



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

CV date 18/11/2022

First name	Fernando Javier		
Family name	Álvarez Franco		
Gender (*)	Male	Birth date (dd/mm/yy)	23/10/1972
ID number	34776984-H		
e-mail	fafranco@unex.es	URL Web	https://giss.unex.es/testimonial/fernando-javier-alvarez-franco-en/
Open Researcher and Contributor ID (ORCID) (*)	0000-0002-7610-1452		

(*) Mandatory

A.1. Current position

Position	Catedrático de Universidad		
Initial date	29/07/2019		
Institution	Universidad de Extremadura		
Department/Center	Ing. Eléctrica, Electrónica y Automática	Facultad de Ciencias	
Country	Spain	Teleph. number	+34 924289300 (Ext. 86830)
Key words	Local Positioning Systems, Digital Signal Processing, Human Activity Monitoring Sensors, Electronic Embedded Systems		

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

Period	Position/Institution/Country/Interruption cause
13/05/2010 - 28/07/2019	Profesor Titular de Universidad / UEx / Spain
18/11/2008 - 12/05/2010	Profesor Contratado Doctor/ UEx / Spain
01/07/2006 - 17/11/2008	Profesor Colaborador/ UEx / Spain
21/11/2001 - 30/06/2006	Profesor Ayudante de Escuela Universitaria/ UEx / Spain
01/10/1999 - 20/11/2001	Profesor de Escuela Universitaria Adscrita a la UEx / Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
MSc in Signal Theory and Communications	Universidad de Vigo (Spain)	2014
Electronic Engineer	Universidad de Extremadura (Spain)	2012
PhD in Electronics	Universidad de Alcalá (Spain)	2006
Licensed in Physics (Electronics)	Universidad de Sevilla (Spain)	1998

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

Throughout my 22 years of research activity, I have published a total of 54 articles in JCR journals (27 Q1), presented more than 150 communications in international and national conferences and led 10 Research Projects (1 European, 6 National and 3 Regional). My major scientific contributions can be framed in the three fields of knowledge that are detailed below.

In the field of digital signal coding, I developed a recursive algorithm to design an efficient correlation structure for spread-spectrum sequences that was published in the *IEE Electronics Letters* in 2004. The generalization of this algorithm resulted in a collaborative work published in the *IEEE Transactions on Signal Processing* in 2007. This research was developed in the



PARMEI national plan project (DPI2003-08715-C02-01) where I participated as a collaborator during the realization of my doctoral thesis in the Electronics Department of the University of Alcalá. This work opened a new research line in the aforementioned Department, which led to several doctoral theses (C. Marziani, 2007; M. C. Pérez, 2009) as well as to new collaborative publications, such as those in the *IEEE Communications Letters* in 2008, the *IEE Electronics Letters* in 2010 or *Signal Processing* in 2011.

In the field of advanced sonar systems, I developed a biologically inspired sonar that imitates the behaviour of bat neurons, published in the *IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control* in 2009. This is the result of my 7-month research stay in the Intelligent Sensors Laboratory at Yale University in 2008, funded by the José Castillejo programme, as well as my participation as a collaborator in the RESELAI national research project (TIN2006-14896-C02-01). Within this project, I had already collaborated in developing systems that led to publications such as those in *Sensors & Actuators* in 2007 or the *Journal of Intelligent Robotics Systems* in 2009, the latter linked to a previous 3-month stay in the LASMEA Laboratory at Blaise-Pascal University in 2006. The experience acquired with biomimetic algorithms was exploited to lead a first national research project, LEMUR (TIN2009-14114-C04-04), where these algorithms were proposed to design a sonar to identify types of textiles, published in the *IEEE Sensors Journal* in 2011.

