

João Barreiros Coelho Rodrigues

E-mail | Personal Webpage

 LinkedIn |  Github |  CiênciaVita |  ORCID |  Google Scholar
Lisbon, Portugal

RESEARCH INTERESTS

Digital Systems Design, Computer Architecture, Embedded Systems, Reconfigurable Computing, FPGA-based acceleration, High-Level Synthesis, and edge deployment of hardware-accelerated machine learning models.

EDUCATION

- **Instituto Superior Técnico – Universidade de Lisboa** Sep 2023 – Nov 2025
MSc in Electrical and Computer Engineering
Lisbon, Portugal
 - GPA: **18/20**
 - Thesis: *Embedded System for Aerial Image Segmentation*, graded **19/20**
 - Major in Computer Systems; Minor in Electronic Circuits and Systems
- **Instituto Superior Técnico – Universidade de Lisboa** Sep 2020 – Feb 2024
BSc in Electrical and Computer Engineering
Lisbon, Portugal
 - Final GPA: **14/20**

WORK EXPERIENCE

- **INESC-ID / INESC INOV** Nov 2025 – Present
Early-Stage Researcher
Lisbon, Portugal
 - Conduct research on FPGA-based reconfigurable computing for efficient edge AI inference
 - Design and implement hardware accelerators using High-Level Synthesis and RTL
 - Assist on the development of methodologies for rapid HW/SW co-design targeting embedded systems
 - Contribute to the **SMARTChips** project, focusing on AI accelerator architectures and prototyping
 - Perform system-level validation through simulation and FPGA-based experimentation
- **Instituto Superior Técnico – Universidade de Lisboa** Nov 2023 – Aug 2025
Teaching Assistant
Lisbon, Portugal
 - Taught laboratory and problem classes under the Department of Electrical and Computer Engineering
 - Courses lectured include Algorithms and Data Structures, Digital Systems, Programming, and Computer Architectures
 - Achieved consistently high student evaluations (up to 9/9 QUC scores)
 - Co-founded the **Open Lab for the Scientific Area of Computer Systems**, supporting hands-on undergraduate education

PUBLICATIONS

- Rodrigues, João Barreiros; Neto, Horácio C.; Véstias, Mário Pereira. “ARES: Dataflow Co-Design for Embedded Swin Transformer Acceleration on SoC-FPGAs.” Accepted for publication in the Proceedings of the International Symposium on Highly Efficient Accelerators and Reconfigurable Technologies (HEART '26), Heidelberg, Germany, 2026.
- Teixeira, Rúben; Rodrigues, João Barreiros; Aguiar, Jaime; Li, Jiao; Sousa, José T. de. “Versat-AI: An ONNX-to-SoC Compiler for Model-Agnostic CGRA Edge Inference.” *Journal of Low Power Electronics and Applications*, vol. 16, no. 3, article 36, 2026. DOI: [10.3390/jlpea16030036](https://doi.org/10.3390/jlpea16030036)

ACADEMIC PROJECTS

- **SMARTChips: FPGA-Based AI Accelerator for Embedded Systems** Nov 2025 – Present
Tools: Xilinx Vivado, Cadence, Brevitas, PyThase
 - Designing a reconfigurable neural processing unit (NPU) using High-Level Synthesis (HLS)
 - Developing end-to-end C implementation of quantized ResNet8 for hardware/software co-validation
- **ARES: Accelerated Embedded Swin Transformer System** Sep 2024 – Nov 2025
Tools: C, FPGA HLS, SoC-FPGA platform
 - Developed hardware/software co-designed accelerator for Feed-Forward Network (FFN) of Swin Transformer
 - Adapted vision transformer models for FPGA-friendly fixed-point inference
 - Integrated accelerator with embedded software on SoC-FPGA for aerial image segmentation
 - Achieved efficient resource utilization while maintaining inference accuracy

SKILLS

- **Hardware Description Languages:** C (HLS), VHDL, Verilog
- **Programming Languages:** C, C++, RISC-V Assembly, Python, MATLAB
- **Hardware Design & EDA:** Xilinx Vivado, Cadence SoC Workflow
- **Operating Systems:** GNU/Linux
- **Developer Tools:** Git, Vim/Neovim, L^AT_EX
- **Other Hard Skills:** Linux Technical Support, Hardware Repair, Electronics Troubleshooting, Soldering

