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	Alejandro		
Family name	Fernández-Montes	González	
Gender (*)	Male	Birth date (dd/mm/yyyy)	
Social Security, Passport, ID number			
e-mail		URL Web: https://prisma.us.es/investigador/1330	
Open Researcher and Contributor ID (ORCID) (*)		0000-0002-2998-4950	

(*) Mandatory

A.1. Current position

Position	Catedrático de Universidad			
Initial date	23/12/2024			
Institution	Universidad de Sevilla			
Department/Center	Lenguajes y Sistemas Informáticos	Escuela Técnica Superior de Ingeniería Informática		
Country	SPAIN		Teleph. number	
Key words	Optimization and Simulation of Distributed Systems, Energy Efficiency, Scheduling			

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

Period	Position/Institution/Country/Interruption cause
2024-	Catedrático de Universidad
2018-2024	Titular de Universidad/ U. de Sevilla / Spain / Birth of daughter
2016-2018	Contratado Doctor / U. de Sevilla / Spain
2015-2016	Ayudante Doctor / U. de Sevilla / Spain
2008-2011/2014-2015	Profesor Sustituto Interino/PIF/PSI / U. de Sevilla / Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Ph.D. Engineer in Computer Science	U. de Sevilla / Spain	2013
Official Msc. in Software Engineering and Technologies	U. de Sevilla / Spain	2008
Bachelor's degree in Computer Science and Engineering	U. de Sevilla / Spain	2007

Part B. CV SUMMARY

For the last 10 years, I have been **focused on optimizing performance and improving energy efficiency and cost savings in hyperscale Data Centres (DC)**, from which I highlight the following contributions:

- Application of **AI techniques to identify and classify the workload** that is being executed by the DC so that the resource manager can be optimized according to the workload characteristics. We demonstrated that KPIs can be improved by at least 20%. Published in [1] the **D1 JCR-ranked** Journal Future Generation Computer Systems and received the **award of the best paper of 2021** of the ETSII of the US.
- Development of a **simulation tool for hyperscale DCs** that enables researchers to run simulations and apply various strategies to improve performance and energy efficiency. The main contribution was to offer the research community a reliable simulation tool. Published in the Q1 JCR Journal Simulation Modelling P&T in three articles in [4, 6, 8] and available as an open-source tool.
- Development of **energy policies** that can be applied to hyperscale DCs to improve their energy efficiency. Published in Q1-Q2 JCR ranked journals [2, 3, 7, 9] and conferences [11, 12]. At least **20% of energy consumption** can be saved without having an impact on DC performance.
- Development and application of analysis **techniques to compare relative efficiency between DCs** and computing infrastructures. This contribution allows DC operators to compare the relative efficiency between their DCs and offers recommendations on what characterization or parameterization should be done on nonefficient infrastructures. Published in a JCR-Q1 journal [10].

Leadership and Scientific Responsibilities

- **PI of the REACT project of the Retos 2018** call, which resulted in 13 JCR-Q1/Q2 publications. PI of project.
- PI of the INDISTINCT project of the National Plan 2022 (ongoing)
- PI of Data Center Digital twin project of the Junta de Andalucia regional government 2022 (ongoing)
- Moreover, I am PI of more than 10 R&D contracts that sum up 300k€.
- I advised the Ph.D. Thesis of D. Fernández Cerero, focused on DC optimization, who obtained the **Extraordinary Doctorate Award granted by the University of Sevilla** (US) in 2018.for the **best thesis of 2018**.

International relationships

I maintain strong and fluent collaborations with international colleagues:

- **5 international research stays**, 2 research stays at ENS-Lyon, at Shanghai Jiao Tong U., and 2 periods of 6 months at the U. of Technology of Cracow as postdoctoral researcher.
- **14 articles** in collaboration with more than **15 researchers from international institutions**.
- **member of the European** COST Action IC1406 High Performance Modeling and Simulation for Big Data Applications (cHiPSet)

Other milestones

- International Ph.D. thesis and obtained the **Extraordinary Doctorate Award**.
- Coordinator of an Official Msc.
- Visiting professor at the Krakow University of Technology, in the Official Msc. of Computer Science.
- **Award of Best Foreign Professor of the 20/21.**
- Involvement in university management member of 'Consejo de Gobierno', 'Claustro Universitario' 17-20 and 20-), and many other commissions at university and school level.

