

CURRICULUM VITAE ABREVIADO (CVA)

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

Part A. PERSONAL INFORMATION

First name	Alpha Pernía Espinoza		
Family name			
Gender (*)	Female	Birth date (dd/mm/yyyy)	
Social Security, Passport, ID number			
e-mail		URL Web	
Open Researcher and Contributor ID (ORCID) (*)		0000-0001-6227-075X	

(*) Mandatory

A.1. Current position

Position	Full professor		
Initial date	28/10/2024		
Institution	Universidad de La Rioja		
Department/Center		Department of Mechanical Engineering	
Country	Spain	Teleph. number	
Key words	Numerical simulation (FEM, CFD), Process modelling, Process optimization, Additive Manufacturing, Bioprinting, Plasma treatment		

A.2. Previous positions (research activity interruptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
02/10/2011 – 28/10/2024	Associate Professor/Universidad de La Rioja/Spain
YYYY-YYYY	

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD on Industrial Engineering	Universidad de La Rioja/ Spain	2007
Licensed on Industrial Engineering	Universidad de La Rioja/ Spain	2004
Master on Automation and Instrumentation	Universidad de Los Andes (Venezuela)	2001
Licensed on Electrical Engineering	Universidad de Los Andes (Venezuela)	1998

(Include all the necessary rows)

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

Since 2001, I have been a member of the EDMANS research group at the University of La Rioja (UR), collaborating closely with other groups, such as P2ML: Projects, Plasma and Machine Learning. In 2008, I was honoured with the PhD Extraordinary Award for my European doctoral thesis. I was appointed Associate Professor at the UR in 2011 and achieved the position of Full Professor in 2024. Over my career, I have been awarded three six-year research terms.

I have contributed to numerous research projects, including five European projects, four national projects, and more than 15 collaborations with regional and national enterprises, serving as principal investigator in over five of these. My scholarly output includes co-authoring over 50 publications in international indexed journals, five books, and four industrial patents (three of which are currently in use), as well as a utility model. My research findings have been presented at more than 50 national and international conferences. Additionally, I have conducted research stays at esteemed institutions, such as the German steel research institute Betriebsforschungsinstitut (BFI-Düsseldorf).

My expertise centres on the modelling and optimisation of products and processes through numerical simulation and machine learning techniques. My research spans the steel industry, elastomer industry, additive manufacturing, bioprinting, and plasma treatments. In recent years, I have focused on the use of cold atmospheric plasma (CAP) technologies for:

- Treating and decontaminating food and surfaces
- Decontaminating steel and 3D-printed containers
- Enhancing adhesion in 3D-printed materials and elastomer components
- Producing plasma-activated water (PAW) for diverse applications

As principal investigator, alongside PhD. F. Alba-Elias, I led the National Project “Aplicación de recubrimientos plasma polimerizados y PAW con capacidad antimicrobiana y antibiofilm” (PID2020-113658RB-C21), funded with €209,330 from 2021 to 2024.

Since 2016, I have been deeply involved as co-founder and head of UR-Maker (www.unirioja.es/urmaker), the makerspace of the University of La Rioja. Through this platform, I have fostered technological knowledge transfer and social impact by organising workshops, courses, and events, including Arduino Day (2017–2021) and TEC Rioja 2023. I am also committed to encouraging young people, particularly girls, to pursue careers in science and technology. I have served as coordinator and mentor for the "Inspira STEAM" programme in La Rioja, instructor for Spain's "STEM Talent Girl" programme, and organiser and speaker for multiple editions of the "International Day of Women and Girls in Science."

I have supervised five doctoral theses, the most recent being “Novel Advances in Bioprinting Based on the Mechanical Design and Optimization of Open-source Systems” by Enrique Sodupe-Ortega, successfully defended on 2 April 2019.

To date, my academic contributions include 55 publications indexed in Web of Science, an H-index of 12, 449 total citations, and 387 citing articles.

Part C. RELEVANT MERITS (*sorted by typology*)

C.1. Publications (*see instructions*)

1. Divasón, J., Pernia-Espinoza, A., Martinez-de-Pison, F.J. HYB-PARSIMONY: A hybrid approach combining Particle Swarm Optimization and Genetic Algorithms to find parsimonious models in high-dimensional datasets (2023), **Neurocomputing**, 560, 126840. <https://doi.org/10.1016/j.neucom.2023.126840>
2. Divasón, J., Cenicerós, J.F., Sanz-García, A., Pernia-Espinoza, A., Martinez-de-Pison, F.J. PSO-PARSIMONY: A method for finding parsimonious and accurate machine learning models with particle swarm optimization. Application for predicting force–displacement curves in T-stub steel connections (2023), **Neurocomputing**, 548, 126414. <https://doi.org/10.1016/j.neucom.2023.126414>
3. Martinez-de-Pison F.J., F.J.;Ferreiro J.;Fraile E.;Pernia-Espinoza A. A comparative study of six model complexity metrics to search for parsimonious models with GAparsimony R Package (2021), **Neurocomputing**, 452, pp. 317-332. <https://doi.org/10.1016/j.neucom.2020.02.135>

