

CURRICULUM VITAE

Part A. PERSONAL INFORMATION		CV date	31/01/2023
First name	Javier		
Family name	Ortega Heras		
Gender	Male	Birth date (dd/mm/yyyy)	08/10/1986
ID number	70071095P		
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Open Researcher and Contributor ID (ORCID)	0000-0001-6075-593X		

A.1. Current position

Position	ComFuturo Fellow		
Initial date	01/04/2023		
Institution	Spanish National Research Council (CSIC)		
Department/Center	DAEND	Institute for Physical and Information Technologies (ITEFI)	
Country	Spain	Teleph. number	(+34) 630349469
Key words	Historical constructions, non-destructive evaluation (NDE), finite element modeling, structural analysis, seismic vulnerability, material characterization, heritage, conservation, documentation		

A.2. Previous positions

Period	Position/Institution/Country/Interruption cause
2022-2023	Marie Skłodowska-Curie Individual Fellow (MSCA-IF); ITEFI, Spanish National Research Council (CSIC); Spain
2018-2021	Postdoctoral researcher; ISISE, Department of Civil Engineering, University of Miho; Portugal
2019-2020	Professor; Escola Superior de Gallaecia; Portugal
2014-2018	PhD researcher; ISISE, Department of Civil Engineering, University of Miho; Portugal
2016-2016	Engineer; Atkinson-Noland & Associates; USA

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Ph.D. in Civil Engineering	University of Minho, Guimarães, Portugal	2018
M.Sc. in Structural Analysis of Historical Constructions	University of Padova, Padova, Italy University of Minho, Guimarães, Portugal	2013
Architecture	ETSAM, UPM, Madrid, Spain	2011

Part B. CV SUMMARY

I am an architect with a Ph.D. in Civil Engineering. Currently, I am a ComFuturo Fellow at ITEFI, working on developing novel non-destructive in-situ inspection systems (equipment and methods) for the material, geometrical and mechanical characterization of historical masonry elements, particularly focusing on obtaining an accurate 3D digital reconstruction of the interior of masonry elements. Previously, I was awarded the MSCA-IF to develop novel non-destructive inspection tools for the mechanical characterization of historical masonry, through the 3D internal reconstruction of masonry assemblies, based on acoustic wave propagation techniques.

Moreover, I am co-founder and associate of FENEC, a non-profit association providing non-destructive testing and specialized structural analysis services for the built heritage. We have participated in several seismic retrofitting projects, including the World Heritage Site (WHS) of Gjirokastra (Albania) and the castles of Agia Roumeli and Loutro, in Crete (Greece). I am member of ICOMOS Spain since 2019, for which I carry out heritage impact assessment reports for WHS.



The research work that I carried out has been enriched with consultancy projects, numerous field missions, and professional experience. I have over nine years of professional and academic experience in the field of conservation of historical and vernacular structures, with work on many monuments throughout the world, including WHS, such as the Shah Mosque, in Isfahan (Iran), the Alhambra, in Granada (Spain), the Beira Railway Station (Mozambique) or the Brooklyn Bridge (USA). I believe this complementary expertise involving academic and professional works is essential to carry out sound research in the field of conservation of historic structures, since it allows understanding the decision-making process and identifying the needs for research.

My research career has thus primarily focused on obtaining a better understanding of historical and vernacular structures, specifically focusing on five main research lines:

- (1) **Structural diagnosis of historical constructions involving advanced structural analysis and non-destructive evaluation.** This line of research has been complemented with the abovementioned collaborations with industry.
- (2) **Tomographic imaging the interior of historical construction elements** for the characterization of their inner damage and morphology, using non-destructive techniques. The interest in mapping and documenting the non-visible inner characteristics of heritage structures can have an important impact in structural diagnosis to make informed decisions on how to intervene. This line of research has resulted in several funded European research projects as PI: the Heritage Within (HWITHIN) European research project (406k€); the DocumeNDT MSCA-IF project (173k€); the S-RAY ComFuturo project (222k€); and the national research project MeDeAH (121k€).
- (3) **Material and structural characterization of representative heritage structures through laboratory testing.** This line of research is a necessary complement to the NDT investigations to validate the novel techniques that I am developing. Additionally, I am co-supervising one PhD thesis focused on the out-of-plane behavior of unreinforced stone masonry structures.
- (4) **Detailed and large-scale seismic vulnerability assessment of historic constructions.** Besides the participation in professional works dealing with the seismic retrofitting of heritage structures, this research line is aligned with my PhD thesis, which focused on the proposal of a novel seismic vulnerability assessment method for vernacular architecture. Several research paths have opened since then through collaboration with other researchers and PhD thesis supervision, expanding the proposed method to other building typologies and introducing new concepts, e.g. uncertainty.
- (5) **Conservation management of the built heritage and heritage impact assessment.** This research line has built upon the participation on the Keeping It Modern project from the Getty Foundation about the Beira Railway Station (Mozambique). Additionally, I am leading the INHAVIT research project (249k€). Under the framework of this project, I am supervising 3 PhD theses and coordinating a team of 5 researchers from 3 institutions.

