



CURRICULUM VITAE (CVA)

IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

Part A. PERSONAL INFORMATION

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|---------|------------|
| CV date | 12/10/2021 |
|---------|------------|

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|------------------------------------------------|---------------------|------------|------------|
| First name | J. Francisco | | |
| Family name | Duque-Carrillo | | |
| Gender (*) | Male | Birth date | 08/11/1955 |
| Social Security, Passport, ID number | 07.041.010-C | | |
| e-mail | duque@unex.es | URL Web | |
| Open Researcher and Contributor ID (ORCID) (*) | 0000-0003-0393-2893 | | |

(*) Mandatory

A.1. Current position

| | | | |
|-------------------|--------------------------------------------------------------------------------------------|------------------|-----------------|
| Position | Professor | | |
| Initial date | 05/14/1993 | | |
| Institution | University of Extremadura | | |
| Department/Center | Dept. of Electrical Engineering, Electronics, and Control | | |
| Country | Spain | Telephone number | +34 924 289 544 |
| Key words | Microelectronic Design, Low-Voltage Analog and Mixed-Signal ASICs, Biomedical Applications | | |

A.2. Previous positions (research activity interruptions, art. 14.2.b))

| Period | Position/Institution/Country/Interruption cause |
|--------|-------------------------------------------------|
| | |

A.3. Education

| PhD, Licensed, Graduate | University/Country | Year |
|-------------------------------|-----------------------------------|------|
| Lic. in Physics (Electronics) | University of Sevilla (Spain) | 1977 |
| Ph. D. in Physics | University of Extremadura (Spain) | 1984 |

Part B. CV SUMMARY (max. 5000 characters, including spaces)

After obtaining the degree of Doctor, the trajectory of J. F. Duque-Carrillo in the different aspects has been the following.

1. Academic and professional positions

In 1986 he acceded to a position of Associated Professor (TU) at the University of Extremadura (UEx) and that same year he began a postdoctoral stay (18 months) as Visiting Scholar at the Dept. of Electrical Engineering of Texas A&M University (College Station, TX), thanks to a Fellowship of the NATO Scientific Program. This postdoctoral stay allowed him to enter the field of design of analog and mixed-mode application specific integrated circuits (ASICs) and to become familiar with the corresponding software tools and equipment for testing prototypes. At the beginning of 1988 he joined AT & T Microelectronics as Design Engineer of Integrated Circuits, spending a year between Tres Cantos (Madrid) and Allentown (PA, USA). In May



1993 he reached the position of Professor (CU) in the Electronic Technology Area of Electronic Technology at the UEx. This position, which is maintained to date, has been alternated with shorter stays at TAMU fundamentally, and another longer of 12 months (between 2011 and 2012) as Postdoctoral Researcher at Technical Superior Institute (IST) of the Technical University of Lisbon (Portugal), working in the area of Wireless Body Sensor Networks.

2. Training of researchers and research teams

After ending the link with AT&T Microelectronics (1989), he rejoined the University of Extremadura where he began, mainly through participation in competitive R&D programs, to equip himself with the essential facilities for the training of graduates in microelectronic design, the implementation of the subject in postgraduate training programs, which in turn favors access to fundraising and ultimately, the creation and progressive consolidation of the Electronic Technology Research Group.

In the researcher training aspect, he has been director or co-director of eight doctoral projects in the field of CI design and participating as principal investigator in 25 R&D projects financed by competitive national and European programs.

3. Scientific contributions

The scientific contributions are summarized in 55 publications in journals, of which 11 have been disseminated in the most recognized medium in the field of integrated circuit design (IEEE J. of Solid-State Circuits), 3 book chapters and more than one hundreds of communications to international congresses. He regularly carries out technical evaluation of papers for journals such as IEEE J. Solid-State Circuits, IEEE T. Circuits and Systems, Electronics Letters, IEEE Sensor J., Analog Integrated Circuits and Signal Processing, etc. He has served as Associate Editor for the IEEE T. Circuits and Systems-II magazine.

The previous activity has allowed it to obtain the recognition of 5 research periods of six-year term (the sixth period of which it has the six possible, corresponds to a transfer six-year term).

