CHRISTOPHER THIERAUF

Roboticist, PhD Student

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EDUCATION

Ongoing

2020 – Present (est. 2026) **PhD, Computer Science and Human-Robot Interaction** — **Tufts University**
Joint PhD in Computer Science and Human-Robot Interaction.
Research focusing on resilient robots in open-world domains.

2020 – Present (est. July 2022) **MSc, Computer Science and Human-Robot Interaction** — **Tufts University**
Joint Masters in Computer Science and Human-Robot Interaction.
Relevant Courses: Probabalistic Robotics, Reinforcement Learning for Robotics, Advanced Robotics, Human-Robot Interaction

Completed

2016 – 2020 **BSc, Computer Science** — **Wentworth Institute of Technology**
Bachelor's in Computer Science, with emphasis on robotics.

2016 – 2018 **Minor in Applied Mathematics** — **Wentworth Institute of Technology**

PUBLICATIONS

Journal Papers In Preparation

"Mixed Interactive Interactions from Performance Assessments"
Christopher Thierauf, *Theresa Law, Tyler Frasca, Matthias Scheutz*.
- Designed and implemented resilience mechanism that performs risk and likelihood assessment for mixed interactive task interaction. Concluded with user study, demonstrating effectiveness.

"Open-world fault recovery through reasoning and planning"
Christopher Thierauf, *Matthias Scheutz*.
- Designed and implemented system which uses reasoning to plan future actions which can select robot actions to explore and solve problems

Journal Papers In Review

Submitted to THRI 2022 (special issue on AI in HRI)
"'Do this instead': Robots that Adequately Respond to Corrected Instructions."
Christopher Thierauf, *Ravenna Thielstrom, Bradley Oosterveld, Will Becker, Matthias Scheutz*.
- Implemented software mechanisms to handle self-corrections across utterances in natural language instructions to robot platforms.

Conference Papers In Review

2023 **Submitted to AAMAS 2023**
"Norm-Guided Reference Resolution".
Mitchell Abrams, ***Christopher Thierauf****, Matthias Scheutz.*
- Wrote ROS1 code to implement robot behaviors integrating with a reference resolution system and cognitive architecture.

Conference Papers

2022 **AAMAS**
"ACuTE: Automatic Curriculum Transfer from Simple to Complex Environments".
Yash Shukla, ***Christopher Thierauf****, Ramtin Hosseini, Jivko Sinapov.*
-Wrote ROS1 code and PyBullet code to implement real-world equivalents to simulated robot behaviors.

2021 **ICRA**
"Robot Development and Path Planning for Indoor Ultraviolet Light Disinfection."
Jonathan Conroy, ***Christopher Thierauf****, Parker Rule, Evan Krause, Hugo Akitaya, Andrei Gonczi, Matias Korman, Matthias Scheutz.*
-Designed and wrote firmware for custom robot platform to execute our novel algorithm, which provides formal guarantees for disinfection. Performed demonstration in an office environment.

Undergrad research/publications

2019 **Lecture** **LibrePlanet**
"Free Software in the 3D Printing Community." **Christopher Thierauf**. LibrePlanet 2019.

2018 **Refereed Conference Paper** **IEEE MIT URTC**
"Networking 3D Printers with Printfarmer." **Christopher Thierauf**. IEEE MIT Undergraduate Research Technology Conference, 2018.

2017 **Fulfilled Grant Requirements** **Northeast SARE FNE18-893**
"Laser Scarecrow Prototype." Stephen Chomyszak, Nick Stratton, **Christopher Thierauf**, Ken Costa. In fulfillment of SARE FNE18-893 awarded to Elliot Farm.

WORK EXPERIENCE

2020 - Present **Graduate Research Assistant, Human-Robot Interaction** **Tufts University**
- Advised by Matthias Scheutz, PhD, PhD in the Human-Robot Interaction Lab
- Wrote code for ongoing research in cognitive architectures and human-robot interaction, object manipulation, navigation
- Handled SLAM stack design and maintainence for challenging navigation tasks
- Designed and manufactured robot hardware systems for research purposes
- Mentored and directed undergraduates towards ongoing research goals

Summer 2021 **Graduate Robotics Co-Op** **Thinking Robots, Inc.**
- Designed and manufactured hardware to meet grant requirements for mobile disinfection system.
- Wrote code to accompany robot add-ons.