4. Sanz-Garcia, A., Sodupe-Ortega, E., Pernía-Espinoza, A., Shimizu, T., Escobedo-Lucea, C. A versatile open-source printhead for low-cost 3d microextrusion-based bioprinting (2020). **Polymers**, 12 (10), pp. 1-18. <https://doi.org/10.3390/polym12102346>
5. Muro-Fraguas, I., Sainz-García, E., Pernía-Espinoza, A., Alba-Elías, F., Atmospheric pressure air plasma treatment to improve the 3D printing of polyoxymethylene (2019). **Plasma Processes and Polymers**, 16 (7). <https://doi.org/10.1002/ppap.201900020>
6. Ortega, E.S., Sanz-Garcia, A., Pernia-Espinoza, A., Escobedo-Lucea, C. Efficient fabrication of polycaprolactone scaffolds for printing hybrid tissue-engineered constructs (2019). **Materials**, 12 (4). <https://doi.org/10.3390/ma12040613>
7. Pernia-Espinoza, A., Diegelmann, V., Escribano-Garcia, R., Fernandez-Ceniceros, J., Martinez-de-Pison, F.J. A novel hybrid strip finishing process to improve mechanical properties and reduce energy consumption(2019). **International Journal of Material Forming**, 12 (1), pp. 27-43. <https://doi.org/10.1007/s12289-018-1403-x>
8. Pernía-Espinoza, A., Fernandez-Ceniceros, J., Antoñanzas, J., Urraca, R., Martinez-de-Pison, F.J. Stacking ensemble with parsimonious base models to improve generalization capability in the characterization of steel bolted components (2018). **Applied Soft Computing Journal**, 70, pp. 737-750. <https://doi.org/10.1016/j.asoc.2018.06.005>
9. Sodupe-Ortega, E., Sanz-Garcia, A., Pernia-Espinoza, A., Escobedo-Lucea, C. Accurate calibration in multi-material 3D bioprinting for tissue engineering (2018). **Materials**, 11 (8). <https://doi.org/10.3390/ma11081402>
10. Fraile-Garcia, E., Ferreira-Cabello, J., Martinez de Pison Ascacibar, E., Fernandez Ceniceros, J., Pernia-Espinoza, A. Implementing a technically and economically viable system for recording data inside concrete (2017). **Construction and Building Materials**, 157, pp. 860-872. <https://doi.org/10.1016/j.conbuildmat.2017.09.139>
11. Urraca, R., Pernía-Espinoza, A., Díaz, I., Sanz-Garcia, A. Practical methodology for validating constitutive models for the simulation of rubber compounds in extrusion processes (2017). **International Journal of Advanced Manufacturing Technology**, 90 (5-8), pp. 2377-2387. <https://doi.org/10.1007/s00170-016-9537-9>
12. Sanz-García, A., Pernía-Espinoza, A., Fernández-Martínez, R., Martínez-De-Pisón-Ascacibar, F.J. Combining genetic algorithms and the finite element method to improve steel industrial processes (2012). **Journal of Applied Logic**, 10 (4), pp. 298-308. <https://doi.org/10.1016/j.jal.2012.07.006>

C.2. Congress, indicating the modality of their participation (invited conference, oral presentation, poster)

C.3. Research projects, indicating your personal contribution. In the case of young researchers, indicate lines of research for which they have been responsible.

1. PROYECTOS I+D (Ministerio de Ciencia e innovación): **PID2020-113658RB-C21** "Aplicación de recubrimientos plasma polimerizados y paw con capacidad antimicrobiana y antibiofilm". Participants: Universidad de La Rioja, Universidad de León y Centro de Investigación Biomédica de La Rioja. Budget: 209.330 €. 2021-2024. PIs: Fernando Alba-Elías and Alpha Pernia-Espinoza.
2. RETOS (MINECO): **AGL2017-82779-C2-1-R** "Recubrimientos Anti-Biofilm mediante Plasma-polimerización Atmosférica No-equilibrada para su utilización en la industria alimentaria (RAPANUI)". Participants: Universidad de La Rioja, Universidad de León y Centro de Investigación Biomédica de La Rioja. Budget: 193.600 €. 2017-2020. PI: Fernando Alba-Elías.
3. Regional: **ADER 2017-I-IDD-00033** "Tecnologías de mejora de la adhesión del calzado (TECNACAL)". Participants: Universidad de La Rioja and Centro Tecnológico del Calzado de La Rioja. Budget: 261.679 €. 2018-2020. PI: Fernando Alba-Elías.
4. European: **610953**, "VINEyardROBOT". European Commission. FP7-ICT - Specific Programme "Cooperation". Participants: Universidad de La Rioja, Forschungsanstalt Geisenheim, Avanzare

