GUILHERME FRÓES SILVA

Lecturer

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ACADEMIC QUALIFICATIONS

Leadership and Management

Harvard Business School Online

2024 – 2026

- Leadership Principles 2024
- Management Essentials 2026

Doctor of Philosophy (Electrical Engineering)

Queensland University of Technology
School of Electrical Engineering and Robotics

2019 – 2023 | Brisbane, Australia

Ph.D. thesis "Control Design Methods for $\mathcal{L}_\infty$ String Stable Nonlinear Interconnected Systems Subject to Disturbances".

The thesis looks at ways to design controllers that prevent string instability while providing insight into the design process and proposes methods that leverage the relationship between the energy of a system and that of its neighbours to ensure the "string stability" of an interconnected system. This work uses concepts of Lyapunov Theory and Contraction Analysis and resulted in publications [7], [3], and [1].

Master of Philosophy (Electrical Engineering)

PUCRS

2015 – 2017 | Porto Alegre, Brazil

Master Thesis "Real-Time Shadow Detection and Removal in Aerial Motion Imagery Application".

Worked alongside Transparent Sky on the problem of compensating for shadows in aerial surveillance imagery. This work resulted in publication [4].

GPA: 8.7/10

Sandwich Program in Electrical Engineering

The University of Birmingham

2012 – 2013 | Birmingham, UK

Included several units and an internship placement at the Birmingham Centre for Railway Research and Education that involved the design and assembly of an autonomous unit for rail inspection using a laser sensor.

Bachelor of Engineering (Automation and Control)

PUCRS

2009 – 2015 | Porto Alegre, Brazil

Thesis "Project and Control of a Rotary Dual-Stage Actuator".

GPA: 8.2/10

SUMMARY

Guilherme received his B.Eng. (Control and Automation) degree in 2015 and his MPhil (Electrical Engineering) in 2017, both from PUCRS, Brazil. In 2018, he lectured at PUCRS, teaching various control and industrial automation courses. He received his PhD (Electrical Engineering) from The Queensland University of Technology (QUT), Australia, in 2023. He is currently a Lecturer at QUT and his research interests are collision risk estimation for airspace characterisation, and control of scalable networks of dynamic systems and high-precision positioning systems.

ACHIEVEMENTS

EATP Round 2 *2024-2026*
Funded by the Emerging Aviation Technology Partnerships Program, the Australian Digital Airspace Characterisation project is pioneering new digital tools to measure and model the safety of drone operations in Australia's airspace.
Awarded 1.5 million AUD.

Other Funded Projects
Airspace Mid-Air Collision Risk Calculations (Boeing) *2023-2026*
Awarded 430k AUD.

UK Air Space Risk Study (Civil Aviation Authority, UK) *2024-2028*
Awarded 267k AUD.

Vice-Chancellor's Awards for Excellence
Received the 2024 VCAE in the category "External Partnership and Engagement" for Transforming Aviation Safety: Leading Impactful Collaborations with Industry.

AAUS 2023 Industry Awards
Australian Association for Uncrewed Systems' 2023 Industry Awards in the Innovations – Operations category with the Boeing/QUT Air Risk Collaboration Team.

2023 BTEC Award
Contributed to work that has been awarded "Best of BTEC" for the track "Sustainability and Future Mobility" at Boeing's technical conference.

Publication Award
Was awarded the SAGE HDR Student Publication Prize (2021) for the journal paper [3], published in Automatica.

WORK EXPERIENCE

Lecturer in Electrical Engineering (Aerospace and Control)

Queensland University of Technology

Oct 2023 – Ongoing

Brisbane, Australia

Lecturer, School of Electrical Engineering and Robotics.

Chief Investigator, QUT Centre for Robotics.

Units:

- Control and Dynamic Systems (2025-2)
- Modern Control (2025-1, 2026-1)
- Research Methods for Engineers (2024-2, 2025-2)
- Mechatronics Design I (2024-1)
- Robot Systems (2024-1)

Leadership and Engagement:

- ECR/HDR Representative in the FoE Equity Committee
- Academic Champion for the QUT Aerospace Society
- Mental Health First Aider
- QCR Chief Investigator
- Ally

Research Fellow

The University of Newcastle

Mar 2023 – Oct 2023

Newcastle, Australia

Investigated nonlinear networked systems scalability in the context of the Discovery Project DP220103637.

Research Fellow (Associate Investigator)

QUT Centre for Robotics

July 2022 – Oct 2023

Brisbane, Australia

Activities focus on airspace characterisation for risk estimation of uncrewed aircraft operations.

Previous work as a Research Assistant (Mar 2022 - July 2022) provided traceability between the Defence Aviation Safety Regulations (DASR) and the Joint Authorities for Rulemaking on Unmanned Systems (JARUS) – Specific Operations Regulation Assessment (SORA).

Sessional Academic

Queensland University of Technology

July 2019 – Oct 2023

Brisbane, Australia

Tutored and developed material for the following units: **Control and Dynamic Systems, Modern Control, Autonomous Systems, and Aircraft Systems and Flight**.

