# 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

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|---|---|
| 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 nov 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=ThbzClMAAAAJ

may 2023  
may 2024  **Postdoctoral Researcher**,  
*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  
feb 2019  **Engineering Intership**,  
*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  
aug 2018  **Engineering Internship**,  
*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  
apr 2018  **Industrial Study Project**,  
*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  
aug 2017  **Engineering Internship**,  
*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  
jun 2016  **Scientific Initiation**,  
*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  
sep 2013  **Technical Internship**,  
*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)

## 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)
— 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.
— Combinatorial 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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 http://orcid.org/0000-0001-9341-1877
 http://scholar.google.com/citations?user=ThbzCIMAAAAJ

## Programs

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|---|---|
| 2024 | **locafleet**.<br>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**.<br>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.<br>`https://github.com/Accacio/pendulum` |
| 2019 | **DES-tools**.<br>Collection of terminal tools to generate semi-automatically figures and tables in LATEX to represent discrete event systems (automata and Petri nets).<br>`https://github.com/Accacio/DES-tools` |
| 2019 | **DAOCT**.<br>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.<br>`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

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| 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
- Acoustics

- Robotics
- Smart City
- Aeronautics
- Renewable Energy
- Orthotics and Prosthetics
- Electronics

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