Stefany Cruz

2145 Sheridan Road, Evanston, IL 60208

🌐 www.stefanylcruz.com   ✉ stefanycruz2024@u.northwestern.edu

RESEARCH INTERESTS

My research focuses on democratizing wearable technologies by developing and co-designing inclusive wearables with and for marginalized groups. I work at the intersection of hardware systems and human-computer interaction to explore how we can build equitable, efficient, and intelligent wearable systems.

EDUCATION

Northwestern University   **Evanston, IL**
PhD. Computer Engineering   *September 2019 - Present*
Advisor: Josiah Hester

Northwestern University   **Evanston, IL**
M.S. Computer Engineering   *June 2022*

University of California, Riverside   **Riverside, CA**
B.S. Electrical Engineering   *June 2019*

Pasadena City College   **Pasadena, CA**
A.S. Mathematics, A.S. Physics, A.A Engineering and Technology   *May 2016*

AWARDS

Social Justice Mini-Grant, $2,500, 2022
Supported by Northwestern University's Office of Diversity and Inclusion

Microsoft Research Ada Lovelace Fellowship, 2021
Supported by Microsoft Research

CRA-WP Grad Cohort for Women Workshop, 2020 (Postponded to 2021 due to Covid-19)

CRA-WP Grad Cohort for URMD Workshop, 2020

NSF SenSys/BuildSys Student Travel Grant, 2019

GEM PhD Fellowship, National Gem Consortium, 2019
Sponsored by Lexmark International, Inc. and Northwestern University

National Science Foundation ECCS Research Grant, $5,000, 2017
University of California, Riverside

Hispanic Serving Institute Summer Bridge Research Grant, $5,000, 2016
University of California, Riverside

MESA Pasadena Student Achievement Award, $1,000, June 2016
Pasadena City College

Student Achievement Award, $500, May 2016
Department of Computer Science and Mathematics, Pasadena City College

PUBLICATIONS

BFree: Enabling Battery-free Sensor Prototyping with Python
Vito Kortbeek, Abu Bakar, **Stefany Cruz**, Kasım Sinan Yıldırım, Przemysław Pawełczak, Josiah Hester
ACM Conference on Pervasive and Ubiquitous Computing (UbiComp'21) Published in PACM IMWUT, Volume 4, Issue 4

SmokeMon: Unobtrusive Wearable for Measuring Smoking Topography (*Accepted Minor Revisions*)
Rawan Alharbi, Lingfeng Li, **Stefany Cruz**, Sougata Sen, Bonnie Spring, Aggelos Katsaggelos, Josiah Hester,

Nabil Alshurafa
EquityWare: Co-Designing Wearables With And For Low Income Communities (*Under review*)
Stefany Cruz, Alexander Redding, Connie Chau, Claire Lu, Julia Persche, Josiah Hester, Maia Jacobs.

RESEARCH PROJECTS

En-Badge   **July 2021 - present**
Northwestern University   *Evanston, IL*

Building a re-configurable low-cost, low-energy wearable device co-designed with and for low-SES communities.

Equityware   **July 2021 - April 2022**
Northwestern University   *Evanston, IL*

Designed and deployed a qualitative research study to understand and Co-design wearables with and for minority low-SES communities. I conducted semi-structured interviews with 19 participants, performed open coding on over 20 hours of audio transcripts, and distilled common themes on perceived useful features and barriers that prevent the adoption of wearables amongst minority low-SES communities.

SmokeMon: Unobtrusive Wearable for Measuring Smoking Topography   **December 2020 - Present**
Northwestern University   *Evanston, IL*

Developed a low-power, low-cost prototype for a wearable device that measures smoking topography. SmokeMon is intended to assist with the difficulties of smoking addiction.

BFree   **July 2019 - December 2020**
Northwestern University   *Evanston, IL*

Developed firmware to re-design Circuit Python (a fork of Micro-python). The purpose is to make the Circuit Python platform resilient to power failures, useful for energy harvesting applications, and simplifying the ease of the platform so that it can be more "maker - friendly" to reach a wider audience.

WORK EXPERIENCE

R&D Electrical Systems Engineering Intern   **June 2018 - August 2018**
Applied Medical   *Rancho Santa Margarita, CA*

- Tested and wrote scripts for Altera Cyclone V FPGA boards that were implemented on the Voyant 2 Electro Surgical Generator.
- Learned to use Quartus Prime for validating and debugging Altera Cyclone V FPGA code.
- Learned to use state of the art lab equipment for hardware system validations.
- Tested, trouble shot, and validated product functionality and ensured coverage of various test cases for the Voyant 2 PCB/PCBA's Feed Back System, Primary Microcontroller, and Housekeeping Power Supply.
- Created and assisted in writing and reviewing validation test plans.

Undergraduate Researcher   **August 2017 - December 2017**
University of California, Riverside - Department of Electrical Engineering   *Riverside, CA*

- Built and programmed crazyflie 2.0 Nano quadcopters using the ROS environment.
- Researched and learned to configure the crazyflie's firmware and loco positioning nodes to calibrate anchors for the loco positioning system used around the lab's room.
- Programmed the crazyflie radio and PS4 gamepad for flight control.
- Became familiarized with UWB technology and the DWM 1000 sensor module mounted on the loco positioning deck for precision real time location using two way ranging. This was later supposed to be used for crazyflie's autonomous flight mode.

