CURRÍCULUM VÍTAE NORMALIZADO

Abián Hernández Guedes

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GOBIERNO DE ESPAÑA
MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES

FECYT INNOVACIÓN

Summary of CV

This section describes briefly a summary of your career in science, academic and research; the main scientific and technological achievements and goals in your line of research in the medium -and long- term. It also includes other important aspects or peculiarities.

Abián Hernández Guedes graduated from the University of Las Palmas de Gran Canaria (ULPGC), Spain, in 2015 as a computer scientist and since 2017 he holds a Master's degree in Telecommunication Technologies from ULPGC. He completed his Ph.D. in Telecommunication Technologies and Computer Engineering in 2025, earning the distinction Cum Laude with his thesis titled "Exploring Medical Artificial Intelligence Interpretability through the Lens of Information Theory." His research emphasizes that, for Deep Learning (DL) to be reliably integrated into critical domains such as medicine, the development of more interpretable DL-based models is essential. To address this challenge, his work explores interpretability through the fundamental concept of information.

He participated in various projects related to medical image processing (HELICoiD and ITHaCA) and the development of sustainable medical technology (MACbioIDi). He has participated in different NA-MIC (National Alliance for Medical Image Computing) events, presenting and collaborating in several projects to develop multi-modal image processing algorithms, especially segmentation, registration, and classification processes. In 2020, he obtained a Predoctoral Research Grant from the Canary Islands Government. In 2022, he performed a research stay with the Department of Mechanical and Aerospace Engineering, Tokyo University of Science, Japan, headed by Prof. Takemura, collaborating in the use of hyperspectral imaging analysis and feature selection methods based on deep learning approaches. His research interests include the interpretability of deep learning models based on information theory and their applications in medical scenarios.

Leadership Merits

Brief presentation of the merits related to leadership activities of special relevance.

Abián Hernández Guedes

Surname(s): **Hernández Guedes**
Name: **Abián**
ORCID: **0000-0002-2508-2845**
Contact aut. region/reg.: **Canary Islands**
Personal web page: **https://solidusabi.github.io/**

Current professional situation

Professional category: Freelancer
Start date: 16/10/2024
Performed tasks: As a freelancer, I have designed and implemented applications using the .NET framework, delivering robust and scalable solutions tailored to clients' needs. In parallel, I have developed educational content focused on artificial intelligence, aimed at making complex concepts accessible and engaging. Additionally, I have conducted data analysis and developed algorithms to support informed decision-making, helping clients extract actionable insights from their data.

Previous positions and activities

	Employing entity	Professional category	Start date
1	Universidad de las Palmas de Gran Canaria	Research staff	01/07/2020
2	Universidad de las Palmas de Gran Canaria	Auxiliary Technical Staff	16/03/2020
3	Universidad de las Palmas de Gran Canaria	Research Staff	01/09/2017
4	Aerolaser System SL	Senior Programmer	01/09/2016
5	CanaryFly S.L.	IT administrator	01/01/2013

1 **Employing entity:** Universidad de las Palmas de Gran Canaria **Type of entity:** University
Professional category: Research staff
Start-End date: 01/07/2020 - 01/07/2024
Performed tasks: Research and development in the field of medical imaging and signal processing focus on several key aspects. The investigation is centered on medical imaging computation for classification and segmentation based on Machine Learning approaches, which enables more accurate and efficient analysis of medical images. Additionally, there is a strong emphasis on researching the interpretability of Deep Learning models and uncertainty estimation for their application in medical contexts, aiming to provide more reliable and trustworthy results. Furthermore, the development of efficient architectures of Deep Learning models for signal processing tasks is also a priority, with the goal of improving accuracy and reliability in disease detection and diagnosis, as well as in the analysis of medical signals.
Identify key words: Communication, information; Artificial intelligence; Stochastic procedures of inference; Statistics and probability; Medical computing; Computer vision

2 **Employing entity:** Universidad de las Palmas de Gran Canaria **Type of entity:** University
Professional category: Auxiliary Technical Staff
Start-End date: 16/03/2020 - 01/07/2020
Performed tasks: Maintenance of the official website for the Master's Degree in Applied Electronics and Telecommunications at the University of Las Palmas de Gran Canaria has been performed, along with the development of WordPress plugins to integrate new features into the School of Telecommunications Engineering's official websites.

