Arthur Fender Coelho Bucker

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Gender: Male **Date of birth:** 04/05/1999 **Nationality:** Brazilian

ABOUT ME

I am a passionate roboticist and AI researcher pursuing a PhD in Robotics at Carnegie Mellon University (CMU) at the roBot Intelligence Group (BIG). I focus my research on the fields of Robotic Learning facilitated by multimodal human-robot interaction and self-supervised learning.

WORK AND RESEARCH EXPERIENCE

[04/2024 – 08/2024] **Microsoft — Applied Sciences Group (ASG) — Research intern**

Researched autonomous virtual agents for the Windows OS, contributed to the Windows Agent Arena project, and developed a temporal aware RAG system for Autonomous Agents.

Link: https://microsoft.github.io/WindowsAgentArena/

[01/2023 – 04/2023] **Microsoft — Autonomous Systems and Robotics Research — Research Intern**

Conducted research on foundational models for robotics. Developed the software of an indoor autonomous drone for an official Microsoft demo representing the Airsim Project. In real life, the vehicle demonstrated the execution of trajectories created by generative models.

Links: https://www.youtube.com/watch?v=2eU0rLp464s | https://www.microsoft.com/en-us/research/group/autonomous-systems-group-robotics/articles/chatgpt-for-robotics/

[10/2021 – 10/2022] **Munich Institute of Robotics and Machine Intelligence (MIRMI) — Research intern**

Research in collaboration with "Microsoft Business AI - Science & Research (US)" in the field of Natural-language-facilitated Human-Robot-Interaction. I created and developed a system able to modify robotic trajectories using natural language commands. The approach leverages pre-trained language models and a transformer-based architecture to allow human interaction over an arbitrary set of robotic platforms. The outcome of the project was a paper published at the IROS2022 conference and presented as a spotlight contribution at 2 ICRA2022 workshops.

Link: https://arthurfenderbucker.github.io/NL_trajectory_reshaper/

[05/2020 – 10/2020] **Carnegie Mellon University - Researcher Intern**

Conducted 2 researches at AirLab CMU on the field of AI and Robotics. Achieving 2 publications at IEEE -ICRA 2021: “Coordinating Multiple Aerial Cameras for Robot Cinematography” (1st author) and “Learning semantic control space for expressive robot cinematography” (2nd author).

Link: https://arthurfenderbucker.github.io/publications/

[08/2018 – 05/2019] **International Product Development**

Technical leadership on an interdisciplinary group of 8 master students from USP and Aalto University (Finland) for the development of a Hydro Acoustics Localization and

Communication System for Divers. The project, sponsored by SAAB, was developed with a budget of €10.000.

Link: https://arthurfenderbucker.github.io/porfolio/Hydro-acoustic_localizer

[08/2018 – 05/2020] **CITI USP, Brazil — Research intern**

Applying concepts of distributed networks and swarm intelligence in embedded systems for sea turtle life monitoring and organic sensing. The project is being developed in a partnership with project Tamar

Link: https://arthurfenderbucker.github.io/porfolio/Internet_of_Turtles_-_Distributed_traking_System

[02/2018 – 08/2018] **Grupo Turing AI — Head of project management**

A group with the goal of studying, applying, and disseminating Artificial Intelligence Knowledge.

Managed the group members on the development of several AI projects. As a group member, I led or participated in projects on fields of computer vision (Hepatic carcinoma outcome prediction, Brazilian sign language simultaneous translation), Natural Language Processing (political thermometer of Brazilian Politicians on social media), and Evolutionary Algorithms (autonomous players of Pong and Tetris).

Group member (Jan, 2017 - dec, 2020)

Link: https://arthurfenderbucker.github.io/porfolio/robotic_hand

[10/2018 – 09/2020] **Skyrats, Autonomous Drones — Member**

Group of Autonomous drones design of the University of São Paulo

Responsible for developing computer vision and AI solutions for embedded systems and autonomous Drones. In addition to working on the hardware and electronics design.

Captain of the indoor team at IMAV 2019 Madrid - International Micro Air Vehicle Competition.

Link: https://arthurfenderbucker.github.io/porfolio/IMAV

[01/2018 – 03/2018] **AB InBev, Brazil — Summer intern**

Worked for 2 months with computer vision solutions for product identification, Business Intelligence and predictive analytics at the Logistics and Distribution Center of AB InBev.

