# Curt Henrichs

Software Engineer

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## About

I am passionate about building real things for real people.
My interests include human-robot interaction, embedded systems, software engineering, and mixed-reality interfaces.

## Skills

Python, ROS, Git, Atmel, C/C++, Linux, Javascript, React, Angular, Unity/C#, Keras, MATLAB, MoveIt/Relaxed-IK

## Education

(2018 - 2021*) M.S. in Computer Science ~ Emphasis: HCI / HRI — GPA: 3.7 / 4.0
University of Wisconsin - Madison, Madison, WI

Coursework:
- Human Computer Interaction
  + Wearables
  + User Modeling
  + Data Visualization
- Artificial Intelligence
  + Machine Learning
  + Computer Vision
- High Performance Computing
  + Adv. Computer Architecture

- Human Robot Interaction -

(2014 - 2018) B.S. in Computer Engineering ~ Emphasis: Embedded Systems — GPA: 3.9 / 4.0
Milwaukee School of Engineering, Milwaukee, WI

Coursework:
- Embedded Systems
  + Computer Architecture
  + Digital / Analog Circuits
  + Control Systems
  + Digital Signal Processing
  + Computer Networking
- Software Development
  + Operating Systems
  + Data Structures
  + Computer Vision
  + Neural Networks
  + Computer Graphics
- Business / Management
  + Servant Leadership
  + Entrepreneurship
  + Ethics for Mgmt. and Eng.

- Engineering Practices -

## Experience

(2019 - 2021*) Graduate Research Assistant ~ People and Robots Lab, Computer Sciences
University of Wisconsin - Madison, Madison, WI

- Developed collaborative robot (cobot) authoring and training interfaces [Authr, Expert View Dashboard].
- Researched interactions with cobots for both attention management and levels of task interdependence.
- Worked with several colleagues outside of lab (in Human Factors and Optimization) to investigate cobot effectiveness when deployed on a variety of manual work activities.
  - Contributed robot capability analysis as inputs into allocation algorithm.
- Contributed to lab infrastructure and processes.
  Ex. Maintained centralized robot description and configuration repository for lab.
  Ex. Device bringup and documentation (Universal Robots UR3e, Microsoft Hololens 1 & 2).
  Ex. Debugged and updated Robotiq gripper ROS drivers for colleague under paper deadline.
- Assisted colleagues with their user studies, technical development, and paper writing.

(2016 - 2018) R&D Software Engineering Intern
Dedicated Computing, Waukesha, WI

- Responsible for development of embedded firmware in C/C++.
- Prototyped server hardware and software systems [Matrix Storage, Fan Controller].
- Integrated embedded devices into server control software with Python.
- Developed internal hardware testing infrastructure [Thermal Chamber] with NodeJS, Python, and MongoDB.
- Contributed to product life-cycle documentation for design, implementation, and testing.

## Notable Projects

**Authr ~ Cobot authoring environment.**
- Developed an Angular web app with ROS backend.
- Used MoveIt to compute motion plans and time-of-flight.
- Custom domain language designed around Therbligs.

**Expert View Dashboard ~ Cobot training environment.**
- React web app with ROS backend and Unity simulation.
- Operationalizes expert thinking into a checklist novices use to develop their programs with custom domain language.
- Explored Microsoft Hololens as an alternate XR interface.

**pRAD ~ Evaluation of cobot operator interfaces.**
- Applies predictive robot attention demand (pRAD) to cobots.
- Developed two widgets (timeline and timer) evaluated for task and collaborative outcomes in human-subjects study.
- Captured design suggestions from participant interviews informing future implementation.

**Automated Thermal Chamber Testing.**
- Developed several subsystems:
  - Unit-Under-Test state scraper captures CPU and GPU configuration / sensor values with NodeJS.
  - Thermal couple monitor running on NI cRIO.
  - Chamber control server, with NodeJS, issues low-level TCP byte commands.
- Integrated subsystems into internal testing software.

**Matrix Storage ~ Server Backplane Controller.**
- Developed controller firmware with Atmel C.
  - Aggregates PSU, fan, and environment sensing and control for Linux node on I2C system bus.
- Interfaced firmware with python application.

**Programmable Fan Controller.**
- USB UART with JSON API to configure programmable thermal profiles with individual fan control.
- Firmware written in C for Atmel ARM microcontroller.