3 **Employing entity:** Universidad de las Palmas de Gran Canaria **Type of entity:** University
Professional category: Research Staff
Start-End date: 01/09/2017 - 16/03/2020
Performed tasks: Development of algorithms for medical image processing, with emphasis on thermographic analysis, aimed at early detection of diabetic foot complications. Contributions to the integration of sustainable technologies in developing countries, supporting the reduction of healthcare disparities through innovative solutions. Participation in the open-source project 3D Slicer, enhancing tools for medical image analysis and visualization. Training provided on the implementation of software solutions for medical applications, promoting knowledge transfer and capacity building in clinical and research settings.
Identify key words: Medical computing; Software; Treatment of medical images; Software architectures; Computer vision

4 **Employing entity:** Aerolaser System SL **Type of entity:** Business
Professional category: Senior Programmer
Start-End date: 01/09/2016 - 01/09/2017
Performed tasks: A Graphics engine has been developed for the visualization and analysis of extensive LiDAR datasets, utilizing C++, Qt, and OpenGL. Additionally, a LiDAR classification system has been created, enabling data analysis and processing of LiDAR data.

5 **Employing entity:** CanaryFly S.L.
Professional category: IT administrator
Start-End date: 01/01/2013 - 01/02/2015
Performed tasks: Administration and architecture of Linux and Windows servers, as well as network design, have been managed. Additionally, web development for internal applications has been performed, along with assistance in maintaining the corporate website.

Summary of professional activity

Abian Hernández Guedes has built a career in machine learning, software engineering, and signal processing, with a focus on medical image processing and artificial intelligence.
He began his career in 2013 as a Web Developer and Systems Administrator at Canaryfly, managing servers and developing web applications. In 2016, he joined Aerolaser System as a Software Engineer, working on the visualization and analysis of large LiDAR datasets.
In 2017, Abian began his research at the University of Las Palmas de Gran Canaria, focusing on medical imaging, machine learning for classification and segmentation, deep learning interpretability in medicine, and signal processing architectures. He received a predoctoral research fellowship in 2020 from the Government of the Canary Islands.
In 2022, he conducted research at Tokyo University of Science on hyperspectral imaging and feature selection. He contributed to international projects like WARIFA, focused on AI-driven real-time decision-making, and MACbioIDi, aimed at developing sustainable medical technologies.

Currently, as a Freelancer, Abian utilizes his generalist skills in application design and development, AI education content creation, and data analysis. His diverse expertise allows him to tackle challenges across software development, algorithm design, and AI-based solutions.

Education

University education

1st and 2nd cycle studies and pre-Bologna degrees

1 **University degree:** Higher degree
Name of qualification: Máster en Tecnologías de Telecomunición
Degree awarding entity: Universidad de las Palmas **Type of entity:** University de Gran Canaria
Date of qualification: 08/12/2016

2 **University degree:** Middle degree
Name of qualification: Graduado o Graduada en Ingeniería Informática - Ingeniería de Computadores
Degree awarding entity: Universidad de las Palmas **Type of entity:** University de Gran Canaria
Date of qualification: 16/12/2015

Doctorates

Doctorate programme: Doctorado en Tecnologías de Telecomunicación e Ingeniería Computacional
Degree awarding entity: Universidad de las Palmas **Type of entity:** University de Gran Canaria
Date of degree: 07/03/2025

Language skills

Language	Listening skills	Reading skills	Spoken interaction	Speaking skills	Writing skills
English	B2	B2	B2	B2	B2

