Jacob **Holtom**

Electrical Engineer

Phoenix, Arizona 85044

703-867-1010 | jacob@holtom.me | www.holtom.me | jholtom | jholtom | Jacob Holtom

Work Experience

DASH Tech Integrated Circuits
Phoenix, Arizona

Chief Systems Engineer
May 2023 - PRESENT

- Lead software embedded software engineering team and implementation for novel heterogenous system on chip
- Develop novel optically-enabled distributed coherenct concepts, algorithms and implementations

Center for Wireless Information Systems and Computation Architectures
Arizona State University, Tempe, Arizona

Graduate Research Assitant
Oct 2019 - Apr 2023

- Develop novel distributed beamforming algorithms and implement real-time over-the-air on software defined radio systems
- Demonstrate performance approaching the theoretical limit for distributed-coherent SNR gain and show first-known distributed-coherent relay interference rejection capability using off the shelf software defined radios
- Develop WISCANet Software Defined Radio Network with advanced MIMO and phase coherent capabilities
- Develop Adaptive Waveform Toolkit for real-time flexible waveform employment
- Implement 5G technologies in a lab environment and on a custom domain specific heterogenous SoC
- Develop Radar and Communications DSP Algorithm Corpus for DASH-SoC

Artemis Inc
Spanish Fork, Utah

RADAR Engineering Intern
Apr 2019 - Aug 2019

- Evaluate and develop autofocus algorithms for Stripmap SAR using Time-Domain Backprojection
- Explore and develop combined radar and communications waveforms
- Develop machine learning models for SIGINT
- Develop direction finding algorithms for cooperative use on Software Defined Radar

BYU Spacecraft Group
Provo, Utah

Lead Communications Engineer
Apr 2016 - Apr 2019

- Oversee twin satellites that flew in Sept 2019
- Design an end-to-end satellite communications system within technical constraints
- Lead RF engineering work including the design of dish and on-board antennas and amplifier systems
- Develop custom ground station system that utilizes an Ettus USRP and GNURadio

L-3 Communication Systems West
Salt Lake City, Utah

RF Engineer
Jan 2018 - Sep 2018

- Design RF hardware for mission critical systems
- Test and debug RF hardware
- Work in team and follow standard engineering process

BYU Computer Aided Engineering Design and Manufacturing
Provo, Utah

Assistant Systems Administrator
Nov 2015 - Jan 2018

- Developed Linux infrastructure to maintain storage, enable authentication and enhance the user experience
- Migrated to a new LDAP cluster and schema using SaltStack
- Implemented MIT Kerberos in the environment using SaltStack

SolvereOne and HouseCall IT
Dulles, Virginia and Washington D.C.

Systems Administrator
Jun 2013 - Oct 2015

- Maintained and designed secure network deployments
- Deployed and maintained Windows user and application systems
- Managed Linux administration

Education

Arizona State University
Tempe, Arizona

Ph.D. in Electrical Engineering
Aug 2019 - Apr 2023

- Dissertation: Distributed Coherent Mesh Beamforming: Algorithms and Implementation

Brigham Young University *Provo, Utah*

B.S. in Electrical Engineering *Sep 2015 - Apr 2019*

- Math Minor

Thomas Jefferson High School for Science and Technology *Alexandria, Virginia*

High School Advanced Studies Diploma *Sep 2011 - Jun 2015*

- Designed custom NFC System for Senior Research Project
- Ranked number one high school in the United States

Projects

Software Defined Radio Network

WISCANet *CURRENT*

- Develop and Maintain advanced Software Defined Radio Network
- Enable rapid over-the-air algorithm development and demonstration

Low SWaP Cubesatellite Radio

Phoenix/Elysium Radio *CURRENT*

- Continuing developing of low size, weight and power cubesatellite radio
- Designing high performance radio supporting spread spectrum communication
- Compatible with many existing protocols and communication implementations

IEEE AP-S Conference 2019 *Atlanta, Georgia*

IEEE AP-S Student Design Contest *Sept 2018 - July 2019*

- Designed low-cost FMCW Radar system for use with Raspberry Pi
- Designed system for use as a class-room demonstration of antenna properties
- Open-sourced design and code for further development and exploration
- Accepted as one of the top 6 finalists in international competition

CCSDS Kernel Driver

Linux Address Family *Jul 2017*

- Designed and implemented Linux kernel address family that adds CCSDS Space Packet Protocol support

Publications and Patents

2022	**WISCANet: A Rapid Development Platform for Beyond 5G and 6G Radio System Prototyping**, MDPI Signals	*Special Issue*
2022	**Respiratory and Heart Rate Detection using Continuous-Wave Radar Testbed Implemented in GNU Radio**, GNU Radio Conference 7	*Washington, DC*
2022	**GNU Radio and CEDR: Runtime Scheduling of Heterogenous Accelerators**, GNU Radio Conference 7	*Washington, DC*
2022	**Multi-stage Distributed Beamforming for Distributed Mosaic Wireless Networks**, 17/688,383	*US Patent Pending*
2021	**Rapid Implementation and Demonstration of Radio Applications Using WISCANet**, IEEE International Symposium on Personal, Indoor and Mobile Radio Communications	*Virtual*
2021	**Cardiac and respiratory sensing from a hovering UAV radar platform**, IEEE Statistical Signal Processing Workshop (SSP)	*Virtual*
2021	**Distributed Beamforming Techniques for Flexible Communications Networks**, 55th Asilomar Conference on Signals, Systems, and Computers	*Asilomar, CA*
2019	**Passive CubeSats for remote inspection of space vehicles**, Journal of Applied Remote Sensing	
2018	**Femtosats: Elegant Flight Telemetry for Model Rockets**, International Telemetry Conference	*Glendale, Arizona*