

# Kirk R. Busche

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## EDUCATION:

### Master of Science in Electrical and Computer Engineering

University of Illinois Urbana-Champaign

GPA: 3.94

Thesis: *Frequency-Modulated Continuous-Wave Radar Processing Fundamentals*

Adviser: Professor Minh Do

Relevant Coursework: Pattern Recognition, Digital Signal Processing II, Vector Space Signal Processing, Topics in Image Processing, Random Processes, Optimization for Computer Vision, Digital Imaging

August 2016 - December 2019

College of Engineering

### Bachelor of Electrical Engineering

University of Minnesota-Twin Cities

Honors: Summa Cum Laude with High Distinction

September 2012 - May 2016

College of Science and Engineering

## SKILLS:

Python with TensorFlow and Keras experience, OpenCV, MATLAB, ROS, Microsoft Office Suite, L<sup>A</sup>T<sub>E</sub>X, Linux/Ubuntu, git, svn

## RESEARCH EXPERIENCE:

### Frequency-Modulated Continuous-Wave Radar (UIUC)

November 2017 - December 2019

- Investigated Frequency-Modulated Continuous-Wave (FMCW) radar chirp parameters using Texas Instruments mmWave platform for raw ADC data collection

### Small Target Detection and Background Estimation (UIUC)

October 2018 - December 2019

- Worked with Professor Minh Do and collaborators at Sandia National Laboratories to investigate unsupervised background estimation methods for video sequences with small, low-resolution targets (e.g. satellite video)

### Video Segmentation (UIUC)

January 2017 - September 2017

- Worked with Professor Minh Do to develop online, unsupervised video object segmentation algorithm for the DAVIS dataset using clustering of dense optical flow (partnership with Sandia National Laboratories)

## PRIOR WORK EXPERIENCE

### Graduate Student Intern (Sandia National Laboratories)

September 2018 - December 2019

- Developed preliminary precision-recall using synthesized transient event data for a cloud-based detection pipeline

### Graduate Student in Critical Systems Department (Southwest Research Institute)

May 2017 - August 2018

- Trained and tested convolutional neural networks for methane leak detection and segmentation to be implemented on an embedded platform and investigated the use of computer vision features for flow rate quantification
- Implemented a parallelized data simulator from MATLAB code in Python to generate datasets
- Developed algorithms for predicting anomalous events in high dimensional, multi-sensor time series data

### Research Assistant (UIUC)

August 2017 - December 2019

### Introduction to Electronics Lab Teaching Assistant (UIUC)

August 2016 - December 2017

## AWARDS

- Qualcomm Innovation Fellowship 2018 Finalist