Undergraduate Researcher   **June 2016 - August 2016**
University of California, Riverside - Department of Bioengineering   *Riverside, CA*

- Programmed Atmel Attiny84 microcontrollers to use Pulse Width Modulation to control servomotors.
- The servomotors acted as gauges to measure either temperature or speed on various 3D printed Lego like scientific instruments called MEC's (Multidisciplinary Evolutionary Components). http://evolutionarycomponents.org/
- Learned Solid Works to develop new components for the MEC system and STL to 3D print the components.
- Self-learned how to use the I2C system protocol between the software and the hardware of the MEC system library.

INVITED TALKS/PRESENTATIONS

"Co-Designing wearables with and for Low-SES communities"   **Evanston, IL**
Lambert Conference on the Future of Human-Computer Interaction + Design   *October 24, 2022*

"Research in STEM as a Career"   **Virtual**
Microsoft Research Conversations in STEM (Moderator)   *February 11, 2021*

"Expanding the SMART MEC System Library Using Pulse Width Modulation"   **Riverside, CA**
HSI Summer Bridge to Research Presentation at UCR   *August 20, 2016*

TEACHING EXPERIENCE

Department of Computer Science at Pasadena City College   **Pasadena, CA**
Teaching Assistant   *January 2016 - June 2016*
Graded coding assignments, quizzes, and exams for Professor Jamal Ashraf's Intro to C++ programming class (CS2). Provided feedback to help students succeed in the class.

She.Codes club at Pasadena City College   **Pasadena, CA**
She.Codes Officer Lecturer   *September 2015 - May 2016*
Developed C++ and Python workshops and collaborated with other board members to provide Arduino and Rasberry Pi project workshops

Math Resource Center at Pasadena City College   **Pasadena, CA**
Math Tutor   *May 2014 - June 2016*
Tutored Mathematics ranging from Numerical foundations, Algebra, Trigonometry, Calculus, Linear Algebra, and Differential Equations

LEADERSHIP and INVOLVEMENT

Co-President   **September 2021 - Present**
Graduate Women in Computing   *Northwestern University*
The Graduate Women in Computing (GWiC) is an organization with the goal of creating a support network for women and gender minorities at Northwestern University's CS and CS related departments.

Treasurer   **June 2017 - June 2018**
IEEE UCR Student Branch   *University of California, Riverside*
I was elected to be the treasurer of the IEEE UCR student branch for having strong communication skills as well as having the ability to multi-task and work in high stress environments. My responsibilities consisted of managing the finance records and transactions, allocating a budget of more than $12,000 annually for 15 board members, 4 technical projects, and quarterly technical workshops, and mentored undergraduate EECS students.

Secretary/Coordinator/Event Planner   **April 2015 - May 2016**
She.Codes Club   *Pasadena City College*
I helped co-found a student organization to encourage women to pursue Computer Science and related STEM fields. I developed C++ and Python workshops and collaborated with other board members to provide Arduino and Rasberry Pi project workshops. I also coordinated with industry professionals to come on campus and give guest lectures at annual events. Furthermore, I planned, advertised, and executed the annual She.Codes conference to introduce students to professionals and enable networking.

UNDERGRADUATE MENTORING

Northwestern University
Derya Kitis, Ka Moamoa Lab, Summer 2019, Product Manager at Defne
Alexander Redding, Ka Moamoa Lab, 2021 - 2022, Ph.D. Student at UC San Diego
Alexander Ross, Ka Moamoa Lab, 2021 - 2022, Electronics Engineer at Gerresheimer
Claire LU, Ka Moamoa Lab, 2021 -present, Currently at Northwestern University
Denise Sanchez, Communidad Latinx, 2022 - present, Currently at Northwestern University
University of California, Riverside

Justin Lam, IEEE UCR Student Branch, 2017 - 2019, Systems Engineer at AMD
Gilberto Peraza, IEEE UCR Student Branch, 2017 - 2019, Liu Research Group at UCR
Angela Mangalit, IEEE UCR Student Branch, 2018 - 2019, Software Test Engineer at Illumina
Trinh Nguyen, IEEE UCR Student Branch, 2018 - 2019, Systems Integration Engineer at Illumina
Marcus Yee, IEEE UCR Student Branch, 2018 - 2019, Systems Validation Engineer at Microchip Technology

Technical Skills

o General: System Programming, PCB Development, Testing/Debugging
o Languages: C, Embedded C, C++, Python, Verilog, VHDL, Assembly, GDB.
o Hardware: Arm Cortex-M microprocessors, Atmel AVR microcontrollers, STM32, MSP430,FPGA.
o Software: Solid Works, Fusion 360, MATLAB/Simulink, Open CV, Processing, Unity, Anaconda for AI/ML, Eagle PCB, Cadence.
o Lab equipment: Oscilloscope, Logic Analyzer, Function Generator, Digital Multi Meter, 3-D printing, Soldering, CNC Machining.