Fall 2019 **Software Engineering Co-Op** **Thinking Robots, Inc.**
- Wrote code to interface between natural language goal-control system and humanoid robot.

Spring 2019 **Undergraduate Research Assistant, Human-Robot Interaction** **Tufts University**
- Wrote code for assistive robotics system interfacing natural language to a 7-DoF arm

Summer 2018 **Undergraduate Research Assistant, Additive Manufacturing** **Wentworth Inst. of Tech.**
- Contributed to software, electrical, and mechanical design of novel 3D printing system.

SELECT PROJECTS

2016 – 2019 **Underwater ROV** **MATE International ROV competition**
- Wrote code to control 3 complex electromechanical platforms to complete underwater tasks.
- Led software development team to implement design of custom architecture.

2016 **Spectral Digitizer** **Harvard Astrophysics Laboratory (Subcontracted)**
- Wrote code for high precision stepper motor control to digitize physical records of elemental spectra of various astronomical bodies

COMMUNITY DEVELOPMENT AND OUTREACH

2022 **Mass Robotics Block Party**
- Represented Tufts HRI program and HRI lab at public event for robot education outreach

2022 **Session Co-Chair, ASEE-NE**
- Co-Chaired two sessions of local undergraduate conference
- Judged poster session

2016-Present **Open Source Software Contributions** **github.com/cst0**
Authored, maintained, and released packages to the ROS repositories:
- `gpio_control`: package for device-agnostic gpio pin interfacing
- `rosactive`: CLI tool for managing complex ROS system development
- `rosmodem`: ROS package for better ROS message compression for interfacing with acoustic modems, z-wave, LoRa, etc.
- `monkeywrench`: ROS Package to allow for error injection in live ROS1 systems
- `spot_ros`: Bugfixed Clearpath wrapper for Spot robot, extended with functionality for object manipulation
- Minor open source contributions elsewhere, mainly in robotics space.
- Added features and bugfixes to core ROS libraries (ros-perception, ros-navigation, others)

2020-Present **Club Mentorship** **IEEE, Wentworth Student Branch**
- Provide undergraduate project groups technical expertise and resources
- Provide lectures on relevant technical topics (infrequently)

2018-Present **Undergraduate Project Mentoring** **Wentworth Inst. of Tech.**
- Provide research and technical expertise to undergratuate groups looking to perform engineerings projects or research projects

2018-Present **Undergraduate Research Intern Mentoring** **Tufts University**
- Mentor several undergraduates a year as undergraduate lab researchers
- Undergraduates contribute towards ongoing lab goals and personal research

2016-2020 **Club Leadership** **Wentworth Inst. of Tech.**
- IEEE President, previously Vice-President (Wentworth Student Branch)
- ACM Hackathon Organizing Committee Member (Wentworth student branch)
- Technical Lead, WIT Robotics Club
- Software Lead, WIT MATE ROV Team

MEDIA APPEARANCES

2022 **CBS Boston**
Performed live robot demo of my own work plus lab research for local news station.
`https://www.cbsnews.com/boston/video/boston-hosts-celebration-of-all-things-robotics`

2021 **Tufts Now**
"Building a Better Robot to Disinfect for COVID and More".
Article discussing (in part) my contributions to the design and implementation of a robot to disinfect for COVID-19.
https://now.tufts.edu/2021/05/06/building-better-robot-disinfect-covid-and-more

LANGUAGES

- Comfort in Python, Java, C, C++, Bash
- Some experience with Rust, x86 Assembly, Prolog

FRAMEWORKS

- Proficency in ROS, MoveIt!, ROS_Control.
- Competency in ROS2, OpenCV, PCL.
- Some experience with physics simulation systems (Gazebo, PyBullet). I generally perfer to use the actual robot.

DEVICES

Extensive use of:
- Fetch Robotics '**Fetch**'
- Boston Dynamics '**Spot**'
- Universal Robots '**UR5**'
- Kinova '**ULeA**'
- Custom differentially driven robots
- Custom marine 5 and 6-DoF AUV's

Some use of:
- Baxter, TurtleBot, PR2, others.

OTHER SKILLS

Advanced CLI Linux usage. Proficiency in mechanical design and FDM, and above average experience with manufacturing via mills/lathes. Some experience with electrical debug, minimal experience with electrical design for PCB manufacturing.