

# ROY XING

## Robotician

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## SKILLS

Programming C++, C, Python, MATLAB, Arduino, valgrind, gdb, emacs, Linux, git  
Electronics | CAD Embedded Systems, EagleCAD, LiDAR, FreeCAD, TinkerCAD, Soldering  
Robotics ROS, OpenCV, Control Theory [MPC LQR Cascaded PID], Nonlinear Dynamics, SLAM, Linear Algebra, Inverse Kinematics (IK), Reduced Order Locomotion Models [LIP, SLIP, ASLIP, etc.]

## EXPERIENCE

- Present** | **MassRobotics | Robotics Assistant Lab Manager and Robotics Technician**  
**Oct 2019**
- > Programmed numerous AMRs (Autonomous Mobile Robot) for live demos and simulations.
  - > Setup, programmed, and maintained various robot arms.
  - > Managed, built, and designed 3D printers, robot grippers, and quadrupedal robots.
  - > Wrote libraries for actuators, end-effectors, and sensors for low level processes and ROS compatibility.
    - > **Robotics Contractor for Cleo** : Wrote ROS framework for IR thermal cameras (for 3D mapping), worked with flight controllers and software for ModalAI VOXL for use on an innovative single duct drone.
- Toyota HSR UR5 UR10 Mitsubishi Arms quadrupeds ROS grippers LiDAR Intel RealSense  
Carbon Fiber 3D Printers IR thermal cameras SLAM ModalAI VOXL (embedded systems) drones
- Sept 2018** | **Dynamic Robotics Laboratory (PI : Dr. Jonathan W. Hurst) | Research Assistant**  
**Aug 2019**
- > Conducted research on the physical principles of legged locomotion through dynamic analysis and bio-mechanics research. Worked with and aided in maintaining a CassieV2 from Agility Robotics (lab spin-off).
  - > Programmed simulations on reduced order models of theories of legged locomotion, such as the SLIP model and implemented controllers in MATLAB.
  - > Implemented MPC (Model Predictive Control) in MATLAB and Python meant for walking LIP (linear inverted pendulum) as seen in the MIT Cheetah 2 for autonomous mobility.
  - > Aided in outdoor experiments of the Cassie robot's reinforcement learning walking controllers.
- Cassie Robot Control Theory MPC EGB Bipedal Reduced Order Models SLIP LIP MATLAB Python
- Sept 2018** | **Booz Allen Hamilton (Military Defense Contractor and Consulting Group) | Systems Operations Intern**  
**June 2018**
- > Wrote code on projects such as organizational operation programs and performed code reviews of various languages (Python, C++, C, VBA) for a broad range of contracts and subsystems.
  - > Worked on projects under the Air Force Division team.
- Python C++ C VBA
- Sept 2016** | **Aptima (Military Defense Contractor) | Computer Vision and Robotics Intern**  
**June 2016**
- > Wrote programs for solving advanced computer vision problems based on aerial drone video datasets with OpenCV in C++.
  - > Created ROS (Robot Operating System) projects for brain controlled robotics in Python.
- C++ OpenCV ROS Python drones Kinova Arm

## SCHOOL

2018 Oregon State University [Honors College] [GPA : 3.97/4.00] [BS : Electrical and Computer Engineering with a focus in Robotics (Minor in CS and Maths)]

## HONORS AWARDS PUBLICATIONS

- > AFCEA (Armed Forces Communications and Electronics Association) Fellowship Award 2018
- > Letter of Commendation by Commonwealth of MA Speaker of the House for Achievement in STEM In recognition of winning the RWDC State Championship and National Challenge Merit Award
- > Official Citation by Commonwealth of MA State Senate for excellence in STEM In recognition of winning the RWDC State Championship and National Challenge Merit Award
- > Paper acknowledgements, "Eliminating Peak Impact Forces by Customizing the Passive Foot Dynamics of Legged Robots"
- > Journal acknowledgements, "Mitigating Peak Impact Forces by Customizing the Passive Foot Dynamics of Legged Robots"

## PROJETS

**WHEELED BIPED** : Biped robot on wheels like Boston Dynamics' Handle C++ C Python Control Theory LQR Cascaded PID IK  
**DIGIT HUMANOID** : Implementation of cutting-edge research on Agility Robotics' Digit robot in sim. Digit Control Theory MATLAB  
**FETCH | TURTLEBOT3** : AMRs I made to navigate and fetch user designated objects Turtlebot3 CAD OpenCV ROS SLAM