CHRISTOPHER THIERAUF

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I'm a roboticist working in the National Deep Submergence Facility and Deep Submergence Lab at the Woods Hole Oceanographic Institution, supporting deep-sea research and conducting research into robot autonomy.

My research expertise is in robot resilience, with an emphasis on human interaction and interpretable high-level planning: How can robots make safe decisions that work towards human goals? How can they identify when failure has occurred and then reason about what to do next? How can they communicate this reasoning, and take human instruction?

EDUCATION

2025 — **PhD, Computer Science and Human-Robot Interaction** — **Tufts University**
Joint PhD advised by Matthias Scheutz, PhD, PhD.
Thesis: "Interpret, Innovate, and Interact: Resilient Robot Strategies for Human Domains".
Showed how symbolic AI can be be used with subsymbolic AI and machine learning techniques to produce robots capable of understanding, resolving, and communicating failure to human operators.

MSc, Computer Science and Human-Robot Interaction — **Tufts University**
Joint masters degree. Coursework in robotics, machine learning, and cognitive science.

2020 — **Bachelor of Science** — **Wentworth Institute of Technology**
Computer science, minoring in applied mathematics, with emphasis on robotics.

WORK EXPERIENCE

2023 - Present — **Research Engineer** — **Woods Hole Oceanographic Institution**
Supporting research with the *Sentry* deep-sea AUV by developing software, participating in oceanographic field work, and conducting research into resilient robot autonomy.

2020 - 2023 — **Graduate Research Assistant (Full-time)** — **Human-Robot Interaction Lab, Tufts**
Wrote code and developed hardware for resilient robot behaviors in open-world domains. Emphasis on robotics, AI, cognitive architectures, and machine learning.

Summer 2021	**Robotics Engineer (Co-Op)**	**Thinking Robots, Inc.**
Summer 2020	**Software Engineer**	**HRILab, Tufts University**
Fall 2019	**Robotics Engineer (Co-Op)**	**Thinking Robots, Inc.**
Spring 2019	**Undergrad Research Assistant, Human-Robot Interaction**	**HRILab, Tufts University**
Summer 2018	**Undergrad Research Assistant, Additive Manufacturing**	**Wentworth Inst. of Tech.**

AT-SEA FIELDWORK

2025 May 19 – June 6 — Aboard R/V Endeavor for AUV Sentry ops to Northeast US Continental Shelf mapping cold seeps. Provided mission planning and software, data, and on-deck support.

2025 February 24 – May 5 — Aboard R/V Atlantis for AUV Sentry engineering work, including deploying my research into a custom mission controller system.

2025
January 20 –
February 18

Aboard R/V Atlantis for AUV Sentry ops to 9°50'N East Pacific Rise alongside HOV Alvin to perform geological mapping and biological camera surveys. Provided software support during deployments and data processing post-recovery.

2024
September 1 –
September 24

Aboard E/V Nautilus for AUV Sentry ops to American Samoa. Provided software support during deployments and data processing post-recovery.
`https://nautiluslive.org/blog/2024/09/01/exploring-unknown-american-samoa-new-tech`

2024
June 19 –
July 3

Aboard R/V Atlantis for AUV Sentry ops to Axial Seamount alongside ROV Jason. Provided software support during deployment and data processing post-recovery.
`https://ndsf.whoi.edu/tracking-the-ups-and-downs-of-axial-seamount/`

2024
February 15 –
March 21

Aboard R/V Atlantis for AUV Sentry ops to 9°50'N East Pacific Rise alongside HOV Alvin. Acting software lead.
`https://www.whoi.edu/press-room/news-release/five-new-hydrothermal-vents-discovered-in-the-eastern-tropical-pacific-ocean/`

JOURNAL PAPERS

2024

"Toward Competent Robot Apprentices: Enabling Proactive Troubleshooting in Collaborative Robots"
Christopher Thierauf, *Theresa Law, Tyler Frasca, Matthias Scheutz*.
In MPDI *Machines*.

2023

"'Do this instead': Robots that Adequately Respond to Corrected Instructions."
Christopher Thierauf, *Ravenna Thielstrom, Bradley Oosterveld, Will Becker, Matthias Scheutz*.
In ACM Transactions on Human-Robot Interaction (*THRI*).

CONFERENCE PAPERS

2025

"Deployment and Development of a Cognitive Teleoreactive Framework for Deep Sea Autonomy"
Christopher Thierauf.
In IEEE/MTS *OCEANS*.

2025

"Design of a Depth Triggered Mechanical Fuse"
Ethan Rowe, ***Christopher Thierauf***.
In IEEE/MTS *OCEANS*.

2025

"Robots that Learn to Solve Novelty with Self-Generated RL Simulations"
Christopher Thierauf, *Matthias Scheutz*.
In IEEE International Conference on Development and Learning (*ICDL*).

2025

"FLEX: A Framework for Learning Robot-Agnostic Force-based Skills Involving Sustained Contact Object Manipulation"
Shijie Fang, Wenchang Gao, Shivam Goel, ***Christopher Thierauf****, Matthias Scheutz, Jivko Sinapov.*
In International Conference on Robotics and Automation (*ICRA*).