Teaching experience

General teaching experience

Name of the course: ESTADÍSTICA Y PROCESOS ESTOCÁSTICO
University degree: Graduado o Graduada en Ingeniería de Telecomunicación
Start date: 10/10/2018 **End date:** 08/01/2019
Entity: Universidad de las Palmas de Gran Canaria **Type of entity:** University

Experience supervising doctoral thesis and/or final year projects

1 **Project title:** Optimización Bayesiana de Hiperparámetros
Entity: Universidad de las Palmas de Gran Canaria **Type of entity:** University
Student: Kevin Ortíz Falcon
Date of reading: 01/06/2024

2 **Project title:** Visualizacion Holografica De Datos Medicos
Entity: Universidad de las Palmas de Gran Canaria **Type of entity:** University
Student: Ciara Naranjo Ojeda
Date of reading: 23/12/2021

3 **Project title:** Herramienta para el tratamiento de imágenes médicas en VR mediante tecnología web.
Entity: Universidad de las Palmas de Gran Canaria **Type of entity:** University
Student: Sara Arribas del Rosario
Date of reading: 20/12/2018

Courses and seminars given

Type of event: Seminar
Name of the event: Deep Learning y Medicina: comprensión y validación de los modelos de Deep Learning en el campo médico
Organising entity: Universidad de las Palmas de Gran Canaria **Type of entity:** University
Hours of teaching: 1
Teaching date: 24/03/2024
Theme: Otra Temáctica

Scientific and technological experience

Scientific or technological activities

R&D projects funded through competitive calls of public or private entities

1 **Name of the project:** WARIFA: Watching the risk factors: Artificial intelligence and the prevention of chronic conditions.
Entity where project took place: Universitets-sykehuset Nord-Norge **Type of entity:** Healthcare Institutions
City of entity: Norway
Funding entity or bodies:
Comisión Europea (Programa Horizon 2020)

Start-End date: 01/01/2021 - 03/06/2025
Total amount: 938.333,91 €

2 **Name of the project:** TALENT-HEXPERIA: Talent Imágenes Hiperespectrales Para Aplicaciones de Inteligencia Artificial
Entity where project took place: Universidad de las Palmas de Gran Canaria **Type of entity:** University
City of entity: Las Palmas de Gran Canaria, Canary Islands, Spain
Name principal investigator (PI, Co-PI....): Gustavo Iván Marrero Callicó; Sebastián López Suárez
Nº of researchers: 17
Start-End date: 01/09/2021 - 31/08/2024
Total amount: 175.813 €

3 **Name of the project:** MACbioIDi (Impulsando la cohesión de las RUPs macaronésicas mediante una plataforma TIC común para la I+D+i biomédica)
Entity where project took place: Universidad de las Palmas de Gran Canaria **Type of entity:** University
Nº of researchers: 5
Funding entity or bodies:
INTERREG MAC **Type of entity:** Unión Europea
Start-End date: 01/01/2018 - 01/06/2020
Total amount: 2.354.206,58 €

4 **Name of the project:** ITHaCA (Identificación Hiperespectral de Tumores Cerebrales)
Entity where project took place: Universidad de las Palmas de Gran Canaria **Type of entity:** University
Funding entity or bodies:
Agencia Canaria de Investigación, Innovación y Sociedad de la Información **Type of entity:** Public Research Body
Start-End date: 30/12/2017 - 30/09/2019
Total amount: 69.914,45 €

5 **Name of the project:** HELICoiD (HypErspectraL Imaging Cancer Detection)
Entity where project took place: Universidad de las Palmas de Gran Canaria **Type of entity:** University
City of entity: Las Palmas de Gran Canaria, Canary Islands, Spain
Nº of researchers: 9
Funding entity or bodies:
Comisión Europea **Type of entity:** ...
Start-End date: 01/01/2014 - 31/12/2016
Total amount: 1.375.838 €

