

B.Sc. Cássio J. D. Silva

Researcher in [Digital Twins](#), [Embedded Systems](#) & [Autonomous Vessels](#)

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About

Cássio J. D. Silva works where computing meets physical processes: embedded systems, sensing, telemetry, control, simulation environments, and digital twin architectures for monitoring and validation.

At the [Laboratory of Autonomous Systems \(LSA\)](#) Silva builds fault-tolerance benchmarks and ROS 2 integration for Jundiá, a simulation platform for autonomous vessels operating offshore. The master's research models those vessels as digital twins and validates the models against a proof of concept on a custom application.

At the [Laboratory of Embedded Systems \(LSE\)](#) Silva writes ETL pipelines and trains classifiers that predict obstructive sleep apnea from polysomnography, SpO₂, ECG and thoracic effort signals.

Earlier work injected faults into ArduPilot SITL to measure silent data corruption in the EKF3 estimator, developed mixed reality applications for inclusive mathematics education at [LEPIMAT](#), analyzed facial expression data at the [Virtual Humans Simulation Laboratory](#), produced Android applications for NFC and RFID tags at CEITEC S.A., and built business analytics at RCI.

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Research

PPGCC

M.Sc.

ONGOING

Digital twins for autonomous unmanned surface vehicles

Modelling autonomous surface vessels as digital twins, validated through a proof of concept built on a custom application

ADVISOR

Prof. Dr. César A. M. Marcon

PROGRAMME

PPGCC • PUCRS • Embedded Systems

CO-ADVISOR

Prof. Dr. Anderson R. P. Domingues

PERIOD

July 2026 to present

CNPq

N° 25/2025

ONGOING

Jundiá

Advanced simulation platform for autonomous vessels in offshore environments with digital twin support

PI

Prof. Anderson R. P. Domingues · LSA · PUCRS

TEAM

B, fault tolerance and integration

FELLOWSHIP

CNPq DTI-C · March 2026 to present

PARTNERS

Loughborough University · INSTOR

CNPq

407477/2022-5

CONCLUDED

AIM-FTA

Assessment, identification and mitigation of soft errors in avionics embedded software

PI

Prof. Ney Laert Vilar Calazans · LSA · PUCRS

TARGET

ArduPilot SITL · EKF3, 24 states, multi-core

PERIOD

May to November 2025

RESULT

59 critical SDCs in 3,794 runs · pitch corrupted in all 59 · 31.17 FIT

FINEP

FAPERGS

ONGOING

SleepSensing

Obstructive sleep apnea prediction from biomedical signals through machine learning

LAB

LSE · PUCRS · March 2025 to present

MODELS

Random forest · gradient boosting · CNN · LSTM

SIGNALS

Polysomnography · SpO₂ · ECG · thoracic effort

FEATURES

FFT · wavelets · spectral feature engineering

CNPq

LEPIMAT

CONCLUDED

Mixed reality for inclusive mathematics education

Mixed reality applications for mathematics teaching, aimed at students who learn mathematics differently

LAB

LEPIMAT · PUCRS

FELLOWSHIP

CNPq undergraduate research

PERIOD

October 2022 to November 2023

FOCUS

Assistive technology · accessibility · interaction design

VHLab

Volunteer

CONCLUDED

Facial expression analysis

Analytical exploration of facial expression data for the virtual humans group

LAB

Virtual Humans Simulation Laboratory · PUCRS

PERIOD

June to August 2022

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Timeline

Jul 2026 - present

Graduate student research assistant

PPGCC

Programa de Pós-Graduação em Ciência da Computação · PUCRS · full time

Digital twins applied to autonomous robotics on embedded systems.

Oct 2025 - present

Research assistant

VOLUNTEER

LSE

Laboratory of Embedded Systems · PUCRS

Unpaid research on biomedical signal processing and machine learning for sleep apnea prediction.

