Arthur Fender Coelho Bucker

Nationality: Brazilian **Date of birth:** 4 May 1999 **Gender:** Male

Phone number: (+1) 4123907861 **Email address:** abucker@andrew.cmu.edu

Website: https://arthurfenderbucker.github.io/

Work: 5000 Forbes Ave, 15217 Pittsburgh (United States)

ABOUT ME

I am a passionate roboticist and AI researcher.
My main interests are in the fields of Mechatronics Engineering, Robotics, AI, and Computer Vision

WORK AND RESEARCH EXPERIENCE

Microsoft — Research Intern

[17 Jan 2023 – 7 Apr 2023]

Conducted research on foundational models for robotics at Microsoft's Autonomous Systems and Robotics Research Group.

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/

Munich Institute of Robotics and Machine Intelligence — Research intern

[Oct 2021 – Oct 2022]

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/

Carnegie Mellon University - Researcher Intern

[May 2020 – Oct 2020]

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/

International Product Development

[Aug 2018 – May 2019]

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

CITI USP, Brazil — Research intern

[Aug 2018 – May 2020]

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

Grupo Turing AI — Head of project management

[Feb 2018 – Aug 2018]

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

Skyrats, Autonomous Drones — Member

[Oct 2018 – Sep 2020]

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

AB InBev, Brazil — Summer intern

[Jan 2018 – Mar 2018]

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

Carnegie Mellon University

[Aug 2023 – Current]

PhD. in Robotics

Techniche Universität München

[Oct 2020 – Sep 2022]

MSc. Mechatronics and Robotics

Escola Politécnica da Universidade de São Paulo

[Jan 2017 – Jun 2023]

B. Mechatronics Engineering

AWARDS

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

Fellow at Fundação Estudar

[Jul 2020 – Current]

Leaders program (approval rate = 0.05%)

AUCANI merit scholarship recipient

USP merit Scholarship for academic exchange programs

Microsoft AI for Earth Grantee 2020

Summer Exchange in China (Huawei)

[15 Oct 2019 – 3 Nov 2019]

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

ChatGPT for Robotics: Design Principles and Model Abilities

[Feb 2023 – Mar 2023]

Published a Microsoft Research Articles - Technical Report

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

LATTE: LAnguage Trajectory TransformEr

[Apr 2021 – Sep 2022]

Published at *ICRA 2023 conference*.

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

Reshaping Robot Trajectories Using Natural Language Commands: A Study of Multi-Modal Data Alignment Using Transformers

[Oct 2021 – Mar 2022]

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

Do You See What I See? Coordinating Multiple Aerial Cameras for Robot Cinematography

[2021 – 2021]

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

Batteries, camera, action! Learning a semantic control space for expressive robot cinematography

[2021 – 2021]

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

Graph Neural Networks for Improved El Nino Forecasting

[2020 – 2020]

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