# Alaf DO NASCIMENTO SANTOS

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## EDUCATION

**2024 – 2027 - Doctor of Philosophy in Mathematics and Computer Science.**
Télécom Paris, Institut Polytechnique de Paris, Palaiseau, France.

- Thesis Title: Real-time scheduling for 5G NR SCADA systems.
- Specialization: Computer Science, Data, and Artificial Intelligence (AI).
- Relevant Modules: *Scheduling in wireless networks, Databases, ORCID IDs.*

**2023 – 2024 - Master in Embedded Systems and Information Processing, *summa cum laude*.**
Télécom Paris, Institut Polytechnique de Paris, Palaiseau, France.

- Grade: 4.0 GPA (4.0 scale).
- Research project: Modeling the Critical Real-Time Execution of a 5G Base Station.
- Specialization: Industrial Systems, and Artificial Intelligence.
- Relevant Modules: *Embedded Linux, Embedded Artificial Intelligence, Artificial Intelligence for Robotics, Language Processing, System Modeling, and Real-time Systems.*

**2022 – 2024 - Master of Science in Engineering (Engineer's degree).**
Télécom Paris, Institut Polytechnique de Paris, Palaiseau, France. *Double degree program.*

- Grade: 3.8 GPA (4.0 scale).
- Thesis Title: Remote Access Application for Matter IoT Devices.
- Specialization: Embedded systems, and Mobile Networks.
- Relevant Modules: *Reconfigurable architectures (FPGA, SystemVerilog, and VHDL), Concurrent programming, Microprocessor-based systems, IoT Protocols and Systems, and Mobile networks.*

**2017 – 2024 - Bachelor of Science in Electrical Engineering.**
Federal University of Espírito Santo, Vitória, Brazil. *Double degree program.*

- Grade: 3.7 GPA (4.0 scale).
- Thesis Title: Multiplatform System For Data Reception Via Visible Light Communication.
- Specialization: Telecommunications, and Computer Science.
- Relevant Modules: *Embedded Systems, Computer Architecture, Digital Systems, Computer Networks, Dynamical Systems, Mobile Robotics, Computer Vision, and Oriented IoT Project.*

## PROFESSIONAL EXPERIENCE

**2024 – 2027 - NAI Project (PEPR 5G) PhD Researcher.**
Télécom Paris, Institut Polytechnique de Paris, Palaiseau, France.

- Research on the real-time aspects of URLLC in 5G.
- Teaching activities: Rust programming language.

**2024 - Embedded Systems and IoT Intern.**
Orange S.A., Meylan, France.

- Remote access application for Matter IoT devices.
    - Discovering the Matter and USP protocols
    - Implementation of a tool for transforming a Matter data model into the USP data model
    - Embedded software for an IoT gateway based on ARM Cortex-A processor.
    - Prototype showing the capabilities of a Matter device using the USP protocol
- Developed the first version of the USP data model capable of interacting with the Matter protocol. Achieving an A+ in my master's thesis.

**2023 - Network and Automation Intern.**
Synchrotron SOLEIL, Saint-Aubin, France.

- Software tool parameterization dedicated to centralized supervision of Siemens PLCs (S7-3xx and S7-15xx).

- Over 98 % of the targeted devices were covered through a solution based on the S7 and SNMP protocols.
    - Real-time monitoring tool: Zabbix;
    - Programming languages: Python, C/C++, and CMake.

**2021 – 2022 - Embedded Systems and IoT R&D Intern.**
2Solve Engineering and Technology, Vitória, Brazil.

- Development of software for embedded systems, IoT Web Applications, and technical documentation.
    - Embedded systems based on Raspberry Pi and SAMD21.
    - Programming languages: Javascript, Python, C/C++, and CMake.
    - Dev tools: NodeJS, AngularJS, InfluxDB, and MongoDB.
    - IoT tools: Node-RED and Grafana.
- Research project: Design of an OOK transmitter for short-link visible light data communication.

**2019 – 2021 - Undergraduate Student Researcher.**
UFES Telecommunications Laboratory (LabTel), Vitória, Brazil.

- Software and hardware design for visible light communication systems (VLC systems).
    - Dev tools: Android Studio, NodeJS, VueJS.
    - Programming languages: MatLab, Java, Python, and C++.
- Research projects:
    - Application of Visible Light Communication Technology in Monitoring High-Risk Newborns;
    - SmaL: Smartphone Receiver for Coded Data via Light.
    - Publications: [1], [2] and [3].