Mar 2026 - Jun 2026

Undergraduate research assistant

LSE

Embedded Systems Laboratory · NSESD · PUCRS · internship

ETL pipelines and feature engineering for biomedical signals.

Sep 2025 - Mar 2026

Research assistant

VOLUNTEER

LSA

Laboratory of Autonomous Systems · PUCRS

Design, deployment and optimization of laboratory computing infrastructure.

Aug 2025 - Jun 2026

Undergraduate research assistant

NSESD

Hardware Project Support Group · NSESD · PUCRS · part time

Hardware project support, simulation and test infrastructure.

Mar 2025 - Jul 2026

Undergraduate research assistant

LSA

Autonomous Systems Laboratory · NSESD · PUCRS · part time

Fault injection in ArduPilot SITL, silent data corruption analysis in EKF3, and the first work on the Jundiá simulation platform.

Oct 2022 - Nov 2023

Undergraduate research fellow

CNPQ

LEPIMAT · PUCRS · hybrid

Research and development of mixed reality applications for mathematics education, covering assistive technology and accessibility in digital learning environments.

Jun 2022 – Aug 2022

Research fellow

VOLUNTEER

VHLAB

Virtual Humans Simulation Laboratory · PUCRS

Analytical exploration of facial expression data.

Mar 2021 – Nov 2021

Junior data analyst

RCI

RCI Analytics Intelligence · Porto Alegre · hybrid

Designed and maintained ETL processes for data extraction, transformation and loading, and built business analytics with SAP HANA, Pentaho Kettle, Tableau and IBM SPSS Modeler.

Jun 2019 – Mar 2020

Android developer

CEITEC

CEITEC S.A. · Porto Alegre · on site

Android applications for NFC and RFID devices in the BEM TE VI product line, reading and writing EPC Gen2 tags for livestock traceability, logistics, vehicle identification and authentication.

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Education

Jul 2026 – present

M.Sc. in Computer Science

Pontifícia Universidade Católica do Rio Grande do Sul (PPGCC)

Embedded systems research line. Advisor: Prof. Dr. César A. M. Marcon. Co-advisor: Prof. Dr. Anderson R. P. Domingues.

Feb 2018 – Jun 2026

B.Sc. in Computer Science

Pontifícia Universidade Católica do Rio Grande do Sul

Final grade 10. Undergraduate thesis: *Notas de Pesquisa sobre o Entscheidungsproblem*, advised by Prof. Anderson R. P. Domingues.

Feb 2015 – Dec 2018

Technical diploma in Information Technology

QI Escolas e Faculdades

Emphasis on operating systems and programming languages.

During the undergraduate degree Silva joined the founding cohort of the [Quantum Computing Academic League](#), served in the PUCRS Student Academic Directory, and carried out research across four PUCRS laboratories: Virtual Humans, Autonomous Systems, Embedded Systems, and Mathematics Learning Technologies.

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Skills

RESEARCH

Digital Twins Cyber-Physical Systems Fault Injection Fault Tolerance Soft Errors High-Fidelity Simulation
EKF/State Estimation Signal Processing Machine Learning

DEVELOPMENT

Python C C++ Android/Java ROS 2 ArduPilot SITL HiTL Docker Podman Linux/RHEL Git

DATA

pandas NumPy SQL ETL SAP HANA Tableau SPSS Modeler IBM InfoSphere Pentaho Kettle Power BI

INFRASTRUCTURE

Slurm NFS Tailscale IPMI Dell PowerEdge

LANGUAGES

Portuguese, native English, working level Latin, intermediate French, intermediate

ACADEMIC INTERESTS

Mathematical Logic Theory of Computation Computability Pure Mathematics

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Repositories

The repositories on this GitHub account stay private, because they hold coursework governed by academic integrity rules and laboratory work governed by grant agreements. Public code from the laboratory appears in the [Isa-pucrs](#) organization. Write to the address below for access to a specific project.

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 Lattes 3714839015853496

 github.com/CCcassiusdjs

 linkedin.com/in/cassiusdjs