RAFAEL ACCÁCIO NOGUEIRA

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Education

nov 2019 – dec 2022 **Ph.D in Automatic Control**,
CentraleSupélec/Université Rennes 1, Rennes, France.
Security of Distributed Model Predictive Control under False Data Injection
Supervisor: Hervé Guéguen
— Use of classification and estimation methods to detect attacks and mitigate their effects.

sep 2017 – sep 2018 **Master 2 Research in Electronics - Signal, Imaging,Embedded Systems and Control**, *Control Path*
CentraleSupélec/Université Rennes 1, Rennes, France.

sep 2016 – sep 2018 **Automatic Systems Engineering - Supélec Formation**,
CentraleSupélec, Rennes, France.

apr 2013 – aug 2019 **Control and Automation Engineering Bachelor Degree**,
Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil.
Identification of a mechatronic system
Supervisor: Marcos Vicente de Brito Moreira
— Modelling of a multi-agent mechatronic system using Petri nets, implementation over multiple PLCs (Ladder language), and supervision (data acquisition) for global identification (DAOCT model) using python.

apr 2010 – dec 2012 **Electronics Technician**,
CEFET-RJ, Rio de Janeiro, Brazil.

apr 2006 – dec 2012 **Elementary and High School**,
Colégio Pedro II - Unidade Escolar Centro, Rio de Janeiro, Brazil.

Experience

sep 2024 – aug 2025 **Research Engineer**,
DAPI — IMT Atlantique,
Nantes - France
Team: Commande — LS2N,
Mission d'Enseignement et encadrement de projets étudiants. .
— Cours pour les 3 années de la FISE en Mathématiques, Automatique et Informatique.
— Recherche sur la caractérisation thermique de bâtiments pour détection/prévention des épisodes de coups de chaleur.

jun 2024 – aug 2024 **Research Engineer**,
Departement: Robotique — LAAS/CNRS,
Toulouse - France
Team: Robotique et InteractionS — RIS,
Integration between Robot ontologies and Natural language .
Supervisor: Aurélie Clodic
— Integration between robotics architecture over ROS and Minecraft/Malmö

http://github.com/Accacio
http://orcid.org/0000-0001-9341-1877
http://scholar.google.com/citations?user=ThbzCIMAAAAJ

may 2023 **Postdoctoral Researcher**,
may 2024 *Departement: Décision et Optimisation - LAAS/CNRS*,
Toulouse - France
Team: DIagnostic, Supervision et COnduite - DISCO,
Guaranteed Relative localisation of autonomous vehicles. .
Supervisor: Soheib Fergani

- autOCampus Platform: Developing C++/MATLAB algorithms for the localisation of delivery droïds over the Université Toulouse III - Paul Sabatier's campus.

oct 2018 **Engineering Intership**,
feb 2019 *Team: Machine Learning/Fraud Detection - Stone Pagamentos*,
Rio de Janeiro - RJ - Brasil,
Development of tools used for fraud detection.
Data analysis for payment solutions.

- Programs in Scala using Microsoft SQL Server and other tools
- API Rest, Data Streams, State Machines etc using Akka library

apr 2018 **Engineering Internship**,
aug 2018 *DEA - IRMV - TECH. VEH. INTELLIGENT - Renault*,
Technocentre Renault - Guyancourt - Île de France - France,
Development of supervision system for autonomous vehicle.

- Interface ROS/Simulink using C++, Python and MATLAB/Simulink
- State machine using Stateflow

nov 2017 **Industrial Study Project**,
apr 2018 *RTE - Réseau de Transport d'Électricité*,
Rennes ↔ Paris,France,
Use of automata to optimize the insertion of Renewable Energies.

- Étude des standards CEI 61131 et compatilibité avec besoins RTE

july 2017 **Engineering Internship**,
aug 2017 *Institut d'Électronique et de Télécommunication de Rennes*,
Rennes, France,
Voltage control of distribution networks.

- Simulation using PowerFactory
- Interface between PowerFactory and Simulink
- Automation of simulations with Python scripts
- Control Validation

aug 2015 **Scientific Initiation**,
jun 2016 *Laboratório de Processamento de Sinais e Imagens Médicas, UFRJ*,
Rio de Janeiro, Brazil.
Secure Control for prosthetic robotic arm for muscle atrophy patients

- Modeling and servomotors control
- Signal Processing

apr 2013 **Technical Internship**,
sep 2013 *Rede Globo - Matriz, TV GLOBO*, Rio de Janeiro, Brazil.

- Central de Transmissão e Recepção de Sinais - CTRS
  - Transmission et Réception de Signaux Audiovisuels
  - Traitement des Signaux (Gamma, Coloration, délai audio etc)

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http://scholar.google.com/citations?user=ThbzCIMAAAAJ

Courses

2024–2025 **IMT Atlantique, Nantes, France**,
Project + Exercise + Pratical + Theoretical courses .