2024

"Self-Debugging Robots: Fault recovery through reasoning and planning"
Christopher Thierauf, *Matthias Scheutz*.
In IEEE Resilience Week (*RWS*).

2024

"Fixing symbolic plans with reinforcement learning in object-based action spaces"
Christopher Thierauf, *Matthias Scheutz*.
In International Conference on Intelligent Robots and Systems (*IROS*).

2024 **"Robots That Perform Norm-Based Reference Resolution"**
*Mitchell Abrams, **Christopher Thierauf**, Matthias Scheutz.*
In International Conference on Social Robotics (*ICSR*).

2024 **"Automating Dataset Production Using Generative Text and Image Models"**
***Christopher Thierauf**, Mitchell Abrams, Matthias Scheutz.*
In Empirical Methods in Natural Language Processing (*EMNLP*).

2022 **"ACuTE: Automatic Curriculum Transfer from Simple to Complex Environments".**
*Yash Shukla, **Christopher Thierauf**, Ramtin Hosseini, Jivko Sinapov.*
In Autonomous Agents and Multiagent Systems (*AAMAS*)

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.*
In International Conference on Robotics and Automation (*ICRA*).

TEACHING

2024 **Introduction to Machine Learning (CS-135)** **Tufts University**
Graduate level course in supervised machine learning techniques, including regression, classification, neural networks. Designed course materials, ran office hours and grading.

MEDIA APPEARANCES

2024 **Nautilus Live**
Interviewed for the Nautilus Live blog as part of OET's outreach programming. Interview focuses on my discussion of debugging AUVs at sea.
`https://nautiluslive.org/blog/2024/09/16/auv-sentry-na165-troubleshooting-software-sea`

2022 **CBS Boston**
Performed live robot demo of my own work and 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 includes discussion of my design and implementation of a disinfection robot.
`https://now.tufts.edu/2021/05/06/building-better-robot-disinfect-covid-and-more`

COMMUNITY DEVELOPMENT AND OUTREACH

2025 **Session Chair, IEEE/MTS *OCEANS***
Chaired sessions at IEEE/MTS *OCEANS* in underwater vehicle design and autonomy, judged student poster session

2016-Present **Open Source Software Contributions** **github.com/cst0**
Released, bugfixed, and maintained packages on the ROS repositories, including:
- `gpio_control`: Created package for device-agnostic gpio pin interfacing
- `rosmodem`: Created package for interfacing with acoustic modems, z-wave, LoRa…
- `monkeywrench`: Created package to allow for error injection in live ROS1 systems
- `spot_ros`: Bugfixed existing package, extended for object manipulation
- Added features and bugfixes to some core ROS 1 libraries/tools

2023-Present **Peer Reviewer**

Reviewed for these and others:

- *International Conference on Robotics and Automation (ICRA)*
- *Robotics and Automation – Letters (RA-L)*
- *Robots: Science and Systems (RSS)*
- *Journal of Open Source Software (JOSS)*

2020-Present **Undergraduate Club Advising** **Wentworth IEEE, ACM, and Robotics Clubs**

Teaching ROS and other robotics skills to undergraduate robotics groups.

2020-2023 **Research Intern Supervising/Advising** **Tufts University**

Supervising undergraduate and masters students in full-time semester-long projects:

- Ryan H., "Evaluation of novelty-solving RL agents." (2023)
- Henry N., "Integration of vision system for HRI hospital interactions." (2023)
- Cameron Y., "NLP systems for dynamic environments." (2023)
- Henry G., "Navigation in real-world environments." (2022-2022)
- Daniel B., "Robot behaviors for interacting with elevators." (2023)
- Henry G., "Integration of Spot robot in DIARC architecture." (2022)
- Aryaman P., "Socially-compliant robot navigation." (2021)

2022, 2023 **Mass Robotics Block Party**

Represented Tufts HRI program and 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.

2016-2020 **Professional Leadership** **Wentworth Institute of Technology**

Led local chapter of IEEE (WIT IEEE 2016-2020) and ACM (WIT ACM 2016-2018)

SKILLS

Experimental Design	Experience with constructing qualitative and quantitative human-subject experiments in accordance with **IRB** legal/ethical requirements.
Tools	Proficiency with **Git**-based workflows, **Linux**, CLI, etc. LaTeX.
Programming Languages	Proficiency with **Python**, Java, C, **C++**. Experience with Assembly, Rust, Prolog.
Frameworks	Expertise in **ROS**, MoveIt, ROS_Control, **DIARC** cognitive architecture. Proficient in **ROS 2**, OpenCV, PCL. Competent with physics simulation systems (Gazebo, PyBullet).
Devices	Custom **marine AUV's** (5-DoF and 6-DoF), esp. **AUV Sentry**, mobile manipulators (Boston Dynamics '**Spot**', Fetch Robotics '**Fetch**'), 7-DoF arms (Universal Robots '**UR5**', Kinova '**ULeA**'), custom differentially-driven robots, others.
Manufacturing/Debug	Comfort with electrical debug for software (e.g., **oscilloscopes** for firmware development), **3D CAD** tools, manufacturing with **3D printing**, **mills**, lathes, etc.