EnBED: Electronics & Biomedical Engineering Department (UB)

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Goal

- **EnBED** is a _research and technology center for transference towards the industrial sector_. It is specialized in **advanced materials**, **nanotechnology**, **optoelectronics**, **electronic engineering and information technologies**.
- Research activity is based on collaborative projects that come from public funds of national and EU projects as well as industrial partners in R&D&I projects.
- **EnBED** develops active policies for the protection of intellectual property and has a flexible **and multidisciplinary organization.**

Group Profile | Recent / Ongoing Results

Research

Group Profile

- **Low-Power Analog, Mixed & RF CMOS**
  - HEP detectors (frontends)
  - Ultra-fast cameras
  - IP blocs (DAC/ADC, PLL, LVDS, …)
- **Instrumentation**
  - Embedded Systems based on microcontrollers, microprocessors and FPGAs
  - Embedded platforms for IoT
- **Printed/Organic-µelectronics**
  - Inkjet Printed Technologies & Devices

Recent / Ongoing Results

- **BetterSense (ERC Grant 336917)**: Nanodevice Engineering for a Better Chemical Gas Sensing Technology
- **ChipScope (H2020 FET-OPEN-Grant 737089):** Overcoming the Limits of Diffraction with Superresolution Lighting on a Chip
- **Solar Orbiter:** Image Stabilisation System for the Polarimetric and Helioseismic Imager. Algorithms implemented on FPGAs
- **HV-CMOS sensors (FPA2017-89138-R):** Diseño y fabricación de chips HV-CMOS para el upgrade del LHC
- **Red-RISCV (RED2018-102384-T):** Investigación, Formación e Innovación en Sistemas RISC-V.

Training/Teaching

- **Digital Design**
- **Microelectronic Design & Test**
- **Instrumentation**
- **Computer architecture**
- **Biomedical, Informatics, Telecommunication & Electronics** engineering degrees

- **Blended learning:** Flipped classroom, MOOC, Gamification,…
- **Publications:**
  - Mejora de la implicación del alumnado en "Diseño y síntesis de sistemas digitales" usando e-learning colaborativo, gamificación y aprendizaje basado en problemas, IN-RED 2017: III Congreso Nacional de Innovación Educativa y Docencia en Red, doi: 10.4995/INRED2017.2017.6861
- **UB** Informatics Engineering : **Hardware** subjects **adapted to RISC-V basis**

Innovation

- **CEMIC, Center for Micro and nano-system Engineering for Instrumentation and Communications** (member of the TECNIO network)
- **Tech transfer:** Licensed patents & spin-off creation
- **Industrial R&D**

- **Spin-off: EndoAsic Technologies, Enlighting Technologies & ColorSensing**
- **Recent Patents:**
  - Signal processing method for histogram generation, and corresponding device and use (Spain, Germany and USA)
  - Method for receiving wireless telecommunication using the Single Side Band Amplitude Modulation technique (WO2009/101357A1)
  - Devices and methods for multiplexing liquid in biosensor microchambers (EPA 17382269)

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

R+D+i+T

- **Participating in the "Designing RISC-V-based Accelerators for next generation Computers" (DRAC) RIS3CAT project**
- **Physical implementation & sign-off**
- **IP-Blocks design (PLL, ADC, LPDDR4 PHY, Bias generators, …) for RISC-V cores and related application developments.**
- **Analog & digital design to enable IoT.**
- **Behavioural tests of the RISC-V architecture**
- **Industrial & research Master on IoT**

Global Remarks

"Collaboration with several national entities to set a roadmap that projects our environment (R&D, training, professionals and industry) in a progressive and systematic way towards a sustainable ecosystem around the architectures of ISA open RISC-V."

"Collaboration with the industry to implement new products based on RISC-V"