MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES

Cofinanciado por la Unión Europea

AGENCIA ESTATAL DE INVESTIGACIÓN

CURRICULUM VITAE

CV date	20/01/2025

Part A. PERSONAL INFORMATION

First name	Adrián		
Family name	Amor Martín		
Gender (*)	Male	Birth date	17/05/1989
ID number	47486795Y		
e-mail	aamor@ing.uc3m.es	URL Web	https://aamorm.github.io/
Open Researcher and Contributor ID (ORCID)	0000-0002-6123-4324		

A.1. Current position

Position	Profesor Titular de Universidad		
Initial date	04/03/2025		
Institution	Universidad Carlos III de Madrid		
Departament	Signal Theory and Communications		
Country	Spain	Teleph. number	661371641
Key words	Computational Electromagnetics, High-Performance Computing, Artificial Intelligence, Heterogeneous Computing, Microwave Sensors		

A.2. Previous positions

Period	Position/Institution/Country/Interruption cause
2024	Break (16 weeks): Born of my first daughter (27/05/2024)
2021-2025	Assistant Professor, University Carlos III of Madrid, Spain
2019-2020	Postdoctoral Fellow, Saarland University, Germany
2015-2018	FPU scholarship holder, University Carlos III of Madrid, Spain
2014-2015	PIF scholarship holder, University Carlos III of Madrid, Spain

Part B. CV SUMMARY

Executive summary

I have authored or co-authored **26 JCR-indexed papers** (**21** in **high-impact journals**) and contributed to **53 conferences**. As Principal Investigator (**PI**), I have led **2 national** and **2 regional** publicly funded research **projects**, as well as a **private** research **contract**, totaling **over €500,000**. I have participated in **6** additional research **projects** and **9** private **contracts** and hold **one six-year research period** (2015-2020). I have **opened two research lines** within my group. My **international experience** includes **33 months** at **foreign institutions** with competitive grants or contracts, yielding high-quality results. I am an **IEEE Senior Member**, have the **R3 certification,** and part of the **QoMEX 2025** organizing committee. I have supervised **1** completed **PhD** and **3 ongoing** ones (securing two **four-year contracts**), plus **8 MSc** and **5 BSc** theses (currently **2 MSc** and **4 BSc**). I play an active role at COIT, co-founding the mentorship program "**ment-it**" and coordinating **two working groups**. I am also part of the **national URSI committee**.

Scientific contributions

My main research focus lies in **Computational Electromagnetics** (CEM). Notably, I developed a Finite Element Method (**FEM**) code, part of it **open source**, incorporating new curl-conforming basis functions for large-scale High-Performance Computing (**HPC**) simulations. These innovations have yielded **11 JCR publications**, **30 conference contributions**, **one** completed **PhD** (2020), and a **private contract** with **AIRBUS** (started in 2022), where I am one of three only researchers. Since 2021, I have established a **new research line** on **heterogeneous computing** and Artificial Intelligence (**AI**) for **inverse electromagnetic problems**, funded by **3 public projects** (as PI) and **a** private **contract**, resulting in **5** high-impact **publications** and **5 conferences**. It has also attracted significant interest from students, leading to my supervision of **2 ongoing PhDs**, **2 MSc**, and **2 BSc** theses. As **hardware devices** are crucial for inverse problem, I **initiated another research line** on **sensor** and **antenna design** for **non-destructive testing**, now supervising **1 PhD** in this area and having presented

7 conference contributions (3 at EuMC). I also participate in an **international research project** with Perú on this topic and tutored **3 MSc** and **current 2 BSc** theses.
On the **international front**, I spent 2 years as a postdoctoral researcher at **Saarland University** with Prof. Dyczij-Edlinger, producing **2 Q1 papers** and 3 conference contributions. I obtained competitive **grants** for teaching **stays** at Politecnico di **Torino** (May 2023) and Pontificia Universidad Católica del Perú (July 2023), kickstarting collaborations in **microwave imaging**. In 2024, I conducted a **research stay** at the UPV (Sep/Oct 2024) with Prof. Naranjo, focusing on **AI** for **inverse electromagnetic problems**. During my PhD, I completed short-term **stays** at the University of **Macau** (two months) to develop part of the HPC-enabled FEM code (leading to a Q4 paper) and **seven months** in total at the ElectroScience Laboratory (**Ohio**) under Prof. Jin-Fa Lee, (co-authoring a **Q1 paper**). I am currently the only Spanish representative of the **IEEE P2816 APS/SC/CEM** working group, which develops **best practices** for **antenna modeling** in CEM. I also **review** regularly for **Q1 journals** (94th percentile, Web of Science) in HPC**,** CEM, and communications, being currently a **Guest Editor** in **Mathematics (Q1)**. In addition to being an **IEEE Senior Member** and **Sigma Xi** Full Member (2023), I obtained **R3 certification** at the earliest opportunity (2024).

