Leonardo Santos

✉ leohmcs@gmail.com | 🏠 leohmcs.github.io | 🐙 GitHub | 💼 LinkedIn

Education

UFMG Federal University of Minas Gerais   *Belo Horizonte, Brazil*
BSc. in Electrical Engineering, GPA: 88.9/100   *Mar 2020 - Present*
Relevant coursework: Control of Linear Systems, Mobile Robotics, Robot Motion Planning (graduate course)

KTH Royal Institute of Technology   *Stockholm, Sweden*
Study Abroad, School of Electrical Engineering and Computer Science, GPA: 4.2/5   *Aug 2023 - Jan 2024*
Coursework: Introduction to Robotics, Machine Learning, Safe Robot Planning and Control, Reinforcement Learning

Skills

Programming   Python, C++, MATLAB.
Technologies   ROS, RViz, Git, LaTeX.
Languages   English, Portuguese (Native).

Experience

Intent Lab, Carnegie Mellon University   *Pittsburgh, United States*
Research Intern, Robotics Institute Summer Scholar   *Jun 2023 - Present*
- Working on language-guided safe navigation advised by Prof. Andrea Bajcsy.
- Co-first author paper submitted to ICRA 2025.
- More information on the project website.
- **Technical skills:** Python, ROS.

Division of Robotics, Perception and Learning, KTH   *Stockholm, Sweden*
Research Assistant   *Sep 2023 - Jan 2024*
- Worked on safe motion planning under uncertainty advised by Matti Vahs and Prof. Jana Tumova.
- **Technical Skills:** Python.

AirLab, Carnegie Mellon University   *Pittsburgh, United States*
Research Intern, Robotics Institute Summer Scholar   *Jun 2023 - Aug 2023*
- Worked on Bayesian filters for multi-object tracking using autonomous drones advised by Brady Moon and Prof. Sebastian Scherer.
- Proposed a new formulation that turns search and track into a single objective optimization problem.
- Co-first author paper accepted to the 2025 AIAA SciTech Forum.
- **Technical skills:** C++, ROS.

Computer Vision and Robotics Lab, UFMG   *Belo Horizonte, Brazil*
Research Fellow   *Aug 2021 - Mai 2023*
- Worked on path planning for multi-robot systems, with particular focus on end-to-end connectivity guarantees advised by Prof. Douglas G. Macharet.
- Second author paper published at LARS 2022. One of the papers awarded the conference's Top 15 Papers award.
- First author journal paper submitted to IEEE Latin American Transactions..
- **Technical Skills:** Python, ROS, MoveIt!

Computer Vision and Robotics Lab, UFMG   *Belo Horizonte, Brazil*
Research Assistant   *Fev 2021 - Jul 2021*
- Collaborated with a PhD student on his research on autonomous exploration of confined spaces with applications in the mining industry.
- Worked primarily on testing frontier exploration algorithms in simulations.
- **Technical Skills:** Python, ROS, CoppeliaSim

AVANT, UFMG   *Belo Horizonte, Brazil*
Autonomous Drones Competition Team   *Aug 2020 - Oct 2022*
- Worked on Computer Vision and Autonomous Navigation teams.
- Mentored incoming members on implementation of planning and SLAM algorithms using Python and ROS.
- Led the Computer Vision, Autonomous Navigation and Systems Integration team from Jan 2021 to Jul 2021.
- Served as Technical Leader for the Autonomous Navigation Team from Jun 2022 to Oct 2022.
- **Technical Skills:** Python, OpenCV, ROS, Gazebo

Publications

CONFERENCES

Updating Robot Safety Representations Online from Natural Language Feedback
Leonardo Santos*, Zirui Li*, Lasse Peters, Somil Bansal[†], Andrea Bajcsy[†]
Under review to ICRA 2025. arXiv preprint arXiv:2409.14580, Submitted to ICRA 2025 (2024). 2024

UniSaT: Unified-Objective Belief Model and Planner to Search for and Track Multiple Objects
Leonardo Santos*, Brady Moon*, Sebastian Scherer, Hoa Van Nguyen
Accepted to 2025 AIAA SCITECH Forum. arXiv preprint arXiv:2405.15997. (2024). 2024

Collaborative UGV/UAV Path Planning for Inventory Management in Warehouses
Caio C. G. Ribeiro, Leonardo H. M. C. Santos, Douglas G. Macharet
2022 Latin American Robotics Symposium (LARS), 2022 Brazilian Symposium on Robotics (SBR), and 2022 Workshop on Robotics in Education (WRE), 2022

JOURNAL

Communication Backbone Reconfiguration with Connectivity Maintenance
Leonardo Santos, Caio C. G. Ribeiro, Douglas G. Macharet
Under review to IEEE Latin America Transactions. arXiv preprint arXiv:2409.16851 (2024). 2024

Awards

2022   **National Finalist, Top 3 Overall**, 2nd SARC-Barinet Aerospace Competition
2022   **15 Best Papers Award**, IEEE Latin American Robotics Symposium

Grants & Scholarships

Research Scholarship   *Brazil*
Year long scholarship from the Brazilian **Research Support Foundation of the State of Minas Gerais**   *Oct 2022 - Sep 2023*
(FAPEMIG)
Was also offered a one-year extension of CNPq Scholarship, but chose this instead

Research Scholarship   *Brazil*
Year long scholarship from the Brazilian **National Council for Research and Development (CNPq)**   *Sep 2021 - Aug 2022*

Service & Outreach

UFMG IEEE Student Branch   *Belo Horizonte, Brazil*
Webmaster   *Sep 2024 - Present*
- Founding member of IEEE Student Branch at UFMG, which has the goal of stimulating undergraduate research, out-of-the-classroom training and science outreach in the university.
- Currently responsible for everything related to branding, external communications and advertisement.

RISS RoboLaunch   *Pittsburgh, United States*
Co-Lead Organizer   *Jun 2023 - Aug 2024*
- Helped organize a robotics seminar series aimed at introducing undergraduate students to robotics through a series of accessible talks from speakers from academia and industry.
- Led logistics involving speaker invitations, advertisement, and general team coordination.
- In the two years I was involved, the series hosted talk from professors from CMU, MIT, University of Washington, UC San Diego, Yale University, University of Adelaide, ETH Zurich, among others.