4. Transfer of results

The beginning of the transfer of results derived from the research activity, a mission that we consider fundamental, and given the state of almost complete non-existence of the microelectronic segment in the national environment, required a special effort to incorporate other more conducive lines of work (artificial vision, image processing, automation and control, etc.) in the Electronic Technology Research Group. This has made it possible to carry out actions with industrial segments with strong regional implantation. Thus, in addition to contracts, financing for specific results transfer programs (PETRI) was obtained and a spin-off company has been promoted from the Group, Coveless (2006), initially for the exploitation of two patents that were then transferred to the company. Coveless, whose name was taken from the acronym of the European project that led to the first results, today provides work to about twenty university graduates. In 2012, a second spin-off was established, BioBee Microelectronics, which markets development systems for bioimpedance applications and wireless sensors in the fields of health care and food. The core of BioBee's technology is an ASIC developed in a doctoral work carried out in the Group. The requested proposal, as indicated in the report, revolves around the same technology.

As a result of this trajectory and apart from technology-based business initiatives, the author has 12 patents, of which 9 are or have been in operation.

5. R&D evaluation and management

He has served as an evaluator of R & D projects for different agencies (ANEP, AEI, AVAP, etc.) and also as a member of the National Commission for the Evaluation of Research Activity (CNEAI). In the area of R&D management, specifically from the position of Rector of the UEx in the period 2004-2011, the Institution's research activity was structured in Research Groups and Institutes, provided with Support Services for Centralized research, Extremadura Science and Technology Park, Project Managers as members of the Groups themselves on which the increasingly complex administrative management required by the programs falls, infrastructures to support spin-offs in their early stages, etc.

Part C. RELEVANT MERITS (sorted by typology)



C.1. Publications (*Last 10 years. In the field of the proposal*)

- J. M. Carrillo, M. A. Domínguez; R. Pérez-Aloe, and J. F. Duque-Carrillo, “Low-power wide-bandwidth CMOS indirect current feedback instrumentation amplifier,” *AEU – International Journal of Electronics and Communications* (Elsevier), vol. 123, (153299), 2020. (<https://doi.org/10.1016/j.aeue.2020.153299>)
- M. A. Domínguez, D. Palomeque, J. M Carrillo, J. M. Valverde, J. F. Duque-Carrillo, R. Pérez-Aloe, “Voice-Controlled Assistance Device for Victims of Gender-Based Violence”, in *Developments and Advances in Defense and Security. Smart Innovation, Systems and Technologies*, (A. Roche and R.P. Pereira, Edt.), pp. 397-407, 2020. Springer, Singapore, doi.org/10.1007/978-981-13-9155-2_32, (ISBN 978-981-13-9154-5).
- J. F. Sánchez Muñoz-Torrero, M. Tardío, J. M. Valverde, J. F. Duque-Carrillo, J. M. Vega, “Pulse wave velocity in four extremities for assessing cardiovascular risk using a new device,” *Journal of Clinical Hypertension* (Wiley), vol. 16, pp. 378 - 384, 2014.
- J. L. Ausín, J. F. Duque-Carrillo, J. Ramos, and G. Torelli, “From handheld devices to near invisible sensors: the road to pervasive e-health,” in *Pervasive & Mobile Sensing & Computing for Healthcare: Technological and Social Issues (Smart Sensors, Measurements and Instrumentation)*, pp. 135-156, 2013, Springer-Verlag (ISBN 3642325378).
- J. Ramos, J. L. Ausín, G. Torelli, and J. F. Duque-Carrillo, “Design tradeoffs for sub-mW CMOS biomedical limiting amplifiers,” *Microelectronics Journal*, vol. 44, pp. 904-911, 2013.

C.2. Congress (*Last 10 years. In the field of the proposal*)

- I. Corbacho, J. M. Carrillo, J. L. Ausín, M. A. Domínguez, and J. F. Duque-Carrillo, “0.8-V CMOS Gm-C bandpass filter for electrical bioimpedance spectroscopy,” *IEEE International Conference on Electronics, Circuits and Systems*, Dubai (AUE), 2021.
- I. Corbacho, J.M. Carrillo, J.L. Ausín, M.A. Domínguez, and J.F. Duque-Carrillo, “Unitary vs. resistive feedback in CMOS two-stage indirect current feedback instrumentation amplifiers,” *IEEE International Conference on Electronics, Circuits and Systems*, Glasgow (UK), 2020.
- J. Ramos, J. L. Ausín, G. Torelli, and J. F. Duque-Carrillo, “Smart-needle for fat profile detection in meat,” *IEEE Biomedical Circuits and Systems Conference (Bio CAS): Workshop in Electronics for Better Quality Foods (FoodCAS 2017)*, Turin (Italy), Oct. 19-21, 2017
- D. Palomeque-Mangut, J. L. Ausin, and J. F. Duque-Carrillo, “Comparative Study of CMOS Lock-In Amplifiers for Wideband Bioelectrical Impedance Measurements,” *23rd IEEE International Conference on Electronics Circuits and Systems (ICECS)*, Monte Carlo (Monaco), Dec. 11-14 ,2016.
- J. Ramos, J. L. Ausín, G. Torelli, and J. F. Duque-Carrillo, “A Wireless Multichannel Bioimpedance Spectrometer for Patient Monitoring,” Live Interactive Demonstrations Session, *IEEE Biomedical Circuits and Systems Conference (BioCAS 2014)*, Lausanne (Switzerland), Oct. 22-24, 2014.
- J. Ramos, J. L. Ausín, A. Lorido, F. Redondo, and J. F. Duque-Carrillo, “A wireless, compact, and scalable bioimpedance measurement system for energy-efficient multichannel body sensor solutions,” *XVth International Conference on Electrical Bioimpedance (ICEBI)*, Heilbad Heiligenstadt (Germany), Apr. 22-25, 2013
- J. Ramos, J. L. Ausín, A. Lorido, F. Redondo, and J. F. Duque-Carrillo, “A wireless multichannel bioimpedance measurement system for personalized healthcare and lifestyle,” *10th International Workshop on Wearable Micro and Nanosystems for Personalized Health (p-Health 2013)*, Tallin (Estonia), Jun. 26-28, 2013.



