Robert Brothers

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Profile

A mechanical engineer with over 2 years of professional experience developing the electro-mechanical hardware for medical devices and data analysis software in support of biomedical research. I love solving the hardest problems by creating elegant and simple solutions which has earned me the title **The Maker** amoungst my team.

- Extensive knowledge of C & C++ with years of experience developing for a variety of applications.
- Experience developing embedded systems with integrated AVR 8-bit microcontrollers for analog and digital sensing.
- Efficient development Python programs with tight turn-around
- Advanced-level knowledge of MATLAB with experience developing apps and GUIs

Technical Skills

Prototyping: Breadboarding, LPKF Protomat S104, Voltera, Board Bring-up

Embedded dev: Circuit prototyping, ISP & JTAG debugging

Tools: Oscilloscope, Logic analyzer, Multimeter, Power supply, Function generator

Languages: C & C++, Python, Matlab, Shell Script, LaTeX

Developer Tools: ATMEL Studio, VSCode, avr-libc, AVR Tool Chain, Anaconda

Work Experience

Leidos | *Research Engineer II* — **Nov 2019 - Current**

San Antonio, Tx

As a Research Engineer I provide support to the Naval Medical Research Unit(NAMRU) as a contractor through Leidos for the research, development, testing, and evaluation addressing various aspects of military medicine, such as improving the diagnoses, treatment, and prevention of combat casualties and oral/dental/craniofacial diseases.

- **ELECTROMAGNET CONTROL BOARD**: Significantly improved safety and user experience of electromagnet by developing a control board from the ground up with an embedded microcontroller and programmed in C using the avr-libc library to accept user input via button presses, indicate it's state by coordinating LED I/O, and automatically shut off when high temperatures are detected. — **Mar 2020 - Feb 2021**

  Skills Applied: Board Bring-up | PCB Design | Embedded Systems | ATMEL AVR μ-controller | C Programming | SPI

- **MEDICAL MONITOR INTERFACE & DATA LOGGING**: Saved client over $20,000 in software cost, 2 weeks of delay, and improved the resolution of logged data from 1 sample/min to 1 sample/sec by using Python to develop a real-time data logging software that transmits requests to a server via UART then parses and logs the response. — **Apr - May 2021**

  Skills Applied: Python | UART | Matlab | Data Collection & Analysis

- **MATLAB DATA PROCESSING APP**: Upgraded an existing Matlab GUIDE application to Matlab's App Designer, creating a streamlined user experience as well as adding features for video processing and analysis including a number of video stabilization algorithms, Fourier video analysis, Variance, and low pass filtering. Fixed a number of persistent bugs in the application that would cause the program to crash. — **Apr - May 2021**

  Skills Applied: Matlab | Matlab App Designer | Image & Video Processing

UTSA | *Engineering Project Lead Intern* — **Aug 2019 - Nov 2019**

San Antonio, Tx

As an Engineering Project Lead Intern, I led the research and development of biomedical devices which integrated sensors of multiple types to aid emergency medical technicians in the correct placement of endotracheal tube.

- **DESIGN OF A DATA ACQUISITION BOARD**: Developed a reliable, compact, and low-cost method of sensing and inferring tissue type from subtle variances in light intensity using basic circuit design principles, various analytical and verification techniques and tools, Eagle and JLCPCB, and ARM-based C-Programmable microcontrollers. — **Aug - Oct 2019**

  Skills Applied: Eagle | Circuit Design | Board Bring-Up | Arduino | Oscilloscope | Signal Processing | C Programming

- **DESIGN OF LOW-COST CAPNOGRAPH**: Prototyped a low-cost endotracheal tube with an integrated carbon dioxide sensor saving the research team $1800 per unit using Fusion360 and an Ultimaker FDM 3D printer. These savings led to the research team hiring an additional undergraduate research assistant. — **Aug - Sep 2019**

  Skills Applied: Python | Arduino | Fusion360 | 3D Printing

Education

University of Texas at San Antonio — **December 2018**
Masters of Science in Mechanical Engineering — *San Antonio, Tx*

University of Texas at San Antonio — **May 2015**
Bachelors of Science in Mechanical Engineering — *San Antonio, Tx*

University of Texas at San Antonio — **May 2015**
Bachelors of Science in Chemistry — *San Antonio, Tx*