Societal contributions
My interest in societal impact dates back to a **2013 start-up award** for an HPC project. Since 2020, I have **coordinated the "GT Jóvenes"** group at COIT, co-founding **"ment-it"**, which reached **55 mentees** in the **last edition**. I also established and coordinated the "**GT Ciencia**" group, bridging academia and industry, and I serve as **PI** of an **outreach plan**, where I developed the "**Ambassadors**" program to attract high-school students.

Training of young researchers
I supervised **1 PhD thesis** successfully defended in 2020 and am currently mentoring **3 more**. I have supervised **8 MSc theses** and **5 BSc** and presently oversee **2 MSc** and **4 BSc** students. All my former **mentees** have secured strong positions in **industry**. By **founding new research lines** in **AI-driven inverse electromagnetics** and **sensors/antennas** for **non-destructive testing**, I have created a stimulating training environment for undergraduates, graduates, and PhD candidates (securing 2 **four-year contract** in **competitive calls**). In the **national URSI committee**, I introduced the **3MT competition** to enhance scientific communication among emerging researchers.

Other relevant contributions
I was elected **Treasurer** (2024) of the **IEEE AP-S** and **MTT Spanish Joint Chapter**, reflecting my commitment to community leadership and scientific management. I have been **chairman** of two scientific sessions at **URSI**, and I am on the **organizing committee** of **QoMEX 2025**, reflecting my commitment to scientific leadership and international collaboration.

Parte C. RELEVANT MERITS.
C.1. Publications

1. Martín-Salinas, I. (CA); Badía, J.M.; Valls, Ó.; León, G.; del Amor, R.; Belloch J.A.; **Amor-Martín, A.;** Naranjo, V. 2025. "Evaluating and Accelerating Vision Transformers on GPU-based Embedded Edge AI Systems." The Journal of Supercomputing. Vol. 81:349. JCR impact factor: 2.5, **Q2** (2023).
2. Toth, L.L.; **Amor-Martín, A.**; Dyczij-Edlinger, R. (CA). 2024. "Hierarchical Universal Matrices for Curvilinear Tetrahedral H(curl) Finite Elements with Inhomogeneous Material Properties." IEEE Transactions on Antennas and Propagation. Vol. 72: 89–99. JCR impact factor: 4.6, **Q1** (2023).
3. **Amor-Martín, A. (CA)**; García-Castillo, L.E.; Toth, L.L.; Floch, O.; Dyczij-Edlinger, R. 2024. "A Rigorous Code Verification Process of the Domain Decomposition Method in a Finite Element Method for Electromagnetics." IEEE Transactions on Antennas and Propagation. Vol. 72: 100–109. JCR impact factor: 4.6, **Q1** (2023).
4. **Amor-Martín, A. (CA)**, García-Castillo, L. E. 2023. "Second-Order Nédélec Curl-Conforming Hexahedral Element for Computational Electromagnetics." IEEE Transactions on Antennas and Propagation. Vol. 71: 859–868. JCR impact factor: 4.6, **Q1**.
5. Falcón-Gómez, E.; De Falco, V.; Atia-Abdalmalak, K.; **Amor-Martín, A.**; De La Rubia, V.; Santamaría-Botello, G.; García-Muñoz, L.E. (CA). 2024. "Fully metallic geodesic lenses as

analog electromagnetic models of static and spherically symmetric gravitational fields." Physical Review D. Vol. 110:084002. JCR impact factor: 4.6, **Q1** (2023).

6. Badía, J. M.; **Amor-Martín, A. (CA)**; Belloch, J. A.; García-Castillo, L. E. 2022. "Strategies to parallelize a finite element mesh truncation technique on multi-core and many-core architectures." The Journal of Supercomputing. Vol. 79: 7648–7664. JCR impact factor: 3.3, **Q2**.
7. Castillo-Reyes, O, (CA); **Amor-Martín, A.**; Botella, A.; Anquez, P.; García-Castillo, L. E. 2022. "Tailored meshing for parallel 3D electromagnetic modeling using high-order edge elements." Journal of Computational Science. Vol. 63:101813. JCR impact factor: 3.3, **Q2**.
8. **Amor-Martín, A. (CA)**; Garcia-Castillo, L. E.; Lee, J.-F. 2021. "Study of Accuracy of a Non-Conformal Finite Element Domain Decomposition Method". Journal of Computational Physics. Vol. 429:109989. JCR impact factor: 4.645, **Q1**.
9. Martínez-Fernández, I.; **Amor-Martín, A. (CA)**; Garcia-Castillo, L. E. 2021. "Test-Driven Development of a Substructuring Technique for the Analysis of Electromagnetic Finite Periodic Structures." Applied Sciences. Vol. 11(24): 11619. JCR impact factor: 2.838, **Q2**.
10. González-Serrano, F. J. (CA); Navia-Vázquez, Á.; **Amor-Martín, A**. 2017. "Training Support Vector Machines with Privacy-Protected Data." Pattern Recognition. Vol. 72: 93–107. JCR impact factor: 3.965, **Q1**.