- J. Ramos, J. L. Ausín, G. Torelli, and J. F. Duque-Carrillo, “A high dynamic range wideband CMOS phase angle detector for bioimpedance spectroscopy,” *19th IEEE International Conference on Electronics, Circuits and Systems*, Sevilla, Dec. 9-12, 2012.
- J Ramos, J. L. Ausín, J. F. Duque-Carrillo, and G. Torelli, “Wideband low-power current-feedback instrumentation amplifier for bioelectrical signals,” *9th International Multi-Conference on Systems, Signals & Devices (SSD)*, Chemnitz (Germany), 2012.

C.3. Research projects (Last 10 years. In the field of the proposal)

- Co-Principal Investigator of the Project “Integrated sensor for simultaneous multi-frequency broadband bioimpedance spectroscopy,” National R&D Plan (Ministry of Science, Innovation, and Universities, RTI2018-095994-B-I00), (92928 €), 2018-2021.
- Principal Investigator of the Project “Multichannel heart disease prediction and monitoring system-on-chip based on bioelectrical impedance signals via wireless body sensor networks,” National R&D Plan (Ministry of Economy and Competitiveness, TEC2013-46242-C3-3-P), (365.025 €/105.656 €), 2014 – 2017.
- Co-Principal Investigator of the Project “Salt reduction strategies and development of salting technology and monitoring by bioimpedance in Iberian products for the foreign market,” Technology Fund (CDTI). FEDER-INNTERCONECTA (EXP. 00064362/TIC-20132031), (530.821 €), 2013-2015.
- Investigator of the Project “Analog Front-End Design Strategies for Wireless Biomedical Sensors in Body Area Networks”, National R&D Plan (Ministry of Economy and Competitiveness, TEC2010–19019/MIC), (128,320 €), 2010 – 2013
- Investigator of the Project “Microsystem with low power consumption for the acquisition and processing of biomedical signals: application to the early and non-invasive detection of cardiovascular diseases,” III Regional Plan of R&D (Government of Extremadura, PRI09A080), 2009-2012.

C.4. Contracts, technological or transfer merits (Last 10 years. In the field of the proposal)

• Patents

- * J. F. Sánchez Muñoz-Torrero, M. Tardío, J. Vega, J. M. Vega, J. M. Valverde y J. F. Duque Carrillo, *Device and procedure for the quantification of arterial affection produced by arteriosclerosis*, Application No.: P201130872, Spain, 05-27-2011, University of Extremadura and FUNDESALUD
- * J. L. Ausín, J. Ramos, and J.F. Duque-Carrillo, *Unit, modular system and method for measuring, processing and remotely monitoring electrical impedance*, Application No. P201131426, Núm. Publi. ES 2 401 286, Ext. Int. PCT/ES2012/070635 (WO 2013/030425).
- * J. F. Duque-Carrillo, J.L Ausín, and J. Ramos, *Food quality control method, device and system*”, Application No. P201301058, Publication No. ES 2 535 280, Int. Ext. PCT/ES2014/070825, 03-15-2016, University of Extremadura and BioBee Microelectronics.
- * J. F. Duque-Carrillo, J.L. Ausín, and J. Ramos, *Device for the determination of fat distribution in food*, Application No.: U201730358, Publication ES 1194883Y, 03-29-2017, University of Extremadura and BioBee Microelectronics.

• Spin-off Companies

- * Co-Founder of BioBee Microelectronics S.L. (<https://biobee.tech/>)