EDUCATION

[08/2023 – Current] **Carnegie Mellon University**

PhD. in Robotics

[10/2020 – 09/2022] **Techniche Universität München**

MSc. Mechatronics and Robotics

[01/2017 – 06/2023] **Escola Politécnica da Universidade de São Paulo**

B. Mechatronics Engineering

AWARDS

[2024 – Current] **TCS Presidential Fellow**

Presidential Scholarship funded by Tata Consultancy Services (TCS) for outstanding graduate students at Carnegie Mellon University.

Spotlight contribution - IEEE 2022 ICRA workshop on Collaborative Robots and the Work of the Future

[07/2020 – Current] **Fellow at Fundação Estudar**

Leaders program (approval rate = 0.05%)

AUCANI merit scholarship recipient

USP merit Scholarship for academic exchange programs

Microsoft AI for Earth Grantee 2020

[10/2019 – 11/2019] **Summer Exchange in China (Huawei)**

Seeds for the Future program

Winning Team at Hackathon Ambev

(Hack the World 2017 SP)

Best project award and Team leader

at PACE POLI USP 2017 Competition (1st out of 200 teams)

Brazilian Robotics Olympics Finalist (OBR)

A representative of the State of São Paulo at the national stages of the Brazilian Robotics Olympics

(team leader 2015 & 2016)

Silver medal in the national Theoretical Robotics Olympics (OBR 2016)

Team gold medal at the "International Olympiad Mathématiques sans frontières" (2016)

PUBLICATIONS

[2024] **Windows Agent Arena**

Published in *Neurips 2024 Workshop on Safe & Trustworthy Agents (SATA) | Neurips 2024 Workshop on Open-World Agents | ICLR 2025 (under review)*

Link: https://microsoft.github.io/WindowsAgentArena/

[2024] **Grounding Robot Policies with Visuomotor Language Guidance**

preprint | ICLR 2025 (under review)

[02/2023 – 03/2023] **ChatGPT for Robotics: Design Principles and Model Abilities**

Published in *IEEE Access Journal / Microsoft Research Tech Report - feb 2023*

Link: https://www.microsoft.com/en-us/research/uploads/prod/2023/02/ChatGPT___Robotics.pdf

[04/2021 – 09/2022] **LATTE: LAnguage Trajectory TransformEr**

Published at *ICRA 2023 conference*.

Link: https://arxiv.org/abs/2208.02918

[10/2021 – 03/2022] **Reshaping Robot Trajectories Using Natural Language Commands: A Study of Multi-Modal Data Alignment Using Transformers**

Published at *IROS 2022 conference | IEEE 2022 ICRA workshop on Shared Autonomy in Physical Human-Robot Interaction | IEEE 2022 ICRA workshop on Collaborative Robots and the Work of the Future | Northwest Robotics Symposium 2022*

Links: https://arxiv.org/abs/2203.13411 | https://www.youtube.com/watch?v=fhSOb3z7aXE

[2021 – 2021] **Do You See What I See? Coordinating Multiple Aerial Cameras for Robot Cinematography**

Published in *IEEE International Conference on Robotics and Automation (ICRA 2021)*

Links: https://arthurfenderbucker.github.io/publication/Coordinating_Multiple_Aerial_Cameras_for_Robot_Cinematography | https://arxiv.org/abs/2011.05437 | https://youtu.be/Qq_dRGNAUMs

[2021 – 2021] **Batteries, camera, action! Learning a semantic control space for expressive robot cinematography**

Published in *IEEE International Conference on Robotics and Automation (ICRA 2021)*

Links: https://arthurfenderbucker.github.io/publication/Learning_a_semantic_control_space_for_expressive_robot_cinematography | https://arxiv.org/abs/2011.10118 | https://www.youtube.com/watch?v=aN3kGDRo0XE

[2020 – 2020] **Graph Neural Networks for Improved El Nino Forecasting**

Published in NeurIPS 2020 workshop on Tackling Climate Change with Machine Learning & EGU2021 (Proposal paper)

Links: https://arthurfenderbucker.github.io/publication/Graph_Neural_Networks_for_Improved_El_Nino_Forecasting | https://arxiv.org/abs/2012.01598

LANGUAGES

Portuguese - Native

English - Fluent

German - Intermediate

Spanish - Intermediate

Chinese - Basic

French - Basic