

ARTHUR FENDER COELHO BUCKER

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SUMMARY

Robotics PhD researcher at Carnegie Mellon University specializing in **robot learning**, **deep learning**, **foundation models**, and **agentic AI**, with end-to-end research and development (R&D) experience from idea to real-robot deployment. Develops self-supervised learning, vision-language model (VLM) guidance, and test-time policy steering methods that let robot policies generalize across embodiments and real-world environments, and fine-tunes vision-language-action (VLA) models (full and LoRA). 9 publications (RSS, ICML, ICRA, IROS, RA-L) with **1,600+ citations**; research intern at Microsoft; reviewer for ICRA, IROS, RA-L, CoRL, NeurIPS, and SIGGRAPH.

EDUCATION

Carnegie Mellon University <i>PhD in Robotics; MS in Robotics (2025); Advisor: Prof. Jean Oh</i>	Aug 2023 – Dec 2027 (Expected) <i>Pittsburgh, PA</i>
Technical University of Munich (TUM) <i>MS in Mechatronics and Robotics (double degree)</i>	Oct 2020 – Mar 2022 <i>Munich, Germany</i>
University of São Paulo (USP) <i>BS in Mechatronics Engineering (double degree)</i>	Feb 2017 – Jun 2023 <i>São Paulo, Brazil</i>

SKILLS

Programming: Python, C++, Agentic AI Frameworks, Agentic Workflows
Machine Learning: Deep Learning, PyTorch (model training), TensorFlow, Hugging Face, Transformers, Large Language Models (LLMs), Vision-Language Models (VLMs), Vision-Language-Action (VLA) Models, VLA Fine-tuning (full and LoRA), Prompt Engineering, Chain-of-Thought (CoT) Reasoning, Multimodal Learning, Retrieval-Augmented Generation (RAG), Reinforcement Learning, Imitation Learning, Knowledge Distillation, Graph Neural Networks, Computer Vision, Natural Language Processing (NLP)
Robotics: Robot Learning, Robot Manipulation, Sim-to-Real Transfer, Motion Planning, SLAM, Sensor Fusion, ROS, MuJoCo, Gazebo, AirSim, CoppeliaSim (V-REP), Embedded Systems, UAVs
Cloud: Microsoft Azure, AWS, Lambda
Languages: Portuguese (native), English (fluent), German, Spanish, French (intermediate), Chinese (basic)

EXPERIENCE

Lavoro AI <i>Senior Research Intern</i> Developed automated skill-discovery methods for dexterous robot manipulation, learning generalizable representations through structured exploration in a real-to-sim-to-real pipeline.	May 2026 – Aug 2026 <i>Pittsburgh, PA</i>
Microsoft, Applied Sciences Group <i>Research Intern</i> - Collaborated with Microsoft researchers to co-develop Windows Agent Arena (ICML 2025), a scalable benchmark of 150+ tasks for evaluating multimodal LLM-based OS agents. - Designed a temporal-aware retrieval-augmented generation (RAG) memory that enables autonomous agents to maintain context across long interactions.	May 2024 – Aug 2024 <i>Redmond, WA</i>
Koya AI <i>Machine Learning Researcher</i> Led research on distilling foundation-model knowledge into efficient models for entity extraction and classification of web-scraped data and product catalogs.	Jul 2023 – Aug 2023 <i>São Paulo, Brazil</i>
Microsoft, Autonomous Systems and Robotics Research Group <i>Research Intern</i> - Co-authored ChatGPT for Robotics (IEEE Access), defining design principles and prompt engineering strategies for controlling robots with large language models (LLMs). - Engineered an autonomy stack for indoor monocular drones using ORB-SLAM3 and visual-inertial sensor fusion, deployed in Microsoft demos.	Jan 2023 – Apr 2023 <i>Redmond, WA</i>
MIRMI, Technical University of Munich, and Microsoft <i>Researcher</i> - Led a research collaboration between the Munich Institute of Robotics and Machine Intelligence (MIRMI) and Microsoft on reshaping robot trajectories with natural-language and visual human feedback. - Developed multimodal transformer models aligning language, vision, and trajectory data; published at IROS 2022 and ICRA 2023.	Nov 2021 – Nov 2022 <i>Munich, Germany</i>
Carnegie Mellon University, Robotics Institute (AirLab) <i>Robotics Institute Summer Scholar (RISS) Research Intern</i> - Developed multi-drone coordination and semantic control methods for autonomous aerial cinematography. - Published two IEEE ICRA 2021 papers as first and second author while an undergraduate.	May 2020 – Nov 2020 <i>Pittsburgh, PA</i>

