

# Kiron Mateti, Ph.D.

Versatile self-starter with a growth mindset, passion for automation, strong background in robotics and perception, and track record of implementing high level algorithms on production hardware

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U.S. Citizen (Male)  
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## Summary of Qualifications

- 5 years experience developing perception software for industrial automated guided vehicle applications in C++ using Lean-Agile methodologies
  - Strong academic background in probability and stochastic processes, vehicle kinematics and dynamics, robotic coordinate frames, and state space control and estimation
  - Experience using ROS, and Python to rapid prototype algorithms and visualize point clouds using depth cameras and LIDARs to accelerate solutions for production
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## Experience

### Lead Perception Engineer

January 2021 - Present

*John Bean Technologies, Automated Guided Vehicles, Chalfont, PA*

- Focused on algorithm design, C++ implementation, and production deployment of perception software using the Intel RealSense family of depth cameras and LIDARs
- Developed automatic extrinsic calibration, object detection, feature-based guidance, and product locating software using 2D LIDARs and depth cameras
- Integrated depth camera perception software running on Linux, using ROS, and RViz to visualize algorithm output

### Research and Development Engineer

January 2017 - December 2020

*John Bean Technologies, Automated Guided Vehicles, Chalfont, PA*

- Developed automated guided vehicle software in C++ with a talented team in a Lean-Agile type workflow using Git, JIRA, and Confluence
- Performed root cause analysis for vehicle error conditions, product placement accuracy, and operation throughput using Matlab and Python
- Modeled and simulated dynamics and control of forklift vehicles for lateral and longitudinal control, and pitch over stability

### Research Scientist

June 2012 - January 2017

*US Navy, Naval Surface Warfare Center (NSWC), Crane, IN*

- Developed fusion video tracking software using Matlab Computer Vision Toolbox, and implemented algorithms on NVIDIA Jetson TK1 embedded hardware utilizing CUDA C/C++ and OpenCV
  - Analyzed, debugged, modeled and simulated electro-optic and infrared sensor system gimbal dynamics, control systems, and target geolocation and tracking
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## Education

### Ph.D. in Electrical Engineering

May 2012

*Pennsylvania State University, University Park, PA*

**Dissertation Title:** *Flapping Wing Mechanisms for Pico Air Vehicle Applications Using Piezoelectric Actuators* ([pdf](#))

**Candidacy Areas:** State Space Control and Estimation, and Probability and Stochastic Processes

- Modeled and simulated piezoelectrically actuated flapping wing mechanism including aerodynamic lift forces in Matlab/Simulink and validated model using experimental results in air and in vacuum
- Measured large wing angular positions using high speed stroboscopic photography and image processing using Matlab, and small signal response using a laser vibrometer

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## Summary of Skills

### Real-Time C/C++ Development (5 years):

- Implemented computer vision and control system algorithms in Microsoft Visual Studio C++ for real-time operation, and developed offline unit test methods to use simulated or recorded sensor data to evaluate implemented algorithms
- Developed real-time embedded computer vision devices using NVIDIA Jetson TK1 to track on multiple video feeds using OpenCV libraries and network interface to gimbal control systems using CUDA C/C++ using Linux environment
- Strong knowledge of using OpenCV C++ for implementation of perception algorithms

### Python (4 years):

- Experience with Python and Jupyter Notebooks for 3D point cloud manipulation (open3d and pcl), image/video processing (OpenCV), symbolic math (sympy), data analysis and visualization (numpy, pandas, and matplotlib), and web applications (dash and plotly)

### Matlab/Simulink (over 15 years):

- Developed extensive custom libraries using Object-Oriented Matlab to perform modeling and simulation, prototype computer vision/perception algorithms, and deploy GUI applications

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## Patents and Publications

- Lead inventor on Patents [US 9,599,532](#), related to wearable optical communications devices, and [US 9,602,203](#), related to vibration characterization of optical elements, and co-inventor on [US 10,670,687](#), related to measuring visual augmentation device effectiveness
- Published 13 articles in IEEE and ASME journals and conferences, see ([researchgate.net profile](#))

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## Community Service

### FIRST Robotics Challenge Mentor

September 2013 - June 2015

*Bloomington High School South, Bloomington, IN*

- Led and taught students LabView, C/C++, I2C, SPI, Ethernet, PWM communication and control on a RoboRIO, a Xilinx FPGA and dual-core ARM Cortex-A9 processor to program a semi-autonomous robot for national competition
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