Preface

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Biographical notes: Luciana De Micco is an Electronics Engineer (2004) and Doctor in Engineering with Mention in Electronics (2009), Engineering Faculty of the National University of Mar del Plata (UNMDP), Argentina. She is director of the Laboratory of Chaotic Systems at the Institute of Scientific and Technological Research in Electronics (ICYTE). She is an adjunct researcher at the National Scientific and Technical Research Council (CONICET), Argentina. She is a Category 3 Research Professor, according to the Comisión Nacional de Categorización, Ministry of Education, Argentina, and also a Junior Associate Researcher at the Abdus Salam International Centre for Theoretical Physics (ICTP). She is an Associate Professor at the Universidad Nacional de Mar del Plata. She is interested in chaotic systems, their digitalisation and implementation in digital devices.

Ariel Lutenberg is currently a Full-Time Professor at the School of Engineering of the University of Buenos Aires (UBA), researcher at the National Council of Scientific and Technical Research (CONICET), and the Director of the Master's degrees in Internet of Things and Embedded Artificial Intelligence at UBA. He has supervised several dozen graduate, postgraduate and doctoral students. He has published almost a hundred papers in journals and conferences, and a book with Arm Education Media. He won several times the INNOVAR Award of the Argentine Ministry of Science and Technology. He has transferred many works for Argentine and international companies.

Maria Liz Crespo is a Research Officer at the Abdus Salam International Centre for Theoretical Physics (ICTP) and an associate researcher of the Italian National Institute of Nuclear Physics (INFN), Trieste, Italy. She completed her PhD at the ICTP working in the development of a DSP-FPGA-based readout system for the 83,000-channel RICH detector of the COMPASS experiment at CERN in Geneva, Switzerland. She is currently coordinating the research and

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Gustavo Sutter received his MS in Computer Science from State University UNCPBA of Tandil (Buenos Aires) Argentina in 1997, and PhD from the Autonomous University of Madrid, Spain, in 2005. He has been a Professor at the UNCPBA Argentina and is currently a Professor at Universidad Autónoma de Madrid, Spain. His research interests include FPGA design, digital arithmetic, development of embedded systems and high-performance computing. He is the author of three books and more than a hundred international papers and communications.

Technology is an essential tool that a country requires to build its future. Backward countries suffer the consequences in their industry and science. Recently, few other fields have promised to be as disruptive to our lifestyle, asset management and manufacturing processes as embedded systems.

An embedded system is any electronic equipment with a computing core designed to meet a specific function. The computing core could be a single type or a mixture of microcontrollers, FPGAs, and ASICs that interprets measurements and acts accordingly. It is usually optimised to satisfy strict processing time requirements, reliability, power consumption, size and cost. A vital element is its interaction with the physical environment made possible by sensors and actuators. The foundations of embedded systems have not changed over decades. But only recently, technological advancements in diverse fields such as communications, digital design, and industrial control, to name a few, have influenced further advances. Consequently, the area has re-emerged as a powerful tool with substantial groundbreaking applications, such as the internet of things and Industry 4.0.

Many industries and academic researchers in Latin America work in this field. They face projects and succeed at implementing novel solutions with distinct constraints (tighter budgets, less available parts) than the developed world. Nonetheless, their valuable work rarely transcends their geographical region. This Special Issue is dedicated to sharing their unique advancements with the worldwide scientific community.

The first article, 'An FPGA-based reconfigurable data acquisition system for LIDAR signal detection' by Héctor A. Lacomi, Tomás di Fiore, Nicolás Urbano Pintos and Facundo S. Larosa, presents the design, implementation and testing of a low-cost LIDAR signal processing system. The system proved similar to commercial equipment used for atmosphere remote sensing. It has advantages in modularity, flexibility, lower power consumption and in-field ease of use.

The second article, 'Spectrum sensing in cognitive radio using recurrence diagrams', by Maximiliano Antonelli, Jorge Castiñeira Moreira and Luciana De Micco, addresses spectrum sensing when using cognitive radio. The authors propose a new technique for the detection of primary users. The method employs statistical quantifiers that take causal information from the received signal into account. Results show that a quick decision about data transmission is possible by quicker spectrum sensing.

The third article, 'Automatic generation of VHDL code for a railway interlocking system', by Martín N. Menéndez, Santiago Germino, Facundo S. Larosa and Ariel Lutenberg, proposes a novel technique to automatically analyse a geographical representation of a railway network and produce a suitable FPGA railway interlocking system by generating its VHDL hardware description. This approach accelerates the design, implementation and testing phases on diverse topologies. The article presents topologies of varying complexities and reviews the automated tools developed that are part of a comprehensive workflow.

The fourth article, 'Autopilot for a robotic boat based on an open hardware configuration', by Omar Milián Morón, Delvis Garcia Garcia and Yunier Valeriano Medina, presents an autopilot solution for the Krick Felix vehicle oriented to path-following missions. The article presents a practical implementation of boat-tracking controls and results that validate the proposal under actual operating conditions.

The fifth article, 'Design of a general-purpose automation software based on Raspberry Pi', by Randy Piñero Aguilar and Alberto Prieto Moreno, presents a solution to automate control applications for industrial, laboratory, or home automation processes on specific commercial hardware. The work makes it possible to link resources or pieces of software of traditional technologies transparently to the user and ease the developer's task.

The sixth article, 'Embedded wireless delay tolerant networks on chips for segmented architectures' by Pablo Alejandro Ferreyra, Rubén Danilo Capkob, Alberto Fabián Gómez, Juan Andrés Fraire and Carlos José Barrientos, presents a characterisation of wireless delay-tolerant networks on chips. These networks are attractive for applications of distributed embedded systems.

The final article, by Leonardo Casal and Alejandro Mazzadi, entitled 'Real-time embedded control for continuous measurement of blood pressure: methodologic innovations', presents an improved design and implementation of a device to measure blood pressure through a personal computer and a dsPIC microcontroller. The novel method proposed by the authors manages to improve measurement performance.