But it is in the field of local positioning systems where I have made the most significant contributions since, in addition to the LEMUR project mentioned above, I have led 3 other national projects that are the continuation of the previous one in this area: LORIS (TIN2012-38080-C04-02), TARSIVUS (TIN2015-71564-C4-4-R) and MICROCEBUS (RTI2018-095168-B-C54). In the context of these projects, I have designed a multi-rate filter bank Doppler-tolerant receiver, published in *Sensors and Actuators* in 2013, as well as a multipath compensation algorithm based on acoustic channel impulsive response with matching pursuit, published in *Digital Signal Processing* in 2016. Also, I have collaborated in designing a multiple access interference compensation algorithm, published in *Measurement* in 2018, and linked to a thesis supervised in this area (T. Aguilera, 2016); and in designing an underwater acoustic positioning system, published in the *IEEE Transactions on Instrumentation and Measurement* in 2016 and tied to a co-supervised thesis (J. Aparicio, 2014). Within the acoustic systems, I have recently collaborated in designing positioning algorithms for moving targets in low coverage areas, published in the *IEEE Sensors Journal* in 2020 and the *IEEE Transactions on Instrumentation and Measurement* in 2021 and linked to a recently supervised thesis (J. A. Moreno, 2021). Finally, in collaboration with the Centre for Advanced Robotics at Queen Mary University of London, I have led the development of a millimetre-wave radar drone positioning system, published in *Expert Systems with Applications* in 2021 and tied to a new doctoral thesis supervised in this field (J. A. Paredes, 2021).

I am the founder and current coordinator of the Sensory Systems Research Group (GISS) of the University of Extremadura, within which I have supervised 6 doctoral theses in the last 10 years (3 of them with an international doctorate mention). As coordinator of this group, I have obtained a national FPU contract, a regional FPI contract, an Innovation and Talent Programme contract, a Margarita Salas grant for the training of young doctors, 4 Scientific Research Staff contracts and 8 Research Support Technician contracts. I have evaluated a total of 31 research projects for the Spanish national agency (ANEP) and one for the Luxembourg research agency (FNRL).

I am senior member of the IEEE since 2017, and vice-chair of the Spanish Instrumentation and Measurement Society Chapter since 2021.

Part C. RELEVANT MERITS (sorted by typology)

C.1. Publications (see instructions)

Articles in international journals

J. Aparicio, **F. J. Álvarez**, A. Hernández and S. Holm (2022). *A Survey on Acoustic Positioning Systems for Location-Based Services*. IEEE Transactions on Instrumentation and Measurement (Q1), vol. 71, pp. 1-36.

F. J. Aranda, F. Parralejo, **F. J. Álvarez** and J. A. Paredes (2022). *Performance analysis of fingerprinting indoor positioning methods with BLE*. Expert Systems with Applications (Q1), vol. 202, pp. 117095.

E. Sansano-Sansano, R. Montoliu, O. Belmonte-Fernández, F. J. Aranda and **F. J. Álvarez** (2022). *Continuous Non-Invasive Assessment of Gait Speed Through Bluetooth Low Energy*. IEEE Sensors Journal (Q1), vol. 22, no. 8, pp. 8183-8195.

T. Aguilera, J. Aparicio and **F. J. Álvarez** (2021). *High Availability Acoustic Positioning for Targets Moving in Poor Coverage Areas*. IEEE Transactions on Instrumentation and Measurement (Q1), vol. 70, pp. 1-11.

J. A. Paredes, **F. J. Álvarez**, M. Hansard and K. Z. Rajab (2021). *A Gaussian Process model for UAV localization using millimetre wave radar*. Expert Systems with Applications (Q1), vol. 185, pp. 115563.

J. Aparicio, T. Aguilera and **F. J. Álvarez** (2020). *Robust Airborne Ultrasonic Positioning of Moving Targets in Weak Signal Coverage Areas*. IEEE Sensors Journal (Q2), vol. 20, pp. 13119-13130.

J. A. Paredes, **F. J. Álvarez**, T. Aguilera and F. J. Aranda (2020). *Precise drone location and tracking by adaptive matched filtering from a top-view ToF camera*. Expert Systems with Applications (Q1), vol. 141, pp. 112989.

F. J. Álvarez (2019). *Fundamentals of Airborne Acoustic Positioning Systems*, in the book *Geographical and Fingerprinting Data to Create Systems for Indoor Positioning and Indoor/Outdoor Navigation*, Ed. Elsevier Academic Press, ISBN: 978-0-12-813189-3.

J. Ureña, A. Hernández, J. J. García, J. M. Villadangos, M. C. Pérez, D. Gualda, **F. J. Álvarez** and T. Aguilera (2018). *Acoustic Local Positioning With Encoded Emission Beacons*. Proceedings of the IEEE (Q1), vol. 106, no. 6, pp. 1042-1062.