**2019 – 2020 - Automation Developer.**
Cassiano Antonio Moraes University Hospital (HUCAM), Vitória, Brazil.

- Establishment of electronics for a supervisory system, data monitoring app, and creating technical documentation.
    - Embedded systems based on Raspberry Pi, Arduino, and ESP8266.
    - Real-time monitoring tool: Zabbix.
    - Programming languages: Python, Javascript, and C++.
    - Publications: [4]

**2019 - Educational Program Fellow.**
Tutorial Teaching Program (PET), Vitória, Brazil.

- Group of distinguished students from the Electrical Engineering department at UFES. Software training, such as LaTex. Research about embedded systems. Production of scientific articles.
    - Embedded systems based on Raspberry Pi and Arduino;
    - Programming languages: MatLab, Python, and C/C++.
    - Publications: [5]

## MENTORING EXPERIENCE

**2025 - Undergraduate Final Project Jury Member**
Federal University of Espírito Santo, Vitória, Brazil.
Project: Video streaming in Kubernetes. Author: Gustavo Teixeira Acioli.

## VOLUNTEERING

**2018 – 2019 - Activity Manager.**
Academic Center of UFES Electrical Engineering, Vitória, Brazil.

- Organization of welcome events for freshmen, lectures on subjects of interest to graduation, promotion of sports events, selling of engineering custom t-shirts, and maintaining the study room.

**2018 - Museum Mediator.**
UFES Museum of Life Sciences, Vitória, Brazil.
- Introduce the museum to visitors, control the flow of people, and pass safety guidelines.

## HONOURS AND AWARDS

**2025 - Honorable Mention Find Me on the Moon: NASA Lunar Navigation Challenge.**
National Aeronautics and Space Administration (NASA), USA.
- Selene Squad: rover designed for navigating, mapping, and characterizing the Shackleton Crater.

**2022 – 2024 - BRAFITEC scholarship.**
CAPES Foundation, Brazil.
- Engineer's degree funding granted based on criteria of academic and technical excellence.

**2016 - Honorable Mention Brazilian Public School Mathematics Olympiad.**
Institute of Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brazil.
- Stood out in mathematics at this Olympiad, being the only high school student out of around 500 in the school to receive this award.

**2015 – 2016 - Outstanding certificate at the São João Batista School Science Fair.**
EEEFM São João Batista (High School), Espírito Santo, Brazil.
- 2016 (1st place) - Tesla coil capable of creating electric arcs of a few centimeters.
- 2015 (2nd place) - Physics project involving basic concepts of electromagnetism to turn on lamps wirelessly.

## LANGUAGE SKILLS

- Portuguese - Native Language.
- English - Advanced (C1, 2024).
  - Cambridge Linguaskill B2 (178 out of 180), 2022.
- French - Advanced (C1, 2024).
  - Test de Connaissance du Français B2 (488 out of 699), 2021.

## PUBLICATIONS AND APPEARANCES

1. **SANTOS, A.**, 2022. **Multiplatform System For Data Reception Via Visible Light Communication.** Bachelor's thesis. Federal University of Espirito Santo, ES/Brazil.

2. ZWAAG, K., ROCHA, H., SEGATTO, M., BASTOS, T., SILVA, J., SANTOS, F., **SANTOS, A.** et al., 2021. **Performance Evaluation of an OOK-Based Visible Light Communication System for Transmission of Patient Monitoring Data**. IFMBE Proceedings.

3. **SANTOS, A.**, ROCHA, H., SEGATTO, M., BASTOS, T., SILVA, J., ZWAAG, K. et al., 2020. **Application of Visible Light Communication Technology for Monitoring in Hospitals**. Brazilian Congress on Biomedical Engineering.

4. **SANTOS, A.**, JUNIOR, L., JARDIM, I., 2020. **Low-Cost Module for Supervisory System of Hospital Substations**. In: Congresso Internacional Online das Engenharias.

5. JURESWKI, A., **SANTOS, A.**, MENDONÇA, M., ULHOA, P., 2020. **History of PET Electrical Engineering UFES**. Brazilian Congress of Engineering Education.