

## Overview

Engineer applying software, signal processing, and machine learning experience to real-time systems. Featured industry projects include a mm-wave scanner for concealed weapon detection and an embedded stereo camera for people tracking in retail applications. As a research engineer at USC, I prototyped real-time vision systems. My embedded development experience spans the linux kernel and drivers, automated mfg testing, and application software but primarily focuses on efficient algorithm development and image processing. I currently offer my services as a consultant to a small number of tech startups.

## Education

The Georgia Institute of Technology:	MS in Electrical and Computer Engineering	2014
Western Carolina University:	BS in Electrical Engineering	2009
( <i>magna cum laude</i> )	BS in Applied Mathematics	

## Professional Experience

### **Computational Modeling and Software Services, LLC** (*Owner*) 2020-Present

Helping startup tech businesses implement solutions to complex computational problems requiring automated decision making from real time data streams. As a consultant, I offer assistance on the full pipeline of real time system software design including hardware interfacing, data acquisition and processing, machine learning techniques, and system deployment at scale.

### **USC Information Sciences Institute** (*Lead Research Engineer*) 2020-2023

Lead engineer of several projects in the Visual Intelligence and Multimedia Analytics Laboratory (VIMAL). This is a small research team working on machine learning techniques for biometric security and fraud detection in images and video. The role involves a myriad of engineering tasks focused on developing sensor platforms for deploying the machine learning algorithms in a real-time environment. Responsibilities include software architecture, computational optimizations, data acquisition from multiple sensing modalities, sensor hardware prototyping (some circuit design and CAD of a 3D printed housing), and data collection design and operation. The position also requires writing proposals for large research grants and designing IRB approved human subject research trials.

### **Liberty Defense Technologies, Inc.** (*Sr. Software Engineer*) 2019-2020

Software architect of real-time microwave imaging system for concealed weapon detection. The position was mainly responsible for reconstructing and processing images from data given by a short range mm wave radar transceiver. This required integration of several hardware components including a stereo camera used to locate subjects in the scene. To achieve a real-time frame rate, many of the algorithms were written using CUDA to parallelize processing on an onboard Nvidia GPU. Other responsibilities included implementing fast algorithms for person/object segmentation, triggering captures and other timing between camera and microwave images, and generating training data for object detection models.

### **FLIR Systems, Inc.** (*Software Engineer*) 2015-2019

Firmware/software development of embedded stereo cameras for people tracking in a retail environment. Application areas include: image processing, traffic counting, employee/customer classification using vision and inertial sensor data fusion, BLE beacon advertising. Designed automated mfg. processes (e.g. HW functionality testing, focusing and calibration of stereo lenses) to optimize product scalability.

### **TekTone Sound and Signal Mfg., Inc.** (*Hardware Engineer*) 2010-2013

Designed embedded hardware for nurse call products deployed in hospitals and assisted living facilities. Designed the first UL listed wireless nurse call system.

## Teaching Experience

The Georgia Institute of Technology	Circuit Analysis (ECE2040)	2013-2014
Teaching Assistant	TESSAL (Teaching Enhancement via Small Scale Affordable Labs) Center	
	Fundamentals of Digital System Design (ECE2020)	

# Software Tools

Languages: C, C++, Python  
Tools and Utilities: MATLAB, CUDA, TensorFlow, PyTorch, OpenCV, Docker, Git, Subversion, Package Managers (opkg, dpkg, pacman), Neovim, Visual Studio, Qt, L<sup>A</sup>T<sub>E</sub>X, PADS PCB Layout, OrCAD Schematic Capture, Fusion 360  
Operating Systems: Microsoft Windows, Linux

# Publications

M. Woldeyohannes, J. Schenk, R. Ingel, S. Rigdon, M. Pate, J. Graham, M. Clare, W. Yang, M. Fiddy, “Internal Field Distribution Measurement in 1-D Strongly Anisotropic Sub-Wavelength Periodic Structures of Finite Length,” Optics Express Vol. 19, Issue 1 (Jan. 3, 2011) pp: 81-92.

# Presentations

“Integration of Vision and BLE Transmissions for Employee Recognition,” FLIR Research Symposium, FLIR Systems, Inc. 2018  
“Enormous Field Enhancement in Periodic Birefringent Media,” National Conference of Undergraduate Research, University of Wisconsin, LaCrosse 2009  
“Analysis of Force Controlled Arm Movement,” Undergraduate Expo, Western Carolina University 2009

# Honors and Awards

President’s Fellowship Recipient, The Georgia Institute of Technology 2013  
Most Outstanding Senior in Electrical Engineering, Western Carolina University 2009  
Freshman Math Award, Western Carolina University 2005