LEONARDO SANTOS

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EDUCATION

Federal University of Minas Gerais (UFMG) *July 2025 (expected), Brazil*
B.Sc. in Electrical Engineering, Emphasis in Robotics
GPA: 86.6/100 (top 11%)
Relevant coursework: Mobile Robotics, Control of Linear Systems, Robot Motion Planning (Master's course).

KTH Royal Institute of Technology *Aug 2023 - Jan 2024, Sweden*
Study abroad semester
GPA: 4.2/5.0
Relevant graduate 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 (fluent) and Portuguese (native)

RESEARCH EXPERIENCE

Robotics Institute Summer Scholar (RISS) June 2024 - Present
Carnegie Mellon University | *Prof. Andrea Bajcsy* | *Intent Lab* Pittsburgh, USA

- Developed a framework to update safety specifications online from human language feedback using a Vision Language Model.
- Applied the safety specifications in a downstream reachability controller for safe navigation and demonstrated the system in both hardware and simulation experiments. Co-first author paper under review to ICRA 2025 [1].
- More information and demos on the project website.
- **Technical skills:** Python, ROS.

Research Assistant Sep 2023 - Jan 2024
KTH Royal Institute of Technology | *Prof. Jana Tumova* | *RPL* Stockholm, Sweden

- Studied risk-aware trajectory optimization for safe navigation among humans.
- Implemented an MPPI-based trajectory optimizer to minimize a CVaR risk measure in belief space for trajectory planning under uncertainty.
- **Technical skills:** Python, PyTorch.

Robotics Institute Summer Scholar (RISS) June 2023 - Aug 2023
Carnegie Mellon University | *Prof. Sebastian Scherer* | *AirLab* Pittsburgh, USA

- Developed a framework based on Random Finite Sets that mathematically unifies search and track objectives for informative path planning.
- Contributed to both theoretical and implementation developments.
- Co-first author paper published at 2025 AIAA SciTech Forum [2].
- **Technical skills:** C++, MATLAB, ROS.

Research Assistant Feb 2021 - May 2023
Federal University of Minas Gerais | *Prof. Douglas Macharet* | *VeRLab* Belo Horizonte, Brazil

- Developed a planning pipeline for communication-constrained multi-robot systems. The pipeline is based on virtual structures and guarantees that communication between robots is preserved by construction. Demonstrated in simulation and in a simple hardware experiment. First author paper under review at IEEE Latin America Transactions [3].
- Ran and evaluated experiments in a project that uses a heterogeneous multi-robot system for warehouse management. Second author paper published at LARS 2022 [4].
- **Technical skills:** Python, ROS.

PUBLICATIONS

[1] L. Santos*, Z. Li*, L. Peters, S. Bansal', and A. Bajcsy', "Updating robot safety representations online from natural language feedback," *To appear in IEEE ICRA 2025*, 2025.

[2] L. Santos, B. Moon, S. Scherer, and H. Van Nguyen, "Unisat: Unified-objective belief model and planner to search for and track multiple objects," in *AIAA SCITECH 2025 Forum*, 2025, p. 2114.

[3] L. Santos, C. C. G. Ribeiro, and D. G. Macharet, "Communication backbone reconfiguration with connectivity maintenance," *IEEE Latin America Transactions (under review)*, 2024.

[4] C. C. G. Ribeiro, L. H. M. C. dos Santos, and D. G. Macharet, "Collaborative ugv/uav path planning for inventory management in warehouses," in *2022 Latin American Robotics Symposium (LARS)*, 2022, pp. 121–126.

SERVICE AND OUTREACH

Member of Admissions Committee Jan 2025
CMU RISS

- Helped reviewing applications for the Robotics Institute Summer Scholars (RISS) program at CMU.

Co-Lead Organizer Jun 2023 - Aug 2024
RoboLaunch Pittsburgh, USA

- 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.
- During the time I was involved, we hosted speakers from CMU, MIT, University of Washington, University of Adelaide, ETH Zurich, among others.

Co-Founder and Webmaster Sep 2024 - Present
UFMG IEEE Student Branch Belo Horizonte, Brazil

- Organized events to promote and advertise research at UFMG, including seminars on microelectronics, AI, robotics, and biomedical engineering; research partnerships between Brazilian and French universities.
- Currently responsible for everything related to branding, external communications, and social media presence.

AWARDS AND SCHOLARSHIPS

Google Undergraduate Research Scholarship, 1 of 3 scholars at CMU — *Summer 2024*
Minas Mundi Study Abroad, selected UFMG student — *Fall 2023*
Mobility21 Undergraduate Research Scholarship, 1 of 3 scholars at CMU — *Summer 2023*
National Finalist, top 3 Overall, 2nd SARC-BARINet Aerospace Competition — *Fall 2022*
Top 15 Papers Award out of 80 submissions, LARS 2022 — *Fall 2022*
Minas Gerais Research Support Foundation Scholarship — Fall 2022, Spring 2023
Brazilian National Council for R&D Scholarship — Fall 2021, Spring 2022

SOCIETY MEMBERSHIPS

IEEE RAS Student Member — *2025*
IEEE Student Member — *2024*