6 **Name of the project:** OASIS: OPEN Ai-driven Stack para plataformas HPEC mejoradas en sistemas integrados
Entity where project took place: Universidad de las Palmas de Gran Canaria **Type of entity:** University
Name principal investigator (PI, Co-PI....): Pedro Francisco Pérez Carballo; Gustavo Marrero Callicó
Funding entity or bodies:
CENTRO DE ACUSTICA APLICADA Y EVALUACION NO DESTRUCTIVA **Type of entity:** Associations and Groups
Start date: 01/09/2024
Total amount: 240.750 €

Scientific and technological activities

Scientific production

Publications, scientific and technical documents

1 Abian Hernandez Guedes; Natalia Arteaga Marrero; Enrique Villa; Gustavo M. Callico; Juan Ruiz Alzola. Feature Ranking by Variational Dropout for Classification Using Thermograms from Diabetic Foot Ulcers. Sensors. 23 - 2, Multidisciplinary Digital Publishing Institute, 08/01/2023.

Type of production: Scientific paper **Format:** Journal

Corresponding author: No

2 Abian Hernandez Guedes; Idafen Santana Perez; Natalia Arteaga Marrero; Himar Fabelo; Gustavo M. Callico; Juan Ruiz Alzola. Performance Evaluation of Deep Learning Models for Image Classification Over Small Datasets: Diabetic Foot Case Study. IEEE Access. pp. 124373 - 124386. IEEE, 28/11/2022.

Type of production: Scientific paper **Format:** Journal

Corresponding author: Yes

3 Natalia Arteaga Marrero; Lucas Christian Bodson; Abián Hernández Guedes; Enrique Villa; Juan Bautista Ruiz Alzola. Morphological Foot Model for Temperature Pattern Analysis Proposed for Diabetic Foot Disorders. Applied Sciences. Multidisciplinary Digital Publishing Institute (MDPI), 06/01/2021.

Type of production: Scientific paper **Format:** Journal

Corresponding author: No

4 Natalia Arteaga-Marrero; Abián Hernández; Enrique Villa; Sara González Pérez; Carlos Luque; Juan Ruiz Alzola. Segmentation Approaches for Diabetic Foot Disorders. Sensors. 21 - 3, pp. 934 - 934. Multidisciplinary Digital Publishing Institute, 2021.

Type of production: Scientific paper **Format:** Journal

Corresponding author: Yes

5 Abelardo Baez; Himar Fabelo; Samuel Ortega; Giordana Florimbi; Emanuele Torti; Abián Hernández Guedes; Francesco Leporati; Giovanni Danese; Gustavo Marrero Callicó; Roberto Sarmiento. High-Level Synthesis of Multiclass SVM Using Code Refactoring to Classify Brain Cancer from Hyperspectral Images. Electronics. MDPI, 2019.

Type of production: Scientific paper **Format:** Journal

Corresponding author: No

6 María Dolores Afonso Suárez; Asmaa Skareb; María Nayra Pumar Carreras; Guillermo Valentín Socorro Marrero; José Carlos Ruiz Luque; Abián Hernández Guedes; Juan Ruíz Alzola. MedTec4SusDev. Tecnología médica para el desarrollo sostenible. VI Jornadas Iberoamericanas de Innovación Educativa en el Ámbito de las TIC y las TAC (InnoEducaTIC 2019). 2019.

Type of production: Popular science article **Format:** Book

Corresponding author: No

7 Sonia Raquel León Martín; Abián Hernández Guedes; Himar Antonio Fabelo Gómez; Samuel Ortega Sarmiento; Francisco Javier Balea Fernandez; Gustavo Iván Marrero Callicó. Short-Wavelength Infrared Windows for Biomedical Applications. SWIR Hyperspectral Imaging to Assess Neurocognitive Disorders Using Blood Plasma Samples. SPIE Press, 01/09/2021.

