Lucas Matana Luza

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Education

2018–2021 **Ph.D. in Automatic and Microelectronic Systems**
University of Montpellier (UM), Montpellier, France
Thesis: Analysis of space and atmospheric radiation-induced effects on memory devices

2017–2019 **Master in Electrical Engineering**
Federal University of Santa Catarina (UFSC), Florianópolis, Brazil
Dissertation: A contribution to the in-orbit validation of a radiation-hardened communication platform to be used in small satellites

2012–2016 **Bachelor in Electrical Engineering**
University of Passo Fundo (UPF), Passo Fundo, Brazil
Undergraduate Thesis: Electroencephalogram acquisition module

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Experience

09/2022
Current **SENAI Institute of Innovation in Embedded Systems**
Research Fellow (Scholarship)

01/2022
06/2022 **LIRMM / CNRS**
Engineer
- Development of hardware and software for testing SRAM memories under radiation (heavy ions) with a focus on monitoring voltage, current, and variations in values written in memory cells.
- Software development in Python for test control and visualization of the results in real-time.
- Responsible for carrying out the test campaign in the laboratory.
- Software development in Python for data analysis, correlation, and classification of radiation-induced events.

11/2018
12/2021 **LIRMM / University of Montpellier**
Ph.D. Researcher
- Research involving analysis of the effects of space and atmospheric radiation on electronic devices.
- Testing and characterization of electronic devices under radiation.
- Software development for data analysis.
- Development of controller systems based on FPGAs and microcontrollers (experience with Xilinx/AMD, Microsemi/Microchip, and Altera/Intel).
- Firmware development in C to integrate processors with different IPs in SoCs.
- Development of projects of printed circuit boards.
- Participation in international conferences organization team.

08/2017
02/2019 **SpaceLab / UFSC / CAPES**
Master Researcher
- Implementation of a communication platform based on a radiation-hardened FPGA (NG-Medium NanoXplore) for use in small satellites.
- Design of a scientific experiment called Payload-X for FloripaSat-1 CubeSat.

10/2015
08/2016 **Sigma Transformadores**
Internship
- Development of automation projects for the industry.
- Technical support to electrical systems of industrial machines.
- Testing and validation of electrical transformers.

03/2011
09/2016 **Diula Center**
Manager
- Sales and purchase management.
- Implementation of stock control.
- Financial assistant.
- Customer service management.

Projects

2021–2022

Investigation on Intra-Die Variability and Radiation-Induced SEL in a COTS SRAM Memory Flying on Proba-V

Study of heavy-ion induced effects in a COTS SRAM based on Single-Event Latch-Up and SEU testing focusing on identifying the variability within the samples..

Collaboration: **European Space Agency (ESA) and LIRMM**

- Project Management.
- Development of hardware for testing focused on monitoring current and voltage for detection of Latch-ups induced by heavy ions.
- Software development in Python for real-time visualization of the data generated by the test.
- Responsible for the laboratory testing campaign.
- Software development for data analysis.

2018-2022

MTCube - Memory Test CubeSat

The MTCube embeds the RES (Radiation Effects Study) experiment. RES is a payload developed by the LIRMM team containing COTS memories devices that were extensively studied and characterized under different types of radiation sources under accelerated beams (e.g, Heavy-Ions, Protons, and others). The main purpose of the mission is to characterize the sensitivity of different types of memories with respect to the space radiation environment focusing on Single-Event Effects.

Collaboration: **LIRMM, CSUM, ESA, RADIAC, Fondation Van Allen, and University of Jyväskylä**

- Test and validation of the RES payload.
- Development of a real-time monitoring system based on Django (Python web framework) to follow the in-flight scientific data generated by the payload.

2019

Payload-X

Payload for cubesats using the NG-Medium rad-hard FPGA from Nanoxplore , with the institutional support from the European Space Agency (ESA).

Collaboration: **SpaceLab - UFSC, ESA, and LIRMM**

- Implementation in VHDL focusing on the NG-Medium FPGA of a communication platform based on the CCSDS protocols to allow an in-orbit validation of the device.
- Concept of integration with FloripaSat-1 CubeSat.

Main Academic Publications

2022

Neutron-Induced Effects on a Self-Refresh DRAM

L. Matana Luza, D. Söderström, H. Puchner, R. G. Alía, M. Letiche, C. Cazzaniga, A. Bosio and L. Dilillo

Microelectronics Reliability, Volume 128, 2022

https://doi.org/10.1016/j.microrel.2021.114406

2021

Emulating the Effects of Radiation-Induced Soft-Errors for the Reliability Assessment of Neural Networks

L. Matana Luza, A. Ruospo, D. Söderström, C. Cazzaniga, M. Kastriotou, E. Sanchez, A. Bosio and L. Dilillo

IEEE Transactions on Emerging Topics in Computing, Oct. 2021. [Early Access]

https://doi.org/10.1109/TETC.2021.3116999

The full list of publications can be found at: lucasmluza.github.io

Languages

Portuguese
Native

English
Professional proficiency

French
Intermediate proficiency

Skills

Development Languages
C, Python, VHDL

Software
GCC, Eclipse, VS Code, Git, Vivado, Vitis, Quartus, Libero SoC, NXMap, NXBase2, ModelSim, Eagle.