

Mission

Micro/Nano-Electronic Digital Circuits and Microprocessor based Systems Design, Test and Deploy exploring new technologies applications, novel techniques and architectures to improve the reliability of digital solutions.

Vision

Improve & exploit the “micro/nano-technology features” within the social impacting applications framework through opening collaboration with a multidisciplinary vision.

Group Profile

Recent / Ongoing Results

Research

- **Digital Systems with Microprocessors**
 - Memory stability profile analysis
 - Reliability metrics measurements
 - Digital Systems for IoT and Low-power
 - Hardware based on RISC-V
- **Radiation Effects on Integrated Systems**
 - Radiation effects on Systems & Devices
 - Tolerant hardware based on RISC-V
 - Digital Systems for Noisy Environments

- **SOMNICS (MICINN-TEC2011-25017)**: Soft Error Mitigation in Nanometer CMOS ICs Though Strategic Parameters Considering Statistical Variations.
- **KEYNEMS (MINECO-TEC2014-52878-R)**: Exploitation and Scaling of monolithic non-linear CMOS-M/NEMS device characteristics for specific “More Moore” and “More than Moore” applications.
- **HYDROALGAL (RTC-2016-4812-5)**: Mitigation and Prevention System for cost waters based on advanced hydrodynamic models and low-power instrumentation systems.
- **Red-RISC-V (RED2018-102384-T)**: Investigación, Formación e Innovación en Sistemas RISC-V.

Training/Teaching

- **FPGAs Digital Design**
- **Microelectronic Design & Test**
- **Digital System Design with Microprocessors**
- **Computer Science, Telecommunication & Industrial Electronic** engineering degrees
- **Intelligent Systems & Industrial engineering** Masters

- **Publications:**
 - An affordable experimental technique for SRAM write characterization for nanometer CMOS technologies, *Microelectronics Reliability*-2016
 - Wireless transmission of biosignals for hyperbaric chamber applications. *Plos One*, 2017.
 - Electronic traps for detection and population monitoring of adult fruit flies. *Journal of applied Entomology*, 2018.
 - A 65nm reliable 6T CMOS SRAM Cell with minimum Size Transistors, *Transactions on Emerging Topics in Computing*, 2019
- **UIB Engineering School: Hardware subjects updated & harmonized on RISC-V basis** (initial phase)

Innovation

- In the past lots of Research-based projects
- Now better balanced “research&Industry”
- Supporting local innovation
- Patents and Utility Models with Digital System applications.
- More technology transfer to SMEs and other R&D groups

- **IoTib: Support and generate local ecosystem & knowledge to the implant a LoRaWAN based network to cover all Islands**
- **Fruit Fly e-Trap implementation based on Microprocessor System transferred to Entomologic research group**
- **Algae Detection Camera implemented on Microprocessor architecture transferred to IMDEA institute of Research**
- **FRIODOM: Smart Systems for remote Care beyond the Hospital**

Group positioning & Perspectives in front of Open-Hw & RISC-V

R+D+i+T

- Open Hw/Sw allows state of the art lectures and facilitates multidisciplinary projects and improved professional skills.
- New IP-Blocks design (Reliability Ctrl., Radiation monitoring, ...) for reliable RISC-V cores optimizing technology features
- Open Hw to include safety and security circuits in applications developments.
- Design and Implement RISC-V cores for IoT applications mainly in Health monitoring and Noisy Environments.
- Use RISC-V as innovator driver-thread for universities and collaborative training strategies for all education levels.

Global Remarks

“RISC-V network opens synergies between electronic design layers. Open hardware/software strategies based on the new RISC-V architectures is an opportunity to ramp up the evolution of the entire digital ecosystem and contributing to the Open science knowledge for a better future”

“The new open ISA RISC-V architectures offer an opportunity for innovation and transference activities, improving collaborative projects with the implementation of new Ideas pushed by the Open ecosystem”