

PERSONAL INFORMATION

Laura Parellada Monreal



Bio Sketch

I have been a researcher at FBK since 2020, focusing on microfabrication in cleanroom environments for sensor development, a field I have worked in since 2015. My primary responsibilities at FBK include researching and developing fabrication processes for radiation silicon sensors, particularly silicon photomultipliers (SiPM). As part of the Important Projects of Common European Interest (IPCEI) on microelectronics, I have also led the 3D integration research line, working on Back-side Illuminated (BSI) SiPM and on the development of Through-Silicon Via (TSV) technology to enable the future 3D integration with readout electronics. Since 2022, my work has expanded to the fabrication and development of 3D-trench silicon pixels for charged-particle detection.

WORK EXPERIENCE

September 2020 - Present

Researcher

Fondazione Bruno Kessler, Trento, Italy

- Technology development and microfabrication process of Silicon detectors such as SiPM and 3D sensors.
- Technology development on SiPM working on backside-illuminated mode and with Through Silicon Via (TSV) ready to be 3D integrated with the read-out electronics.
- TCAD process simulation
- Commissioning of a new cleanroom ISO 4 and ISO 5, including being part of five tender committees for equipment acquisition.
- Functional electrical SiPM characterization and data analysis

December 2019 – June 2020

Postdoctoral researcher

Cirimat, Toulouse, France

- RF magnetron sputtering of metal oxide thin films.
- Electrical and microstructural material characterization.
- Study the performance of silicon microsensor platforms for NO₂ detection.
- Analysis, interpretation and presentation of results.
- Mentoring a PhD student.

January - July 2015

Internship

European Synchrotron Radiation Facility (ESRF), Grenoble, France

- Provide AFM expertise to the European Photon & Neutron Science Campus scientist.

EDUCATION AND TRAINING

November 2015 – March 2019

Ph.D. in Applied Engineering

Ceit-IK4 and University of Navarra, San Sebastián – Donostia, Spain

Title: Laser-nanostructured metal oxide semiconductors for conductometric gas sensors

- Cleanroom microfabrication of gas sensing devices based on ZnO and WO₃.
- Nanostructuring of metal oxide thin films by nano- and femtosecond laser systems
- Gas sensing experiments
- 2D heat transfer equation simulation using Matlab.

September 2014 – July 2015

International MSc of Nanosciences & Nanotechnologies: MSc 2 Nanophysics and Nanostructures,

ESRF – BM32 and Joseph Fourier University, Grenoble, France

- Title: GISAXS analysis of platinum nanoparticles grown on graphene/Ir(111)

September 2008 – June 2013

BSc in Physics

University of Barcelona (UB), Barcelona, Spain

PERSONAL SKILLS

Mother tongue(s) Spanish and Catalan

Other language(s) English – C1-C2
Italian – B1-B2
French – A1- A2

Job-related skills Knowledge and experience in cleanroom microfabrication techniques (photolithography, DC and RF sputtering deposition, direct laser interference patterning (DLIP), femtosecond laser subwavelength patterning, dry and wet etching, ion implantation, wafer bonding-debonding, grinding, atomic layer deposition).

Knowledge and experience in material characterization techniques (AFM, SEM, GIXRD, Raman spectroscopy, TOF-SIMS, XPS).

Digital skills Origin, MATLAB, SILVACO (TCAD), L-edit, LABVIEW, LaTeX.

Other skills Organized, self-motivated, analytical, hands-on problem-solving skills, team player.