F. J. Álvarez, T. Aguilera, J. A. Paredes and J. A. Moreno (2018). *Acoustic Tag Identification Based on Noncoherent FSK Detection With Portable Devices*. IEEE Transactions on Instrumentation and Measurement (Q1), vol. 67, no. 2, pp. 270-278.

C.3. Research projects

Title: Localization and Integrated Sensing for Digital Human Activity Tracing: physical layer challenges (INDRI-UEx)

Funding Agency: Ministerio de Ciencia e Innovación (PI2021-122642OB-C42)

Budget: 448 668 € (total), 118 580 € (UEx)

Participating Institutions: Universidad de Alcalá – CSIC – Universidad de Extremadura - UJI

PI subproject UEx: **Fernando J. Álvarez Franco**

Duration: 09/2022 – 08/2025

Title: Sistemas de Posicionamiento Local: un enfoque holístico centrado en la exploración de nuevas tecnologías base (MICROCEBUS)

Funding Agency: Ministerio de Ciencia, Innovación y Universidades (RTI2018-095168-B-C54)

Budget: 287 496 € (total), 78 287 € (UEx)



Participating Institutions: Universidad de Alcalá – CSIC – Universidad de Extremadura - UJI
PI subproject UEx: **Fernando J. Álvarez Franco** Duration: 01/2019 – 12/2021

Title: Transferencia tecnológica para el libre acceso a museos y espacios arqueológicos en Extremadura y Alentejo basado en dispositivos móviles (LIMUS)
Funding Agency: Comisión Europea (0246_LIMUS_4_E)
Budget: 1 102 928 € (total), 299 995 € (UEx)
Participating Institutions: Junta de Extremadura - Universidad de Extremadura – Cámara Municipal de Évora – Campo Arqueológico de Mértola
PI subproject UEx: **Fernando J. Álvarez Franco** Duration: 10/2015 – 12/2019

Title: Red de Posicionamiento y Navegación en Interiores y Ext. Delimitados (REPNIN+)
Funding Agency: Ministerio de Economía, Industria y Competitividad (Excellence Network - TEC2017-90808-REDT)
Budget: 22 000 €
Participating Institutions: UAH–UEx–CSIC–UG–UM–UOC–UAB–UD–UJI–GRADIANT
PI: Dr. José Luis Lázaro Galilea (UAH) Duration: 09/2018 – 08/2020

Title: Mejora y Robustecimiento de Sistemas de Localización en Interiores para Aplicaciones en Robótica y Asistencia a Personas (TARSIUS)
Funding Agency: Ministerio de Economía y Competitividad (TIN2015-71564-C4-4-R)
Budget: 172 530 € (total), 54 692 € (UEx)
Participating Institutions: Universidad de Alcalá – CSIC – Universidad de Extremadura
PI subproject UEx: **Fernando J. Álvarez Franco** Duration: 01/2016 – 12/2018

C.4. Contracts, technological or transfer merits

Research contracts with companies (Art. 83 LOU)

Objective: Optimization of irrigation water management by applying machine learning techniques to sensory data from an IoT network (AIRON).
Contracting company: Ing. de Proyectos, Obras y Sevicios, S. A. Budget: 14 723 €
Contract modality: Research and development Date: 05/2022

Objective: Development of artificial intelligence techniques for the identification of patterns of anomalous behavior from geolocated sensory data (PAI-Sngular)
Contracting company: SNGULAR People, S.L. Budget: 40 677 €
Contract modality: Aids for hiring research support staff Date: 11/2019

Objective: Development of predictive algorithms for street lighting energy consumption based on sensory data on the influx of people and meteorological conditions (INOPAL)
Contracting company: IAAS365, S. L. Budget: 30 000 €
Contract modality: Research and development Date: 09/2017

Patents

Title: Use of pseudo-orthogonal sequences for simultaneous scanning in multiple directions with a high number of image lines for phased array systems. directions with a high number of image lines for phased array systems.
Inventors: C. Diego; A. Jiménez; J. Ureña; A. Hernández and **F. J. Álvarez**
Reference: P201230295 Date: 21-02-2014 (Granted with prior review)

Title: Ultrasonic signal detection method with DSSS modulation tolerant to the Doppler effect.
Inventors: **F. J. Álvarez**; J. A. Moreno; A. Hernández; J. Ureña and M. C Pérez.
Referencia: P201230049 Date: 01-06-2015 (Granted with prior review)