Part C. RELEVANT MERITS

C.1. Publications

[1]. A. Fernández-Montes, D. Fernández-Cerero, F. Escalera González; A. Jakóbik, B. Bermejo, C. Juiz. **JCR-Q2.** 2023. SoftwareX. 24. Pages: 10152- 10159. DOI: 10.1016/j.softx.2023.101527.

[2]. D. Fernández-Cerero, Troyano, J.A.; A. Jakóbik, A. Fernández-Montes. Machine learning regression to boost scheduling performancein hyper-scale cloud-computing data centres. **JCR-Q1**. 2022. Journal of King Saud University - Computer and Information Sciences. 34 (6), Pages: 3191- 3203. DOI: 10.1016/j.jksuci.2022.04.008

[3]. D. Fernández-Cerero, Ortega, F. Javier; A. Jakóbik, A. Fernández-Montes. DISCERNER: Dynamic selection of resource manager in hyper-scale cloud-computing data centres **JCR-Q1 (D1)** 2021. Future Generations Computer Systems. 116, Pages: 190-199. DOI: 10.1016/j.future.2020.10.031

[4]. D. Fernandez-Cerero, F.J. Ortega-Irizo, A. Fernández-Montes, F. Velasco-Morente. Bullfighting extreme scenarios in efficient hyper-scale cluster computing. 2020. **JCR-Q1** Cluster Computing- The Journal of Networks Software Tools and Applications. 23(7). Pages: 1-17. DOI: 10.1007/s10586-020-03094-2

[5]. D. Fernández-Cerero, A. Fernández-Montes, A. Jakóbik, “Limiting global warming by improving data-centre software”. 2020 **JCR-Q1** IEEE Access. 8, Pages: 44048-44062 DOI: 10.1109/ACCESS.2020.2978306

[6]. D. Fernández-Cerero, A. Fernández-Montes, F.J. Ortega, A. Jakóbik “Sphere: Simulator of Edge Infrastructures for the Optimization of Performance and Resources Energy Consumption”. 2020. **JCR-Q1** Simulation Modelling Practice & Theory. 101. Pages: 101966 (1-17). DOI: 10.1016/j.simpat.2019.101966

[7]. D. Fernández-Cerero, A. Jakóbik, A. Fernández-Montes, J. Kołodziej, “GAME-SCORE: Game-based energy-aware cloud scheduler and simulator for computational clouds”. 2019. **JCR-Q1** Simulation Modelling Practice & Theory. 93. Pages: 3-20.

[8]. D. Fernández-Cerero, A. Fernández-Montes, J.A. Ortega. “Energy Policies for Data-Center Monolithic Schedulers”. 2018. **JCR-Q1** Expert Systems with Applications. 110, Pages: 170-181 DOI: 10.1016/j.eswa.2018.06.007

[9]. D. Fernández-Cerero, A. Fernández-Montes, A. Jakóbik, J. Kolodziej, M. Toro. "SCORE: Simulator for cloud optimization of resources and energy consumption". 2018. **JCR-Q2** Simulation Modelling Practice & Theory. 82, Pages: 160-173. DOI: 10.1016/j.simpat.2018.01.004

[10]. A. Fernández-Montes, L. González, J.A. Ortega, L. Lefèvre. “Smart scheduling for saving energy in grid computing”. 2012. **JCR-Q1**. Expert Systems with Applications. 39 (10), Pages: 9443-9450 DOI: 10.1016/j.eswa.2012.02.115.

C.2. Congress.

[11]. D. Fernández-Cerero, Alejandro Fernández-Montes, A. Jakóbik, J. Kolodziej. “Stackelberg Game-Based Models In Energy-Aware Cloud Scheduling”, Int. Conf. on Modelling and Simulation. May 2018. Germany. Oral presentation. Pages: 460-467

[12]. D. Fernández-Cerero, A. Fernández-Montes, J. Kolodziej, L. Lefèvre, “Quality of cloud services determined by the dynamic management of scheduling models for complex heterogeneous workloads”. 11th Int. Conf. on the Quality of Information and Comm. Technology (QUATIC). September 2018. Oral presentation. Pages: 210-219

C.3. Research projects

As Principal Investigator:

- **Gemelo Digital de centros de datos de hiperescala para la optimización energética mediante la aplicación de modelos de IA**. Funder: Junta de Andalucía I+D+i Ref: PROYEXCEL_00286. 2022 -2025. Budget: 78.660€.

