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	Isabel de los Ángeles		
Family name	Nepomuceno Chamorro		
Gender (*)	Female	Birth date (dd/mm/yyyy)	
Social Security, Passport, ID number			
e-mail		URL Web	https://personal.us.es/inepomuceno/
Open Researcher and Contributor ID (ORCID) (*)	0000-0002-4255-7160		

A.1. Current position

Position	Profesora Titular de Universidad		
Initial date	11/11/2019		
Institution	Universidad de Sevilla		
Department/Center	Lenguajes y Sistemas Inform.	E.T.S.de Ingeniería Informática	
Country	Spain	Teleph. number	
Key words	Applied Machine Learning, Clinical Bioinformatics		

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

Period	Position/Institution/Country/Interruption cause
2012-2019	Profesora Contratada Doctora
2006-2012	Profesora Colaboradora
2005-2006	Profesora Sustituta Interina
Nov04-Feb05	Personal Técnico del CICA (Centro Informático Científico de Andalucía)
2004(Feb/Jun)	Desarrolladora FUJITSU
2014	Maternity: 23/03/2014 (6 months)
2014	Sick leave related to pregnancy (26/02/2014 - 23/03/2014)
2016	Maternity (20/4/2016) (6 months)
2016	Sick leave related to pregnancy (08/03/2016 – 20/04/2016)

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Doctora	Universidad Pablo de Olavide	2011
Ingeniera Informática	Universidad de Sevilla	2003

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

Isabel is Profesora Titular at the University of Seville (US), graduating in 2003. She earned her PhD in 2011, receiving the Extraordinary Award from the Universidad Pablo de Olavide. She currently has 3 sexenios. Isabel has been involved in 9 research projects and served as co-PI for the regional project BIDASGRI (US-1263341), funded by FEDER Andalucía with a budget of over €90,000 in time series data analysis. She was PI for her institution's role as associated partner in the MSCA Initial Training Network "Machine Learning Frontiers in Precision Medicine" (ITN MLFPM[1]), and now she is PI for her institution as associated partner in the MSCA ITN “Machine Learning Computational Advancements for personalized medicine” (MLCARE2).

As further evidence of internationalization, in addition to European projects, she served as an evaluator in the 2023 and 2024 calls for the European Commission's SMASH[3] project—the Machine Learning for Science and Humanities postdoctoral fellowship program (a Marie

[1] https://mlfpm.eu/partners-and-pis/
[2] https://mlcare.webs.tsc.uc3m.es/consortium/
[3] https://smash.ung.si/

Skłodowska-Curie COFUND action). Furthermore, she is currently involved in creating an international AI network in Health Sciences called AI-LIFE[4]. She completed two research stays totaling four months at the Centre de Recherche Publique Santé of Luxembourg, which resulted in publications in reputable journals. Additionally, she has published other research in collaboration with researchers from prestigious foreign institutions.

She reviews journals like Computers in Biology and Medicine, iScience, and Bioinformatics, and is a PC member of conferences like IWBBIO and JABI, among others. She participated in two technology transfer contracts (Section C.4 – 1,2) and dissemination activities such as “La Noche Europea de los Investigadores” (Section C.4 – 3,4). Isabel co-supervised a PhD thesis and currently co-supervises four PhD theses. The theses cover generative DL-based methods for clinical synthetic data, time series analysis from ICU patients, integration of various data types using multimodal ML and predictive model from longitudinal data. She has co-authored over 53 articles, book chapters, and conference papers, with 28 articles cited in JCR, 22 in Q1/Q2 journals. Recently, she has 2 journal papers under review and 24 peer-reviewed abstracts in conferences.

Isabel, during her PhD and post-PhD period, made significant contributions to the field of gene expression data analysis from microarray technology. Notably, she designed and developed RegNet, a methodology for inferring gene networks (Section C1 - 10). The impact of RegNet was highlighted as it garnered "Highly Accessed" status in the journal, receiving over 1000 visits within the first 30 days. Building on this success, RegNet evolved into SATuRNO (Section C.1 - 9), a supervised Machine Learning (ML) technique, developed in collaboration with the Laboratory of Cardiovascular Research of the CRP-Santé in Luxembourg. The application of SATuRNO was instrumental in predicting the clinical response of patients who underwent myocardial infarction and primary percutaneous operations and clinical outcome of patients undergoing induced therapeutic hypothermia after cardiac arrest. These methods were further applied to experiments involving the zebrafish model organism, leading to the identification of biomarkers for cardiovascular diseases (Section C.1 - 8). This collaborative effort was the result of two research stays at the LCR, supervised by Dr. Azuaje, between 2009 and 2010. Notably, these stays were partially funded by competitive grants and funds from the visiting center. In this context it is also worth mentioning the work (Section C.1 – 6), which is the result of another international collaboration stemming from the invitation extended to Isabel as a participant in the “ML workflows for patient stratification using omics data” online stakeholder consultation workshop 2021, organized by the European project on Personalized Medicine Trials[5].

