Albert Armea

resume@albertarmea.com · github.com/aarmea

Work

454 Bio – Software and Electrical Engineering Consultant   *Guilford, CT; July 2023 – January 2024*

- Developed embedded camera control software from scratch in C++ 17 and Python for purpose-built microscope cameras and inexpensive bare sensors like the Raspberry Pi HQ camera to automatically collect and analyze data for DNA sequencing.
- Implemented the ability to arbitrarily start and stop camera exposures at any time by reverse engineering the sensors' undocumented vertical sync functionality and reworking PCBs.
- Integrated application-specific features such as synchronized LED flashes, PID temperature control, automatic filter selection, and focus assistance as requested by biochemical engineers.
- Designed and assembled hardware as needed for these goals, including a custom motor controller, level shifters, and an ADC circuit for a temperature sensor.
- Completely revamped the website as the company pivoted to release its procedures, hardware, and software as open source.

Butterfly Network – Senior Software Engineer   *Guilford, CT; May 2018 – August 2022*

- Developed complete systems, including custom test programs in C++ 17 and Python, computer systems, and hardware fixtures to ensure the effectiveness of MEMS ultrasound transducers, PCBs, and assembled probes at contract manufacturing sites.
- Greatly improved production yield by implementing calibration storage in firmware and the iOS and Android apps, which enables correction of CMOS and transducer imperfections in software.
- Worked cross-functionally with hardware teams including electrical, mechanical, FPGA, and semiconductor engineers towards these goals.
- Simplified deployment of test programs to Linux systems and protected proprietary information by implementing their distribution using the AppImage format.
- Added end-to-end testing of imaging, probe configuration, and firmware upgrades to the continuous integration pipeline with a custom software and hardware test harness that integrates iPhones and ultrasound probes.
- Ensured FDA compliance over time by implementing continuous monitoring of probe health by adding logging to the firmware and iOS and Android apps, which includes generalized device usage, battery statistics, and self-diagnostic tests.

Microsoft – Software Engineer   *Redmond, WA; July 2014 – November 2017*

- Improved the accessibility of Word, Outlook, and Windows 10 Mail by implementing adjustable text scaling, populating the tree used by screen readers, and fixing issues in high contrast modes.
- Made images more usable by automatically shrinking large images in received emails and providing scaling options for inserted images when composing an email.

Google – Software Engineering Intern   *Mountain View, CA; June 2013 – August 2013*

- Extended APIs to an internal version control system, providing a unified way to view and manage changelists. These APIs are used to test and search Google's codebase.

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Education

Rensselaer Polytechnic Institute   *Troy, NY; August 2011 – May 2014*

- Bachelor of Science in Computer Science *cum laude*
- Computer Science GPA: 3.72 / 4.0 · Cumulative GPA: 3.56 / 4.0

Projects

/u/alternate-source-bot   *January 2018 – October 2021*

- Wrote a Reddit bot in Python that scraped and analyzed news articles to mitigate the spread of biased and misleading articles online by responding to news posts with the relevant context. The intent was to pop filter bubbles and encourage discussion about what constitutes good coverage.

Noise   *January 2017 – May 2018*

- Developed a completely peer-to-peer and infrastructure-free messaging protocol and proof-of-concept Android app to enable communication when an Internet connection is unavailable using automatically paired Bluetooth connections in the background.
- The protocol is resilient to adverse conditions by using epidemic routing to ensure eventual message delivery, proof-of-work to mitigate spam, and end-to-end encryption to prevent eavesdropping.

Painting Sound   *July 2016*

- Drove development of an award-winning proof-of-concept AR Microsoft HoloLens app that allows the hearing-impaired to visualize sound.
- Prototyped a custom tetrahedral microphone that mounts to and communicates with the HoloLens.
- Implemented signal processing algorithms in C++ to locate sounds in 3D space using this microphone, which the app uses to place visualizations in mixed reality.

Awards

Microsoft, OneWeek Hackathon HoloHack First Place Winner   *July 2016*

Rensselaer Polytechnic Institute, Dean's List   *Fall 2011 – Spring 2014*

Skills

Programming Languages: C, C++, Python, Java, Kotlin, Swift, Objective-C

Frameworks: Linux, Windows (Win32 and UWP), macOS, iOS, Android, Qt

Rapid prototyping: CAD in Fusion 360 and SolidWorks, 3D printing, laser cutting

Electronics: Digital circuits, PCB debugging and rework, soldering, firmware programming