HONORS AND AWARDS

- **Academic Excellence** 2024 – 2025
Instituto Superior Técnico
 - Awarded to A-level students ($\approx$ top 10%)
- **Teaching Excellence** 2023 – 2024
Instituto Superior Técnico
 - Awarded for the Algorithms and Data Structures, Digital Systems, Programming, and Computer Architectures courses

EXTRACURRICULAR EXPERIENCE

- **Board Member – Chief Hacker Officer** Sep 2024 – Present
Lisbon, Portugal
HackerSchool
 - Co-managed HackerSchool's technical infrastructure and laboratory
 - Co-organized the **MakerIST** faire
 - Organize technical and recruitment workshops
 - Consulting on HackerSchool's decision making and projects
- **President** Sep 2022 – Sep 2024
Lisbon, Portugal
HackerSchool
 - Managed HackerSchool's financial and technical infrastructure
 - Organized technical and recruitment workshops and promoted Free and Open Source Hardware/Software practices
 - Coordinated partnerships with the **Electrical and Computer Engineering Department**
 - Arranged sponsorship with the **Instituto Superior Técnico**
 - Arranged participation on **Mini-MakerFaire Lisbon 2023**
- **Member** Mar 2021 – Present
Lisbon, Portugal
HackerSchool
 - Teaching workshops on Electronics, Embedded Systems, Git and Additive Manufacturing Processes
 - Actively contribute to the development of various project prototypes

VOLUNTEER EXPERIENCE

- **Co-manager** Sep 2024 – Present
DEEC OpenLab
 - Founding member
 - Workshop organizer
 - Overall lab aid in electronics and 3D Printing fields

EDUCATION OUTREACH

- **Electronics First** May 2024
MIT, DEEC-IST, HackerSchool 
- **3D Modelling and Printing for ECE Majors** April 2025
DEEC Openlab, DEEC-IST, HackerSchool
- **Microcontrollers for IoT** April 2025
DEEC Openlab, DEEC-IST, HackerSchool 
- **Digital Electronics 101** 2023/2024/2025
HackerSchool 
- **Introduction to Digital Systems with the Vivado Suite workshop** Sep. 2024/2025
DEEC 
- **Arduino Sprint Workshop for first year students** Sep. 2025
DEEC 

ADDITIONAL INFORMATION

Languages: Portuguese (Native), English (Fluent), German (Basic), Russian (Basic)

PERSONAL INTERESTS AND PROJECTS

Interests: Reconfigurable Computing, Hacker Culture, Electronics Repair, Embedded Systems, Free and Open Source Software

- **SILk and SARACEn – HackLab Monitoring Co-Projects**

2024 – present

Themes: Microcontrollers, IoT, Sensors and Actuators, Printed Circuit Boards

- Developed SILLk (Smart Integrated Lab Lock)
- Supervised SILLK's PCB design
- Developed SARACEn (Sensor Array for Reevaluation and Actuation in Controlled Environment)
- Both SILLk and SARACEn will integrate with the HackerSchool website

- **GreenThumb – IoT Aeroponic System**

2023 – present

Themes: Microcontrollers, IoT, Sensors, Smart Urban Agriculture, Aeroponics

- Designed an aeroponic plant growing system with sensor-based monitoring
- Implemented embedded control and data acquisition
- Designed enclosure (first prototype out of PET gallon)

- **jbc.rpt – My self-hosted website and webserver**

2024 – present

Themes: HTML, CSS, nginx

- Designed my own custom and expandable website based on the hugo framework, using little JavaScript as requirement
- Deployed from an old T410 Lenovo Thinkpad



REFERENCES

1. **Horácio Cláudio de Campos Neto**

Retired Professor with collaboration agreement, DEEC

Instituto Superior Técnico

Relationship: MSc and PhD Advisor

2. **Mário Pereira Véstias**

Coordinator Professor, DEETC

Instituto Superior de Engenharia de Lisboa

Relationship: MSc and PhD Advisor

3. **José João Teixeira de Sousa**

Associate Professor, DEEC

Instituto Superior Técnico

Relationship: PhD Advisor

4. **Rui Policarpo Duarte**

Adjunct Professor, DEETC

Instituto Superior de Engenharia de Lisboa

Relationship: Research Advisor

5. **Steven B. Leeb**

Emanuel E. Landsman Professor, EECS Dept.

Massachusetts Institute of Technology

Relationship: Senior collaborator (workshops)