C.2. Congress

1. **Amor-Martín, A.**; Garcia-Castillo, L. E. "On the Validation of Curl-Conforming Higher-Order Basis Functions using the Method of Manufactured Solutions." Oral presentation, invited paper. 24th International Conference on Electromagnetics in Advanced Applications (**ICEAA**), 10 Oct. 2023, Venice, Italy.
2. Llorente-Romano, S.; Garcia-Castillo, L. E.; **Amor-Martín, A.** "Numerically Stable Implementation of Ewald Method for 1D Periodicity." Oral presentation. XV Encuentro Ibérico de Electromagnetismo Computacional (**EIEC**), 15 Nov. 2023, Cádiz, Spain.
3. **Amor-Martín, A.**; Garcia-Castillo, L. E. "A Priori Verification Method for Curl-Conforming Vector Functions in Simplices." Oral presentation. 23rd International Conference on Computational and Mathematical Methods in Science and Engineering (**CMMSE**), 4 Jul. 2023, Cádiz, Spain.
4. Falcón, E.; Atia-Abdalmalak, K.; **Amor-Martín, A.**; González-Jiménez, A.; de la Rubia, V.; Santamaría-Botello, G.; De Falco, V.; García-Muñoz, L. E. "Analogous Electromagnetic Wave Propagation in a Schwarzschild Black Hole Space-time Using Parallel Conducting Surfaces Waveguides." Oral presentation. 17th European Conference on Antennas and Propagation (**EuCAP**), March 2023, Florence, Italy. **Nominated** to **Best Paper Award** in Electromagnetics.
5. Santiago-Mesas, S.; Fernández-Aranzamendi, E.; **Amor-Martín, A.;** Segovia-Vargas, D.; González-Posadas, V. "Active Sensor Design Based on Large-Signal Stability Analysis with Pole-Zero Identification." Oral presentation. 54th European Microwave Conference (**EuMC**), Sep. 2024.
6. Santiago-Mesas, S.; Fernández-Aranzamendi, E.; Segovia-Vargas, D.; **Amor-Martín, A.;** González-Posadas, V. "A High-Stability and High-Sensitivity Active Sensor for Non-Invasive Breast Cancer Detection." Oral presentation. 53rd European Microwave Conference (**EuMC**), 20 Sep. 2023.
7. Toth, L. L.; **Amor-Martín, A.**; Dyczij-Edlinger, R. "Convergence Study of H(curl) Serendipity Basis Functions for Hexahedral Finite-Elements." Oral presentation. Invited paper. 24th International Microwave and Radar Conference (**MIKON**). 12 Sep. 2022, Gdansk, Poland.
8. **Amor-Martín, A.**; Toth, L. L.; Dyczij-Edlinger, R. "H(Curl)-Conforming Hierarchical Basis Functions on Prisms and Hexahedra." Oral presentation. Kleinheubacher Tagung (**KH**). 23 Sep. 2019, Miltenberg, Germany.
9. **Amor-Martín, A.**; Garcia-Castillo, L. E.; Garcia-Donoro, D. "Towards a Scalable Hp Adaptive Finite Element Code Based on a Nonconformal Domain Decomposition Method." Oral presentation. 48th European Microwave Conference (**EuMC**), 24 Sep. 2018, Madrid, Spain.
10. Garcia-Donoro, D.; Ting, S.W.; **Amor-Martín, A.**; Garcia-Castillo, L. E. "Higher order finite element method solver for the analysis of microwave devices in planar technology." Oral presentation. 46th European Microwave Conference (**EuMC**), 4 Oct. 2016, London, UK.

C.3. Research projects

1. TEC-2024/COM-360. DISCO6G-CM, "Desarrollo e Integración de Sensores y Comunicaciones

para servicios avanzados en 6G – Grupo emergente de modelado físico integrado y computación eficiente (IPMEC-UC3M).” Proyectos de I+D realizados en colaboración entre grupos de investigación, Comunidad de Madrid. **Adrián Amor Martín.** 01/01/2025-31/12/2028. 132,625.50 €. **Principal Investigator.** I am using my expertise in mathematical modeling and HPC, together with the lessons learned in C.3.2 and C.3.3, to implement IA models in embedded heterogeneous systems for ISAC. This is a continuation of my collaboration with Dr. Belloch.

