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Robotician, PhD Student

WHO AM I?

Robotician working as a graduate research assistant at the HRI Lab at Tufts University, currently pursuing a PhD in Human-Robot Interaction advised by Professor Matthias Scheutz. My research focuses on resilience in human-robot interaction, involving topics ranging from machine learning, vision processing, kinematics, cognitive architectures, and robot design.

LANGUAGES

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

FRAMEWORKS

- Proficiency in ROS, MoveIt!, ROS_Control.
- Competency in ROS2, OpenCV, PCL.
- Some experience with Gazebo, PyBullet

DEVICES

Extensive use of:

- Fetch Robotics '**Fetch**'
- Boston Dynamics '**Spot**'
- Universal Robots '**UR5**'
- Kinova '**ULeA**'
- Custom platforms.

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.

EDUCATION

Ongoing

2020 – Present **PhD, Human-Robot Interaction** **Tufts University**
Joint PhD in Computer Science and Psychology.
Research focusing on resilient robots in human domains.

2020 – Present **MSc, Human-Robot Interaction** **Tufts University**
Joint Masters in Computer Science and Psychology.
Relevant Courses: Probabilistic Robotics, Reinforcement Learning for Robotics, Ethics in AI, 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**

RESEARCH

My field prioritizes conference publications. Only full papers in top-tier conferences are shown.

Conference Papers

Submitted to IROS 2022, awaiting peer review

"Open-world fault recovery through reasoning and planning"

Christopher Thierauf, Matthias Scheutz.

A knowledge and reasoning approach to fault-detection and discovery by performing explicit exploratory action.

Submitted to RSS 2022, awaiting peer review

"Do this instead" – How to Adequately Respond to Corrected Instructions"

Christopher Thierauf, Brad Oosterveld, Ravenna Thielstrom, Will Becker, Matthias Scheutz

Enabling robots to address sudden changes in intent of a human partner.

AAMAS 2022

"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.

ICRA 2021

"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 and was demonstrated in an office environment.

Undergrad research

2019

Lecture

LibrePlanet 2019

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

2018

Refereed Conference Paper

IEEE MIT URTC 2018

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

2018

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.

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 maintenance 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** **Subcontracted, Harvard Astrophysics Laboratory**
- Wrote code for high precision stepper motor control to digitize physical records of elemental spectra of various astronomical bodies

COMMUNITY DEVELOPMENT

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
Minor open source contributions elsewhere, mainly in robotics space.

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 Mentoring** **Tufts University and Wentworth Inst. of Tech.**
- Provide research and technical expertise to undergraduate groups looking to perform engineering projects or research projects
- Typically mentor several undergraduates a year as undergraduate lab researchers

2016-2020 **Club Leadership** **Wentworth Inst. of Tech.**
- President of IEEE (Wentworth Student Branch) for after holding Vice-President position
- Association of Computing Machinery Hackathon Organizing Committee Member
- Robotics Club Technical Lead
- WIT MATE ROV Software Lead