Innovacion Tecnologica SL, Universitat Politecnica de Valencia, Force-A SA, Wall-Ye SARL, Les Vignerons de Buzet Societe Cooperative Agricole, Sivils Srl, Scea Gueyze et Domaines.
01/12/2013-31/05/2017. Budget: 2.714.078 €. PI: Javier Tardáguila Laso.

5. Regional: **ADER 2012-I-IDD-00126**, “Sistema inteligente en tiempo real basado en redes de sensores y minería de datos para la toma de decisiones en procesos de construcción de edificios e infraestructuras” (CONOBUILD). Participants: Universidad de La Rioja, Desarrollo de Ideas y Proyectos ARQUA, S.L. Budget: 110.482,24€. PI: Francisco Javier Martinez-de-Pison-Ascacibar. 09/10/2013-09/10/2015.
6. European: **RFSR-CT-00016**, “Development of an innovative hybrid procedure for combining tension levelling and skin pass rolling” (HYPROCOM). Participants: VDEH - Betriebsforschungsinstitut GMBH, BILSTEIN GMBH & CO. KG, Instituto de Soldadura e Qualidadeassociacao, SUNDWIG GMBH, Universidad de La Rioja. Budget: 1.287.748€. PI: Eliseo Vergara-Gonzalez. 01/07/2007-31/07/2010

C.4. Contracts, technological or transfer merits, Include patents and other industrial or intellectual property activities (contracts, licenses, agreements, etc.) in which you have collaborated. Indicate: a) the order of signature of authors; b) reference; c) title; d) priority countries; e) date; f) Entity and companies that exploit the patent or similar information, if any.

1. OTEM 120514. “Desarrollo modelo de enderezamiento por elementos finitos y optimización del proceso” (CONTECA). Arcelor Mital SSC España. Budget: 27.998 €. PI: Alpha Pernia-Espinoza. 23/05/2012-23/05/2013.
2. OTEM 111205. “Optimización de los parámetros del proceso de enderezamiento de carriles” (OPEC). Arcelor Mital SSC España. Budget: 39.567 €. PI: Alpha Pernia-Espinoza. 05/12/2011-05/12/2012.
3. Patent: Joaquin Ordieres-Mere; Fernando Alba-Elias; Vergara-González; Francisco Javier Martinez-de-Pison; Alpha Pernia-Espinoza; José Antonio Gómez-Cristóbal; Lazaro Cremades-Oliver; Maria González-Benítez; Carlos Sierra-Garriga. 200701479. APARATO PARA ACONDICIONAR MATERIAL PARTICULADO MEDIANTE MEZCLA, HUMECTACION Y SECADO. **ES2339082**. Spain. 13/12/2011. Universidad de La Rioja.
4. Patent: Eliseo Vergara-González; Fernando Alba-Elias; Francisco Javier Martinez-de-Pison; Alpha Pernia-Espinoza; Ana González-Marcos; Rafael Fernandez-Palacios. P200802568. MÉTODO Y DISPOSITIVO PARA LA ELIMINACIÓN PARCIAL DEL ÁCIDO ISOCIANÚRICO EN EL AGUA DE PISCINAS. **ES2336185**. Spain. 21/01/2011. Universidad de La Rioja.
5. Patent: Joaquin Ordieres-Mere; Fernando Alba-Elias; Eliseo Vergara-González; Francisco Javier Martinez-de-Pison; Alpha Pernia-Espinoza; Eduardo Martinez-de-Pison; Manuel Castejon-Limas; Ana González-Marcos. 200701627. DISPOSITIVO DE ABSORCION ACUSTICA. **ES2326769** Spain. 16/03/2010. Universidad de La Rioja. INGENIERÍA ACÚSTICA 3 S.L. (CIF: B33898008 Gijón, Pque. Científico y Tecnológico de Gijón).
6. Patent: Fernando Alba-Elias; Joaquin Ordieres-Mere; Vergara-González; Francisco Javier Martinez-de-Pison; Alpha Pernia-Espinoza; Eduardo Martinez-de-Pison; Manuel Castejón-Limas; Ana Gonzalez-Marcos. P200702229. PROCEDIMIENTO Y SISTEMA PARA EL TRATAMIENTO DE AGUAS CONTAMINADAS CON METALES PESADOS. **ES2325349**. Spain. 08/03/2010. Universidad de La Rioja.