In summary, I have participated in twelve research projects in the field of conservation of heritage structures, being principal investigator (PI) of five of them, raising a total of 1.17M€ as PI since the completion of my PhD. I have supervised 10 Master's Thesis and 1 Ph.D. Thesis and I am co-supervising 4 Ph.D. Thesis. I have taught in the Advanced Masters in Structural Analysis of Monuments and Historical Constructions (SAHC), at the University of Minho and at the Escola Superior de Gallaecia (ESG). My *h*-index (Google Scholar) is 11 (408 citations), with 20 publications indexed in JCR (Q1: 10, Q2: 10).

Part C. RELEVANT MERITS

C.1. Publications

Ortega J., Meersman M.F.L., Aparicio S., Liébana J.C., Martín R., Anaya J.J., González M. (2023) An automated sonic tomography system for the inspection of historical masonry walls, Open Research Europe, 3-60.

Núñez García M., Saloustros S., Mateos Redondo F., Alonso Campanero J.A., **Ortega** J., Greco F., Aranha A., Martínez Cuart I. (2022), "Seismic Retrofit of Existing Structures Based on Digital Surveying, Non-Destructive Testing and Nonlinear Structural Analysis: The Case of Gjirokastra Castle in Albania", Applied Sciences 12, 12106 (Q2).



Aparicio Secanellas S., Liébana Gallego J.C., Anaya Catalán G., Martín Navarro R., **Ortega Heras J.**, García Izquierdo M.A., González Hernández M., Anaya Velayos J.J. (2022), "An Ultrasonic Tomography System for the Inspection of Columns in Architectural Heritage", *Sensors* 22(17), 6646 (Q2).

Vuoto A., **Ortega J.**, Lourenço P.B., Suárez J., Núñez A.C. (2022), "Safety assessment of the Torre de la Vela in la Alhambra, Granada, Spain: The role of on site works", *Engineering Structures* 264, 114443 (Q1).

Dinani A.T., Destro Bisol G., **Ortega J.**, Lourenço P. (2021), "Structural Performance of the Esfahan Shah Mosque", *Journal of Structural Engineering*, 147(10) (Q2)

Ortega J., González M., García M.A., Masini N. (2021), "Heritage Within. European Research Project", Escola de Engenharia, Universidade do Minho, ISBN 978-989-54496-6-8.

Ortega J., Vasconcelos G., Rodrigues H., Correia M. (2019), "A vulnerability index formulation for the seismic vulnerability assessment of vernacular architecture", *Engineering Structures*, 197, 109381 (Q1).

Ortega J., Vasconcelos G., Rodrigues H., Correia M. (2018), "Assessment of the efficiency of traditional earthquake resistant techniques for vernacular architecture", *Engineering Structures*, 173, 1-27 (Q1).

Maccarini H., Vasconcelos G., Rodrigues H., **Ortega J.**, Lourenço P.B. (2018), "Out-of-plane behavior of stone masonry walls: Experimental and numerical analysis", *Construction and Building Materials*, 179, 430-452 (Q1).

Ortega J., Vasconcelos G., Rodrigues H., Correia M., Lourenço P.B. (2017), "Traditional earthquakes resistant techniques for vernacular architecture and local seismic cultures: A literature review", *Journal of Cultural Heritage*, 27, 181-196 (Q2).

C.2. Congress

Ortega J. (2023), "Automation of Non-destructive Evaluation Systems for the Structural Diagnosis of the Built Heritage", in 2nd Croatian Conference on Earthquake Engineering (2CroCEE), 22-24 March 2023, Zagreb (Croatia). Invited lecture at international conference.

Ortega J., Greco F., Núñez García M., Aranha C., Saloustros S. (2022), "Lidiar con la incertidumbre en la evaluación estructural del patrimonio construido", in II Simposio de Patrimonio Cultural ICOMOS España, 17-19 Nov 2022, Cartagena (España). Oral presentation at national conference.

Ortega J. (2021), "Non-destructive evaluation tools for historical structures", Seminar by invitation at the École Polytechnique Fédérale de Lausanne (EPFL), 2 Nov 2021, Lausanne (Switzerland). Invited lecture.

Ortega J., Saloustros S., Roca P. (2021), "Seismic Vulnerability Assessment method for vernacular architecture considering uncertainty", in 12th International Conference on Structural Analysis of Historical Constructions (SAHC), 29 Sept-01 Oct 2021, Barcelona (Spain). Oral presentation at international conference.

Ortega J. (2021), "Inspection and analysis tools for the seismic vulnerability assessment of vernacular architecture", Seminar by invitation at the Indian Institute of Technology Bhubaneswar, 29 Jun 2021, Bhubaneswar (India). Invited lecture.