Type of production: Book chapter **Format:** Book

Corresponding author: No

8 Toshihiro Takamatsu; Ryodai Fukushima; Kounosuke Sato; Hideo Yokota; Kohei Soga; Abian Hernandez Guedes; Gustavo M. Callico; Hiroshi Takemura. Development of a visible and over 1000 nm hyperspectral imaging rigid-scope system using supercontinuum light and an acousto-optic tunable filter. Optica Open. 21/12/2023.
Type of production: Preprint **Format:** Journal
Corresponding author: No

9 Abian Hernandez Guedes; Ryodai Fukushima; Toshihiro Takamatsu; Himar Fabelo; Samuel Ortega; Nobuyoshi Takeshita; Hiro Hasegawa; Juan Ruiz Alzola; Hiroshi Takemura; Gustavo M. Callico. Contrastive Learning approach for blind Hyperspectral Unmixing (CLHU). TechRxiv. 07/08/2023.
Type of production: Preprint **Format:** Journal
Corresponding author: Yes

Works submitted to national or international conferences

1 **Title of the work:** Detection of Exposed Nerves in Two Individuals In Vivo and Unexposed Nerves Ex Vivo with Near-Infrared Hyperspectral Laparoscope
Name of the conference: 2024 IEEE/SICE International Symposium on System Integration (SII)
Corresponding author: No
City of event: Ha Long, Vietnam
Date of event: 08/01/2024
Ryodai Fukushima; Toshihiro Takamatsu; Kounosuke Sato; Abian Hernandez Guedes; Gustavo M. Callico; Kyouhei Okubo; Masakazu Umezawa; Hideo Yokota; Kouhei Soga; Hiroshi Takemura.

2 **Title of the work:** Towards Skin Cancer Self-Monitoring through an Optimized MobileNet with Coordinate Attention
Name of the conference: 2022 25th Euromicro Conference on Digital System Design (DSD)
Corresponding author: No
City of event: Maspalomas, Spain
Date of event: 28/08/2022
Organising entity: Euromicro **Type of entity:** Associations and Groups
Maria Castro Fernandez; Abian Hernandez Guedes; Himar Fabelo; Francisco Balea Fernandez; Samuel Ortega; Gustavo Marrero Callico. "Towards Skin Cancer Self-Monitoring through an Optimized MobileNet with Coordinate Attention".

3 **Title of the work:** Automatic Segmentation Based on Deep Learning Techniques for Diabetic Foot Monitoring Through Multimodal Images
Name of the conference: Image Analysis and Processing – ICIAP 2019
Corresponding author: Yes
City of event: Trento, Italy
Date of event: 09/09/2019
End date: 09/09/2019
Organising entity: University of Trento
Abian Hernandez Guedes; Natalia Arteaga Marrero; Enrique Villa; Himar Fabelo; Gustavo Marrero Callico; Juan Ruiz Alzola.

4 **Title of the work:** Random forest training stage acceleration using graphics processing units.
Name of the conference: 2017 32nd Conference on Design of Circuits and Integrated Systems (DCIS)
Corresponding author: Yes
City of event: Barcelona, Spain

Date of event: 22/11/2017
End date: 24/11/2017
Organising entity: Escuela Técnica Superior de Ingeniería de Telecomunicación de Barcelona-UPC
Type of entity: University
Abian Hernandez Guedes; Himar Fabelo; Samuel Ortega; Abelardo Baez; Gustavo Marrero Callico; Roberto Sarmiento. "Random forest training stage acceleration using graphics processing units.".

Other achievements

Stays in public or private R&D centres

Entity: Tokyo University of Sciene
Type of entity: University
Faculty, institute or centre: Department of Mechanical Engineering
City of entity: Noda, Japan
Start-End date: 01/08/2022 - 31/01/2023
Duration: 4 months
Goals of the stay: Doctorate
Provable tasks: Hyperspectral imaging analysis, focusing on feature selection and hyperspectral unmixing.
Type of stay: Investigación