Lecturer

PUCRS

Feb 2018 – Dec 2018

Porto Alegre, Brazil

Units:

- Industrial Automation
- Robot Programming
- Discrete-Event System Simulation
- Integrated Manufacturing Systems
- Control Systems Analysis
- Modelling for 3D Printing

Research Assistant

LABIMA (Image Lab) - PUCRS

Aug 2015 – Jan 2017

Porto Alegre, Brazil

Research focused in automatic shadow removal from aerial images for the United States Air Force Grant regarding the shadow problem. In Jan 2016, visited The University of New Mexico and Transparent Sky.

Accomplishments

- Development of real-time automatic shadow detection software using OpenCV and CUDA technologies.
- Teaching Assistantship in undergraduate *Signals and Systems* course.

DETAILED RESEARCH EXPERIENCE

Scholarships and Projects
Awarded funding by the Emerging Aviation Technology Partnerships (EATP) Program, in a chief investigator capacity. This project is funded to develop a digital toolkit for air risk analysis to accelerate regulatory processes and airspace initiatives for emerging aviation technology. **Awarded 1.5 million AUD.**
From Jun 2024 to May 2026.

Consultancy (worth **267k AUD**) for the Civil Aviation Authority (UK) in the project "UK Air Space Risk Study".
From Aug 2024 to Mar 2028.

Chief investigators in the project "Airspace Mid-Air Collision Risk Calculations" funded by Boeing Defence Australia (**430k AUD**).
From Mar 2023 to Dec 2026.

Awarded the QUT Postgraduate Research Award (QUTPRA) and the QUT Centre for Robotics Top-up scholarship during his PhD.
From Feb 2019 to Feb 2022.

Research Assistant within the United States Air Force Grant looking at an image processing methodology to remove shadows of aerial images.
From Aug 2015 to Jan 2018.

Had a scholarship from Cordenação de Aperfeiçoamento de Pessoal de Ensino Superior (CAPES) covering tuition fees during his Masters of Philosophy.
From Aug 2015 to Aug 2017.

Panels
2024
Panel Member at Cameron Coombe's PhD Confirmation Seminar on 2024-01-17.

REFERENCES

Prof Aaron McFadyen
@ aaron.mcfadyen@qut.edu.au
Queensland University of Technology, Australia

Prof Jason J. Ford
@ j2.ford@qut.edu.au
Queensland University of Technology, Australia

Dr Alejandro Donaire
@ alejandro.donaire@newcastle.edu.au
The University of Newcastle, Australia

Brendan Williams
@ brendan.p.williams@boeing.com
Boeing Defence Australia

PUBLICATIONS

Journal Papers

[1] G. F. Silva et al. "Scalable Input-to-State Stability of Nonlinear Interconnected Systems". In: *IEEE Transactions on Automatic Control* (2024), pp. 1–11. DOI: 10.1109/TAC.2024.3468069.

[2] G. F. Silva et al. "String Stability in Microgrids Using Frequency Controlled Inverter Chains". In: *IEEE Control Systems Letters* 6 (2022), pp. 1484–1489. DOI: 10.1109/LCSYS.2021.3114143.

[3] G. F. Silva et al. "String stable integral control design for vehicle platoons with disturbances". In: *Automatica* 127 (2021), p. 109542. ISSN: 0005-1098. DOI: https://doi.org/10.1016/j.automatica.2021.109542.

[4] G. F. Silva et al. "Near real-time shadow detection and removal in aerial motion imagery application". In: *ISPRS Journal of Photogrammetry and Remote Sensing* 140 (2018). Geospatial Computer Vision, pp. 104–121. DOI: 10.1016/j.isprsjprs.2017.11.005.

Conference Papers

[5] Joshua Lloyd and Guilherme Froes Silva. "Scalability and Stability Analysis of Networked Systems Using the Robotarium". In: *2025 Australian & New Zealand Control Conference (ANZCC)*. 2025, pp. 87–92. DOI: 10.1109/ANZCC65042.2025.10873358.

[6] A. McFadyen, G. F. Silva, and B. Williams. "Adjacent Airspace Risk and Containment Requirement Estimation for Uncrewed Operations". In: *2024 International Conference on Unmanned Aircraft Systems (ICUAS)*. 2024, pp. 546–555. DOI: 10.1109/ICUAS60882.2024.10556826.

[7] G. F. Silva et al. "String Stable Integral Control of Vehicle Platoons with Actuator Dynamics and Disturbances". In: *59th IEEE Conference on Decision and Control (CDC)*. 2020, pp. 2837–2842. DOI: 10.1109/CDC42340.2020.9303743.

Patents

[8] Boeing. "MID-AIR COLLISION (MAC) RISK MODELS AND SYSTEMS AND METHODS FOR GENERATING MAC RISK MAPS". US20250061400A1. U.S Patent Pending. Apr. 2024. URL: https://patents.google.com/patent/US20250061400A1/en?oq=US-20250061400-A1.