Lourenço P.B., Miranda E., **Ortega J.** (2021), "Conservation of heritage structures: concepts, challenges and applications to concrete. Modern Movement in Mozambique: survey, condition assessment and conservation of the Beira Central Station", in Challenges in the preservation of the architectural heritage of the 20th century: themes and experiences, Excellence course of the Doctoral School of Politecnico di Torino, 22-26 Feb 2021, Torino (Italy). Invited lecture.

Ortega J. (2020), "Análisis estructural de construcciones históricas: una especialización para arquitectos", Seminar by invitation at Universidad de Granada, 29 Oct 2020, Granada (Spain). Invited lecture.



Ortega J, Saloustros S, Vasconcelos G, Rodrigues H (2019), “Numerical modeling considering uncertainty for the seismic vulnerability assessment of vernacular architecture”, in Congress of Numerical Methods in Engineering (CMN 2019), 01-03 Jul 2019, Guimarães (Portugal). Oral presentation at international conference.

Ortega J., Vasconcelos G., Rodrigues H., Correia M. (2019), “Avaliação da vulnerabilidade sísmica da arquitetura vernácula no núcleo antigo de Vila Real de Santo António”, in 11º Congresso Nacional de Sismologia e Engenharia Sísmica (SÍSMICA 2019), 29-30 Abr 2019, Lisboa (Portugal). Oral presentation at national conference.

Ortega J., Vasconcelos G., Rodrigues H., Correia M. (2016), “Seismic behavior of an old masonry building in Vila Real de Santo António, Portugal”, in 10th International Conference on Structural Analysis of Historical Constructions (SAHC), 13-15 Sept 2016, Leuven (Belgium). Oral presentation at international conference.

C.3. Research projects

- **MeDeAH** (application of Mechatronics and Deep learning for tomographic imaging of the Architectural Heritage to improve structural diagnosis). Sep 2023-Aug 2025

Funding entity: AEI Proyectos Generación de Conocimiento 2022. PID2022-140071OB-C21

Candidate role: **Principal Investigator (PI)**. Total funding: 121,250.00€

Institutions: CSIC, UPM, UGr, University of Zagreb

- **ARGUS** (Non-destructive, scalable, smart monitoring of remote cultural treasures). Dec 2023-Dec 2026

Funding entity: HORIZON-CL2-2023-HERITAGE-01-01 (101132308).

Candidate role: Researcher. Total funding: 3,996,147.50€

Institutions: Consortium of 11 international institutions led by Athena Research Center

- **S-RAY** (Deep-learning Sonic-RAY tomography for architectural heritage digital reconstruction and structural diagnosis). Apr 2023-Mar 2026

Funding entity: FGCSIC. ComFuturo Programme (MSCA COFUND 101034263).

Candidate role: **Principal Investigator (PI)**. Total funding: 222,228.00€. Institutions: CSIC

- **INHAVIT** (Sustainability-led approaches for the rehabilitation and revitalization of the cultural built heritage of Montesinho Natural Park). Oct 2021-Oct 2024

Funding entity: Foundation for Science and Technology (FCT), Lisbon (Portugal). Call for SD&TD projects in the Natural Park of Montesinho (MTS/BRB/0086/2020).

Candidate role: **Principal Investigator (PI)**. Total funding: 248,926.82€

Institutions: University of Minho, University of Aveiro, Polytechnic Institute of Bragança

- **DocumeNDT** (Characterization, documentation and virtualization of the cultural masonry heritage using wave propagation Non-Destructive Techniques). Jan 2022-Dec 2023

Funding entity: H2020-MSCA-IF-2020. Grant agreement ID: 101030275.

Candidate role: **Principal Investigator (PI)**. Total funding: 172,932.00€. Institutions: CSIC

- **Heritage Within** (HWITHIN). Jan 2020-Dec 2021

Funding entity: CROSS-SECT – Cross Sectorial Strand. INNOVLAB - Bridging culture and audiovisual content through digital. 614719-CREA-1-2019-1-PT-CROSS-SECT-INNOVLAB.

Candidate role: **Principal Investigator (PI)**. Total funding: 244,106.00€

Institutions: U Minho, CSIC, CNR, UPM

- Robotics and automation for NDT Inspection of Heritage Structures. Jan 2023-Dec 2024

Funding entity: CSIC. ILINK22031. Candidate role: Researcher. Total funding: 18,759.12€

Institutions: CSIC, EPFL, University of Zagreb

- Beira Railway Station, Mozambique. Oct 2019-Apr 2022

Funding entity: Keeping It Modern Grant, The Getty Foundation. Candidate role: Researcher. Total funding: 160,000.00€.

Institutions: U Minho, University of Eduardo Mondlane (UEM), Mozambique Ports & Railways Company (CFM)