In 2017, following her second maternity leave, Isabel's research interests expanded to include omic data from sequencing technology, and clinical data analysis. In scRNA-seq data analysis, she collaborated with the PIs of Subproject 1 to develop a method integrating pathway knowledge with deep neural networks for dimensionality reduction and cell type annotation (Section C.1 – 4). Concurrently, she explored generative Deep Learning (DL)-based methods in scRNA-seq, developing a biological constrained variational autoencoder (Section C2.1 – 1). In the clinical domain, her research focuses on generating clinical synthetic data using Generative Adversarial Networks (GAN) (Section C.1 - 5). More recently, she developed an experimental review for early sepsis detection in the Intensive Care Unit (ICU) and a flexible framework for sepsis prediction together with a method to impute this kind of dataset (Section C.1-3,2,1).

In academic training, Isabel co-supervised a PhD thesis; the student, Belén Vega, now holds the position of P. Ayudante Doctora in the US and she is in the research team. Currently, Isabel is co-supervising four PhD theses in collaboration with three members of the research team. This research is focused on generative DL models and multimodal ML. The first thesis centers on a generative DL-based method for generating clinical synthetic data using GAN and classical methods to enhance unbalanced dataset. The second thesis addresses challenges

[4] https://ai-life.biochem.mpg.de/

5 https://ecrin.org/projects/permit

in time series analysis from patients in the ICU, specifically tackling the huge amount of missing data (imputation problem) through the fusion of models (GANs and GNN). The third PhD thesis involves the integration of various data types (images, electronic health records, etc.) using multimodal ML. The four PhD thesis have started this academic year and involves the analysis of longitudinal clinic data. Finally, she advised as "Tutor" of 2 theses.

Finally, regarding academic management, she recently served as the coordinator of the Master Universitario en Análisis de Datos Ómicos y Biología de Sistemas por la Universidad Internacional de Andalucía. Additionally, she was the Secretary of her department with more than 100 members, having the responsibility of managing the PAP (Plan de Asignación de Profesorado) of three academic years.

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

C.1. Publications *(see instructions)*

1. J Solís-García, B Vega-Márquez, JA Nepomuceno, Isabel A. Nepomuceno-Chamorro[6]. CoSTI: Consistency models for (a faster) spatio-temporal imputation. KNOWLEDGE-BASED SYSTEMS (0950-7051 / 1872-7409), 2025.
2. J Solís-García, B Vega-Márquez, JA Nepomuceno, Isabel A. Nepomuceno-Chamorro[6]. A flexible framework for sepsis prediction: Standardizing data management and imputation in time series using MIMIC-III. SoftwareX (2352-7110), 2025.
3. J Solís-García, B Vega-Márquez, JA Nepomuceno, JC Riquelme-Santos, Isabel A. Nepomuceno-Chamorro[6]. Comparing artificial intelligence strategies for early sepsis detection in the ICU: an experimental study. Applied Intelligence, 1-15, 2023. https://doi.org/10.1007/s10489-023-05124-z
4. P Gundogdu, C Loucera, I Alamo-Alvarez, J Dopazo, I Nepomuceno-Chamorro[6]. Integrating pathway knowledge with deep neural networks to reduce the dimensionality in single-cell RNA-seq data. BioData Mining 15, 1-21, 2022. https://doi.org/10.1186/s13040-021-00285-4.
5. B Vega-Márquez, C Rubio-Escudero, I Nepomuceno-Chamorro[6]. Generation of synthetic data with conditional generative adversarial networks. Logic Journal of the IGPL 30 (2), 252-262, 2022. https://doi.org/10.1093/jigpal/jzaa059.
6. R Diaz-Uriarte, E Gómez de Lope, R Giugno, H Fröhlich, PV Nazarov, [...] Ten quick tips for biomarker discovery and validation analyses using machine learning. PLOS Computational Biology 18 (8), e1010357, 2022. [Position 6/8. Authors sorted alphabetically]. https://doi.org/10.1371/journal.pcbi.1010357
7. IA Nepomuceno-Chamorro, JA Nepomuceno, JL Galván-Rojas, […]. Using prior knowledge in the inference of gene association networks. Applied Intelligence 50, 3882-3893, 2020. https://doi.org/10.1007/s10489-020-01705-4
8. S Ródios, PV Nazarov, IA Nepomuceno-Chamorro, C Jeanty, [...]. Transcriptional response to cardiac injury in the zebrafish: systematic identification of genes with highly concordant activity across in vivo models. BMC genomics 15, 1-15, 2014. [Position 3/10] https://doi.org/10.1186/1471-2164-15-852
9. IA Nepomuceno-Chamorro, F Azuaje, Y Devaux, PV Nazarov, A Muller, [...]. Prognostic transcriptional association networks: a new supervised approach based on regression trees. Bioinformatics 27 (2), 252-258, 2011. https://doi.org/10.1093/bioinformatics/btq645
10. IA Nepomuceno-Chamorro, JS Aguilar-Ruiz, JC Riquelme. Inferring gene regression networks with model trees. BMC Bioinformatics 11, 1-12, 2010. https://doi.org/10.1186/1471-2105-11-517

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

1. [Paper presentation. **Best paper award**] P Gundogdu, M Payá-Milans, I Alamo-Alvarez, [...]. Cell-Level Pathway Scoring Comparison with a Biologically Constrained

[6] She is listed in the last position because she led the work as the supervisor of her PhD student, who developed the technical work.