2. PID2022-137048OA-C43. STARRING-IMPLE, “Spatial Audio and Array Processing for Industrial Applications and Digital Transformation: Efficient Implementations Through Parallel and Approximate Computing.” Proyectos de Generación de Conocimiento, Ministerio de Ciencia e Innovación. **Adrián Amor Martín,** José A. Belloch-Rodríguez**.** 01/09/2023-31/08/2026. 42,000 €. **Principal Investigator.** I use my expertise in HPC and mathematical modelling to develop new approaches for the algorithms that will be tested in the coordinated project.
3. 2022/00024/001. MIMACUHSPACE-CM, “Microwave Materials Characterization Using Heterogeneous Systems-on-Chip for the Space Environment.” Comunidad de Madrid. Convocatoria Proyectos Interdisciplinares de I+D - Jóvenes doctores/as Convenio plurianual CM-UC3M. **Adrián Amor Martín,** José A. Belloch-Rodríguez. 01/01/2022-31/12/2023. 60,000 €. **Principal Investigator**. I lead all the tasks related to material characterization with a FEM code using HPC infrastructures.
4. TSI-063000-2021-150. PPET, “Plan de Promoción de Estudios de Telecomunicación.” Ministerio de Asuntos Económicos y Transformación Digital. Convocatoria UNICO-5G I+D: Programa de Universalización de Infraestructuras Digitales para la Cohesión – 2021. **Adrián Amor Martín.** 01/01/2022-31/12/2025. 250,000€. **Principal Investigator.** I coordinate all the tasks at the UC3M, and we create a group of reference engineers, foster inter-university students’ groups, and organize events to disseminate engineering activities to attract talent into the STEAM fields. I also created the Ambassadors program to bring the experience of a telecommunications engineer to high schools.
5. PE501086263-2024-PROCIENCIA. “Innovative design of open-circuit coaxial probe for tissue characterization.” Programa Nacional de Investigación Científica y Estudios Avanzados, Consejo Nacional de Ciencia, Tecnología e Innovación del Perú. Patricia Raquel Castillo Araníbar. 01/06/2024-30/09/2025. 83,214 S/. (21,497€). **Part of the working team.** I collaborate with prof. Araníbar in the modelling of the hardware devices with FEM solvers.
6. TEC2016-80386-P. “Electromagnetic Simulator for HPC Environments”. Ministerio de Economía y Competitividad. Plan Nacional de I+D+I (Convocatoria EXCELENCIA). Luis E. García Castillo. 01/01/2017- 31/12/2019. 119,427 €. **Part of the working team**. The core of this project is based on my Ph.D. thesis, using algorithm-based parallelization and introducing HPC optimization in an object-oriented Fortran code.
7. TEC2010-18175/TCM, “Análisis de Estructuras Periódicas Finitas Regulares e Irregulares mediante Técnicas de Descomposición de Dominios en Paralelo con Adaptatividad hp Automática”. Ministerio de Ciencia e Innovación. Plan Nacional de I+D+I. Luis E. García Castillo. 01/01/2012-31/12/2014. 168,432 €. **Part of the working team**. I contributed to the study of the DDM approach and developed basis functions.

C.4. Contracts, technological or transfer merits

1. SPACECAR: Caracterización de materiales mediante tecnología de microondas usando sistemas embebidos heterogéneos para el entorno espacial. Arquimea. Adrián Amor Martín, José A. Belloch-Rodríguez. 25/04/2023-20/12/2023. 60,500 €. **Principal Investigator**. I develop algorithms for material characterization using microwave radiation in harsh environments.
2. Integration and Industrialization of FEM Solutions for Computational Electromagnetics. Airbus Defence and Space, S.A.U. Luis E. García Castillo. 13/05/2022-28/02/2025. 165,000 €. **Researcher**. I am one of the three researchers in the working team and develop codes based on the implementation of new basis functions, new boundary conditions, and equivalent problems.
3. INDRA-UC3M chair in radiofrequency technologies. Indra Sistemas, S.A. Daniel Segovia Vargas (UC3M). 26/10/2021-26/10/2023. 29,011.76 €. **Part of the working team**. I am an academic tutor who coordinates students’ work with Indra’s goals.
4. Antenna measurement from different manufacturers with Starlab Satimo given by Telefónica. Telefónica. Daniel Segovia Vargas (UC3M). From 01/06/2014. Around 343,269.04 €. **Researcher**. Coordinator for the measurements part and collaboration with Telefónica in the development of Matlab libraries based on standards (BASTA).