- **Modelado y Simulación de un Performance Digital Twin que habilita la aplicación de IA para la sostenibilidad de los grandes centros de datos.** Funder: Ministerio de Ciencia e Innovación. Ref.: PID2021-122208OB-I00. 2022-2025. Budget: 55.418€.
- **Ayuda para la recualificación del profesorado universitario.**. Ref: 2043.Funding Entity: FEDER. From 2022 to 2023. Budget: 63.908,37€.
- **Energy Efficiency And Performance Of Data Centers** By Smart Virtualization And Deep Learning. Ref: RTI2018-098062-A-I00. Funding Entity: Ministerio de Ciencia, Investigación y Universidades 2019-2021. Budget: 25.168 €
- **Masive**. Ref: 2018/00000520.Funding Entity: Plan propio U.S. 2017-2018. Budget: 5.000€.
- **Efficient eLAstic SofTware Infrastructure for City**. Ref: 2017/1017. Funding Entity: Plan propio U.S. 2016-2017. Budget: 5.000€.

As investigator:

- **High-Performance Modelling and Simulation** for Big Data Applications. Ref: ICT1406. Funding Entity: **European Comission. European Cooperation in Science and Technology**. 2015-2019. Principal Investigator: J. Kolodziej. Budget: 440.000€

C.4. Contracts, technological or transfer merits.

As Principal Investigator:

1. Expansion of Simulation Framework for Digital Twin Integration (EXPASIN). Italica Sinterizado Dental S.L. 1/11/2024-30/10/2026. 120.000 €
2. Modelado y Desarrollo de Arquitectura para Digital Twins en Industria 4.0 Sindekar Chile, SPA. 16/10/2023-16/10/2025. 39.000 €.
3. Mantenimiento de Plataforma de Gestión Inteligente Optimizada para Cloud Computing Itálica Sinterizado Dental S.L. 01/12/2020-01/12/2022. 8.400 €.
4. DAISHO: Investigación, Desarrollo e implantación de Plataforma de gestión inteligente optimizada para cloud computing. Daisho Telecom S.L. 22/06/2020-22/06/2021. 19.205 €.
5. OPOFLIX LMS: Investigación, Desarrollo e implantación de Plataforma de contenidos e-learning optimizada para cloud computing como base a la aplicación de Inteligencia Artificial para especialización de oferta de contenidos a estudiantes Opoflix S.L. 15/06/2020-15/06/2021. 40.970 €.
6. PrEdicción de la caRga para la mejora de la eFiciencia de la platafORMa cloud Itálica Sinterizado Dental S.L. 02/03/2020- 02/03/2022. 7.100 €.
7. COSMIC3: Planificador de Recursos en Cloud de Sokar Mechanics Sokar Mechanics, S.L. 10/04/2019-11/04/2020. 4.700 €.
8. Mejora de la Plataforma Eficiente Cloud de Sokar Mechanics COSMIC2 Sokar Mechanics, S.L. 03/09/2018-04/09/2019. 7.800 €.
9. Optimización energética del centro de datos de DELEM Delem Ocio, S.L. 24/10/2017-25/10/2018. 2.100 €.
10. COSMIC: Desarrollo de la Plataforma Eficiente Cloud de Sokar Mechanics Sokar Mechanics, S.L. 15/02/2017-16/12/2018. 4.800 €.

Patents:

- **Sci (Simple Cluster Interface)**: Architecture For Managing User Tasks In A Cluster Via The Web. AFM, et. al. Pub. No.: WO/2012/052581 International Application No.: PCT/ES2011/000310 Published on 26.04.2012 International Filing Date: 21.10.2011
- **Energy-efficient Monitoring** and Localisation Device, System and Method, AFM, et al. Pub. No.: WO2012/010727. International Application No.: PCT/ES2011/000237. Published on 26.01.2012. International Filing Date: 22.07.2011
- Intellectual property registered of the **simulation tool "SCORE"**. Código: SE-1016-18
- Intellectual property registered of the **simulation tool "Grid'5000 Toolbox"** SE-1244-12