RESEARCH PRODUCTS

Journal publications

- Sabiu, B., et al. "Measurements of efficiency, timing and response to irradiation for direct detection of charged particles with SiPMs." *The European Physical Journal Plus* 141.4 (2026): 430.
- Rignanese, L., et al. "Innovative Back-Side Illuminated SiPMs (BSI-SiPMs) from the IBIS project: DCR and timing measurements." *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* (2026): 172124.
- Herweg, K., et al. "Exploring μ SiPMs with BGO for Cherenkov time-of-flight in PET." *IEEE Transactions on Radiation and Plasma Medical Sciences* (2026).
- Alici, A., et al. "Electron identification and hadron discrimination using Cherenkov radiation in air and SiPMs." *Journal of Instrumentation* 21.03 (2026): P03031.
- Acerbi, F., et al. "Cryogenic characterization of FBK NUV-HD-Cryo 3T SiPM sensors for the DUNE photon detection system." *Journal of Instrumentation* 21.02 (2026): P02047.
- Gu, Fengbo, et al. "Characterization of FBK NUV-HD-Cryo SiPMs near LHe temperature." *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* (2025): 171256.
- Ye, Jixing, et al. "New developments in 3D-trench electrode sensors." *Journal of Instrumentation* 20.06 (2025): C06027.
- Parellada-Monreal, L., et al. "Fabrication technologies of back-side illuminated SiPM for VUV/NUV light detection at Fondazione Bruno Kessler." *Journal of Instrumentation* 20.09 (2025): C09010.
- Parellada-Monreal L, Acerbi F, Ficorella A, Franzoi A, Gola A, Merzi S, Nawaz A, Ruzzarin M, Paternoster G. 3D integration technologies for custom SiPM: From BSI to TSV interconnections. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*. 2023 Apr 1;1049:168042.
- Parellada-Monreal L, Mandayo GG, Martín-Mayor A, Souto-Canteli I, Bou-Ali MM. Influence of the test-chamber shape on the performance of conductometric gas sensors. *Sensors and Actuators B: Chemical*. 2022 Jun 15;361:131694.
- Parellada-Monreal L, Gherardi S, Zonta G, Malagù C, Casotti D, Cruciani G, Guidi V, Martínez-Calderón M, Castro-Hurtado I, Gamarra D, Lozano J. WO₃ processed by direct laser interference patterning for NO₂ detection. *Sensors and Actuators B: Chemical*. 2020 Feb 15;305:127226.
- Parellada-Monreal L, Castro-Hurtado I, Martínez-Calderón M, Presmanes L, Mandayo GG. Laser-induced periodic surface structures on ZnO thin film for high response NO₂ detection. *Applied Surface Science*. 2019 May 15;476:569-75.
- Parellada-Monreal L, Castro-Hurtado I, Martínez-Calderón M, Rodríguez A, Olaizola SM, Gamarra D, Lozano J, Mandayo GG. Study of sputtered ZnO modified by direct laser interference patterning: structural characterization and temperature simulation. *Applied Surface Science*. 2018 May 31;441:331-40.
- Gonzalez-Chavarri J, Parellada-Monreal L, Castro-Hurtado I, Castaño E, Mandayo GG. ZnO nanoneedles grown on chip for selective NO₂ detection indoors. *Sensors and Actuators B: Chemical*. 2018 Feb 1;255:1244-53.
- Li-Destri G, Tummino A, Gasperini AM, Monreal LP, Messina GM, Spampinato V, Ceccone G, Konovalov O. Filling nanoporous polymer thin films: an easy route toward the full control of the 3D nanostructure. *RSC advances*. 2016;6(11):9175-9..

Conferences and proceedings

- Acerbi, Fabio, Alberto Giacomo Gola, and Laura Parellada Monreal. "SILICON PHOTOMULTIPLIERS: NEW STRUCTURES FOR IMPROVED RADIATION HARDNESS." *IWORLD 2025*. 2025.
- Parellada Monreal, L., et al. "Back-side Illuminated SiPM for VUV/NUV light detection at Fondazione Bruno Kessler: first results." *IFD 2025-INFN Workshop on Future Detectors*. 2025.
- M. Penna et al. Limits of the time resolution and avalanche build-up analysis of FBK NUV-HD-MT SiPMs. 2024 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). IEEE, 2024.
- L. Parellada-Monreal et al. Glass-free SiPMs with Through Silicon Vias for VUV/NUV light detection.. 2023 IEEE Nuclear Science Symposium, Medical Imaging Conference and International Symposium on Room-Temperature Semiconductor Detectors (NSS MIC RTSD). IEEE, 2023.
- S. Gundacker et al. Digilog: A digital-analog sipm towards 10 ps prompt-photon tagging in tof-pet. 2023 IEEE nuclear science symposium, medical imaging conference and international symposium on room-temperature semiconductor detectors (NSS MIC RTSD). IEEE, 2023.
- L. Parellada-Monreal et al. How the Gas Flow Affects Conductometric Sensor Performance. In *Multidisciplinary Digital Publishing Institute Proceedings*. 2019;14(1):6.
- L. Parellada-Monreal et al. Enhancement of Gas Sensing Response on WO₃ Thin Films Processed by Direct Laser Interference Patterning. In *Multidisciplinary Digital Publishing Institute Proceedings 2019* (Vol. 2, No. 13, p. 813).
- L. Parellada-Monreal et al. ZnO Thin Film Processed by Direct Laser Interference Patterning for Formaldehyde Detection. In *2018 Spanish Conference on Electron Devices (CDE) 2018 Nov 14* (pp. 1-4). IEEE.
- M. Moreno-Sereno et al. Laser Interferometry for Broad Area SPR-Grating Couplers in Chemical Applications. In *Multidisciplinary Digital Publishing Institute Proceedings 2017 Aug 28* (Vol. 1, No. 4, p. 323).
- L. Parellada-Monreal et al. Temperature simulation at ZnO surface processed by laser interference lithography. In *Smart Sensors, Actuators, and MEMS VIII 2017 May 30* (Vol. 10246, p. 102461G). International Society for Optics and Photonics.
- J. González-Chávarri et al. Multisensor platform for indoor air quality measurements. In *Spanish Conference on Electron Devices (CDE) 2017 Feb 8* (pp. 1-4). IEEE.
- L. Parellada-Monreal et al. First results of Back-side Illuminated SiPM for VUV/NUV light detection fabricated at Fondazione Bruno Kessler., *TREDI 2025*. – Poster contribution.

Trento 15/10/2026

Laura Parellada Monreal