- Analyse L3 TD (10h)
- Ident. et est. des signaux et syst. dyn. M1/M2 TP/TD (7.5h)
- Projet Complexe (PROCOM) - IA Racing M1/M2 (6 mois)
- Signaux et systèmes (analogiques et numériques) L3 CM (10h)
- Signaux et systèmes (analogiques et numériques) L3 TD (12.5h)
- SA UE Electrical Engineering (Régulation Thermique) L3 SA (10h)
- Architecture logicielle pour la robotique M1/M2 TP (30h)
- Projet Base roulante (PRONTO) L3 (60h)
- Prototypage des systèmes robotisés M1/M2 Projet (12.5h)

2023–2024 **ENSEEIHT, Toulouse, France**,
Exercise + Pratical courses .

- Introduction MATLAB/Simulink 1A (17h30)
- Programmation C 1A (17h30)

2022 **ECAM, Rennes, France**,
Pratical courses.

- Analyse et commande dans l'espace d'état 2A (18h)
- Asservissement 2A (30h)

2020–2022 **CentraleSupélec, Rennes, France**,
Pratical Courses and Independent Project.

- Commande Prédictive pour bâtiment intelligent 2A (15h)
- Predictive Control 3A (24h)
- Automatique 2A (24h)
- Projet Optimisation pour Microgrid isolé (10h)

2014–2015 **Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil**,
Tutoring/Pratical Courses .

- Logic Circuits (450h):
  - Boole's Algebra, Mealy's and Moore's Machines.
  - Compbinatorial and sequtential logic functions (Flip-Flops, counters, etc)

Publications

2022 **Security of distributed Model Predictive Control under False Data Injection**.
Doctoral Thesis
`https://theses.hal.science/tel-04003991v1`

2022 **Expectation-Maximization based defense mechanism for dMPC**.
9th IFAC Conference on Networked Systems NECSYS 2022
`https://doi.org/10.1016/j.ifacol.2022.07.238`

2021 **Detection and mitigation of corrupted information in dMPC based on resource allocation**.
5th Conference on Control and Fault-Tolerant SYSTOL 2021
`https://doi.org/10.1109/SysTol52990.2021.9595927`

2019 **Identification of a mechatronic system**.
Bachelor Thesis
`http://repositorio.poli.ufrj.br/monografias/monopoli10029376.pdf`

Academic Services

- Reviewer for the European Control Conference 2024/2025
- Reviewer for the Asian Journal of Control 2024/2025

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Programs

2024 **locafleet**.
Implementation of state estimation filters based on set theory (Constrained Zontopes). Main objective is the localisation of a vehicle fleet and use of estimated set for anti-collision control. Integration with ROS and demonstration for the autOCampus platform of University of Toulouse 3.

2021 **pendulum**.
Litterate programming project for the teaching of simulation of dynamic systems and control. We use a "pendulum/cart" system and the simulation runs on the terminal. The user can modify the command applied instantaneously without the need to stop or recompile the simulation.
`https://github.com/Accacio/pendulum`

2019 **DES-tools**.
Collection of terminal tools to generate semi-automatically figures and tables in LaTeX to represent discrete event systems (automata and Petri nets).
`https://github.com/Accacio/DES-tools`

2019 **DAOCT**.
Terminal tool to identify a DAOCT (Deterministic Automaton With Outputs And Conditional Transitions) model of a discrete event system for fault diagnosis based on `.csv` files recovered from a PLC.
`https://github.com/Accacio/daoct`

IT Competences

Programming	C, C++, MATLAB, Python, IEC 61131-3, Scala, Java, LaTeX, SQL, Emacs Lisp, C#, Assembly, etc	Tools	Git, Bash, Emacs, Simulink, PowerFactory, Siemens' Step7, ROS, SCADE Suite, HTML, Roboguide, Asana, Jira, Blender, Gimp, etc
Operating Systems	Linux and Windows		

Languages

	Listening	Speaking	Reading	Writing
Portuguese	Native	Native	Native	Native
French	Fluent	Fluent	Fluent	Fluent
English	Fluent	Fluent	Fluent	Fluent
German	Basic	Basic	Basic	Basic

Prizes

Qualification	MCF Section 61 2023–2027
Scholarship	Double Degree Scholarship BRAFITEC CAPES 2016–2018
3^{rd} position	Industrial Robotics Olympics - FANUC - France 2017

Interests

- Automatic Control
- Security of Cyber Physical Systems
- Transport and Mobility
- Control of distribution networks
- Signal Processing
- Robotics
- Smart City
- Aeronautics
- Renewable Energy
- Orthotics and Prosthetics

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