Variational Autoencoder. International Conference on Computational Methods in Systems Biology, 62-77, 2023.

2. [Talk] P Gundogdu, C Loucera, I Alamo-Alvarez, J Dopazo, I Nepomuceno-Chamorro. Pathway-primed explainable neural network for scRNA-Seq data. Conference GenCompBio - Talk - ISMB/ECCB (European Conference on Computational Biology), 2021. https://www.youtube.com/watch?v=6L2fEvN_XCk
3. [Paper presentation] HA Ahmed, JA Nepomuceno, B Vega-Márquez, IA Nepomuceno-Chamorro. Generating Synthetic Fetal Cardiotocography Data with Conditional Generative Adversarial Networks. Lecture Note 675-684, 2021. 16 International Conference SOCO.
4. [Peer-reviewed abstracts] P Gundogdu, I Alamo-Alvarez, I Nepomuceno-Chamorro, J Dopazo, C Loucera (2022) SigPrimedNet: a signaling-informed neural network for scRNA-seq annotation of known and unknown cell types. Massive Analysis and Quality Control Society (MAQC) 2022 Conference. 5th Annual Meeting of the MAQC Society.
5. [Peer-reviewed abstracts] P Gundogdu, C Loucera, I Alamo-Alvarez, J Dopazo, I Nepomuceno-Chamorro (2021) Pathway-primed explainable neural network for scRNA-Seq data. European Conference on Computational Biology (ECCB).

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. Aprendizaje profundo y transferencia de aprendizaje eficientes para salud y movilidad conectada. Tipo Proyecto: Plan Estatal 2017-2020 Retos - Proyectos I+D+i. Ref.: PID2020-117954RB-C22. 01/09/2021 – 31/08/2024. 116.160€ (Investigador)
2. BIDASGRI: Tecnologías Big Data para Smart Grids. Tipo Proyecto: Proyectos I+D+i FEDER Andalucía 2014-2020. Ref.: US-1263341. 01/02/2020 – 30/04/2022. 90.000€. IP: Jose C. Riquelme Santos and **Isabel Nepomuceno Chamorro**.
3. Machine Learning Frontiers in Precision Medicine (MLFPM). Tipo de Proyecto: ITN. ID: 813533. Coordinator: EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH. Associated Partner: Universidad de Sevilla, IP Isabel A. Nepomuceno-Chamorro.
4. Machine Learning Computational Advancements for peRsonalized mEdicine (MLCARE). Tipo de Proyecto: ITN. Id 101226456. Coordinator: Consorcio Universidad Carlos III de Madrid. Associated Partner: Universidad de Sevilla, IP **Isabel A. Nepomuceno-Chamorro.**
5. Big Data Streaming: Análisis de Datos Masivos Continuos. Modelos Descriptivos. Tipo Proyecto: Plan Estatal 2013-2016 Retos - Proyectos I+D+i. Ref.: TIN2017-88209-C2-2-R. 01/01/2018 – 31/12/2021. 116.000€. (Investigador)
6. Modelos Avanzados para el Análisis Inteligente de Información. Aplicación a Datos Biomédicos y Medioambientales.Tipo Proyecto: Proyectos de Excelencia de la Junta de Andalucía. Ref.: P11-TIC-7528. 26/03/2013 – 31/03/2018. 31.400€. (Investigador).

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. Contrato con empresa: Plataforma wearable para el diagnóstico temprano de trastornos emocionales y agudizaciones en pacientes con enfermedades crónicas mediante el uso de Inteligencia Artificial (SENSING-AI). Contrato 68/83. Ref.: P001-21/E22. 01/04/2021-31/07/2023. (Investigadora)
2. Actividad de transferencia: Modelos de Deep Learning para sistemas de energía renovable: predicción de generación y mantenimiento preventivo y predictivo. Tipo PAIDI: Actividades de Transferencia de Conocimiento. Ref.: PYC20 RE 078 US. 27/12/2021- 30/04/2023. (Investigadora)
3. Transferencia divulgación: Noche Europea de los investigadores. Sept. 2022. https://lanochedelosinvestigadores.fundaciondescubre.es/investigador/isabel-a-nepomuceno-chamorro/
4. Transferencia divulgación: Café con Ciencia. 2022.