PUBLICATIONS

RIO: Flexible Real-time Robot I/O for Cross-Embodiment Robot Learning P. Ortega-Kral*, E. Xing*, A. Bucker , V. Luk, J. Kim, O. Kwon, A. Xie, N. Sobanbabu, Y. Yuan, M. Lee, D. Ameria, B. Ayapilla, J. Bussell, G. Shi, J. Francis, J. Oh (*equal contribution). <i>Robotics: Science and Systems (RSS) 2026</i> .	2026
Visual-Geometric Policy Steering from In-Context Aligned Abstractions A. Bucker , P. Anantharam, J. Francis, J. Oh. <i>Under review</i> .	2026
GRAPPA: Generalizing and Adapting Robot Policies via Online Agentic Guidance A. Bucker , P. Ortega-Kral, J. Francis, J. Oh. <i>IEEE Robotics and Automation Letters (RA-L) 2026, presented at IROS 2026</i> .	2026
Windows Agent Arena: Evaluating Multi-Modal OS Agents at Scale R. Bonatti, D. Zhao, F. Bonacci, D. Dupont, S. Abdali, Y. Li, Y. Lu, J. Wagle, K. Koishida, A. Bucker , L. Jang, Z. Hui. <i>ICML 2025</i> .	2025
ChatGPT for Robotics: Design Principles and Model Abilities S. Vemprala, R. Bonatti, A. Bucker , A. Kapoor. <i>IEEE Access</i> .	2024
LATTE: LAnguage Trajectory TransformEr A. Bucker , L. Figueredo, S. Haddadin, A. Kapoor, S. Ma, S. Vemprala, R. Bonatti. <i>IEEE ICRA 2023</i> .	2023
Reshaping Robot Trajectories Using Natural Language Commands: A Study of Multi-Modal Data Alignment Using Transformers A. Bucker , L. Figueredo, S. Haddadin, A. Kapoor, S. Ma, R. Bonatti. <i>IEEE/RSJ IROS 2022</i> .	2022
Do You See What I See? Coordinating Multiple Aerial Cameras for Robot Cinematography A. Bucker , R. Bonatti, S. Scherer. <i>IEEE ICRA 2021</i> .	2021
Batteries, Camera, Action! Learning a Semantic Control Space for Expressive Robot Cinematography R. Bonatti, A. Bucker , S. Scherer, M. Mukadam, J. Hodgins. <i>IEEE ICRA 2021</i> .	2021
Graph Neural Networks for Improved El Niño Forecasting S. Rühling Cachay, E. Erickson, A. Bucker , E. Pokropek, W. Potosnak, S. Osei, B. Lütjens. <i>NeurIPS 2020 Workshop on Tackling Climate Change with ML</i> .	2020

TEACHING

Carnegie Mellon University, 16-831 Introduction to Robot Learning <i>Teaching Assistant; reinforcement learning, deep Q-learning, DAgger, direct preference optimization (DPO)</i>	Aug 2026 – Present Pittsburgh, PA
Carnegie Mellon University, Introduction to Human-Robot Interaction <i>Teaching Assistant; HRI technologies, psychology of human-robot interaction, HRI study design</i>	Jan 2026 – May 2026 Pittsburgh, PA
University of São Paulo, Embedded Systems <i>Teaching Assistant; electronics, ROS, autonomous vehicles</i>	Feb 2018 – Jun 2018 São Paulo, Brazil

LEADERSHIP AND PROJECTS

University of São Paulo and Aalto University <i>Technical Lead</i> Led a team of 8 engineers building a SAAB-sponsored (EUR 10k) hydroacoustic localization and communication system for divers; featured on the cover of the Finnish magazine Metalliteknikka.	Aug 2018 – May 2019 São Paulo, Brazil and Helsinki, Finland
CITI, University of São Paulo <i>Research Intern</i> Built an embedded system for sea turtle monitoring using distributed sensor networks, swarm intelligence, and LoRa communication.	Aug 2018 – May 2020 São Paulo, Brazil
Skyrats, University of São Paulo Autonomous Drones Group <i>Team Member</i> Implemented computer vision and path-planning algorithms on embedded systems for autonomous drones.	Feb 2018 – Apr 2020 São Paulo, Brazil
Grupo Turing, University of São Paulo AI Group <i>Head of Project Management</i> Managed student AI projects in computer vision, natural language processing, and evolutionary algorithms.	Feb 2018 – Aug 2018 São Paulo, Brazil

HONORS AND AWARDS

Fundação Estudar Leaders Program Fellow (0.05% acceptance rate)	2020 – Present
TCS Presidential Fellowship, Carnegie Mellon University	2024
AUCANI Merit Scholarship, University of São Paulo	2020 – 2022
Spotlight Paper, ICRA 2022 Workshop on Collaborative Robots	2022
Microsoft AI for Earth Grant	2020
Huawei Seeds for the Future Program	2019
Best Project (1st of 200 teams), PACE POLI USP; Winning Team, Ambev Hackathon	2017
Silver Medal, National Theoretical Robotics Olympiad; Team Gold, Mathématiques sans Frontières	2016
National Finalist, Brazilian Robotics Olympiad (OBR)	2015 – 2016