclosures, waterproofing, and sensor integration. Enabled continuous remote/autonomous data collection not previously possible.

WORK EXPERIENCE

General Motors — Warren, MI
User Experience / Software Engineering Intern — May 2021 – Aug 2021

- Built features and conducted defect analysis for a voice assistant app on Android Automotive OS (Java).
- Performed infotainment hardware/software system testing, with focus on vehicle UX and human factors.

Hardware Product Engineering Intern — Jun 2020 – Aug 2020

- Designed state machines and memory usage (under tight constraints) for vehicle ambient lighting UX features.
- Translated customer feature requests to engineering requirements for an ECU module by analyzing 200+ SAE J1939 serial signals and preparing proposals for new signal specifications to SAE (Society of Automotive Engineers).
- Led collaboration with Design, Program, and Manufacturing stakeholders for technology roadmap consensus.

TEACHING EXPERIENCE

Undergraduate Teaching Assistant, Duke University — Durham, NC
ECE 250: Computer Architecture — Summer, Fall 2020

- Led recitation sections, produced course review content, participated in the design of and graded homework.

EGR 101: Engineering Design and Communication — Fall 2019

- Instructed mechanical, electrical, and software prototyping & documentation methods for student project teams.

PUBLICATIONS

The PASSER Project: Development of Micro-computer Enabled Feeders and Nest Boxes for Songbird Ecobehavioral Research. Philson, C.S., **Xu, A.**, Ellery, M., Ray, A., Foltz, S. L., and Davis, J.E. *Proceedings of SICB 2017 (Society for Integrative and Comparative Biology).* New Orleans, LA, Jan 4 – 6, 2017, P2-132.

CAMPUS LEADERSHIP

President, Duke Academy of Model Aeronautics Aug 2019 – May 2021

- Founded a team of 20+ students competing in the AUVSI Student Unmanned Aerial Systems competition.
- Secured $15k in annual funding by preparing and presenting proposals to university and alumni stakeholders.

Associate Editor, DukEngineer Magazine Aug 2018 – May 2020

- Author of an article in 2019 edition and curated content as member of the editorial team for 2020 edition.

ACTIVITIES

- **Scholar**, 2021 Google Computer Science Research Mentorship Program (CSRMP)
- **Conference Scholarship Recipient,** IEEE VR 2021 Conference Bridge-To-VR Program
- **Volunteer IoT Program Coordinator,** U.S. Department of State, Virtual Student Federal Service (VSFS) Program
- **Workshop speaker,** Duke University CS Students Union Winter Series 2021. Talk: "Design of Human Interfaces"

AWARDS

- **Finalist,** 2021 Verizon and Clinton Global Initiative University Social Innovation Competition
- **Wolfram Award and Best Inequality Track Hack Award**, HackDuke 2020: Code for Good Hackathon
- **Mastercard Award for Best Data Analytics Hack**, HackDuke 2019: Code for Good Hackathon

SELECT PROJECTS

Rainforest XPRIZE Software UI – Independent Study Project – *Advisor: Dr. Martin Brooke*

- Developed a software user interface (UI) to pilot Parrot ANAFI drones through a forest environment.
- Wrote code to integrate Parrot SDK with custom UI design. Tested for functionality and human factors, first in a simulated Gazebo-based environment and then on Parrot ANAFI drones.

Aye-aye Lemur Enrichment Feeder – *Client: Duke University Lemur Center – Advisor: Dr. Nan Jokerst*

- Developed a novel enrichment "puzzle" feeder system that adapts to Aye-aye lemur foraging behavior.
- Reduced material waste by >70% and workload performed by animal technicians by ~50%.

Timeturner – Human-Centered Computing Course Final Project

- Designed and built a tangible user interface (consumer electronics device) for time management, following principles of human-centered design, from need-finding and usability studies to prototyping using 3D printing, sensors, and microcontrollers.

ADWatch – Affective Computing Course Final Project

- Researched and designed a wearable device + mobile app for caretakers of Alzheimer's disease patients, guided by affective computing principles. Prototyped concept using EmotiBit platform and wrote an ACM-style report.

Stepper Motor Music Player – Digital Systems Course Final Project

- Fully designed, implemented, and built a music player based on stepper motor resonances, consisting of a 32-bit fully pipelined MIPS processor, motor driver circuit, and digital I/O, using Verilog and Xilinx FPGA board.

SKILLS & INTERESTS

Select Coursework: Engineering Design, Software Design & Implementation, Data Structures & Algorithms, Computer Architecture, Network Architecture, Digital Systems, Embedded Systems Design, Human-Centered Computing, Affective Computing, Probability & Statistical Learning, Data Analysis, Brand Design, Building a Successful Enterprise

Skills: Software & physical/hardware prototyping, programming (Java, Python, C, MATLAB), embedded systems, FPGA, electronics, CAD, CAM, research, user studies, agile/scrum

Interests: Human-computer interaction/interfaces, spatial & tangible computing, consumer products, user experience, accessibility, sustainability