

CURRICULUM VITAE (CVA)

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

Part A. PERSONAL INFORMATION		CV date	18/02/2022
First name	Rubén		
Family name	Martín Clemente		

(*) *Mandatory*

A.1. Current position

Position	Profesor Titular (Associate Professor)		
Initial date	16/02/2004		
Institution	University of Seville		
Department/Center	Signal Theory and Communications / Higher Technical School of Engineering	https://departamento.us.es/dtsc/	https://www.esi.us.es
Country	Spain		
Key words	Signal processing, machine learning, biomedical engineering		

A.2. Previous positions (research activity interruptions, art. 14.2.b)

Period	Position/Institution/Country/Interruption cause
12/11/1996-15/02/2004	Assistant Professor/Univ. of Seville/Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Ingeniero de Telecomunicación	University of Seville, Spain	1996
Dr. Ingeniero de Telecomunicación	University of Seville, Spain	2000

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

Dr. Martín Clemente received his Ph.D. with distinction ('Premio Extraordinario de Doctorado') from the University of Seville, Spain, in 2000. His research interests lie in the areas of signal processing and machine learning with emphasis on unsupervised learning, principal/independent component analysis, source separation and related techniques, including theoretical aspects and applications in biomedical problems. He has supervised the doctoral theses of four students (one of them with Mention of European/International Doctorate), is the co-author of 29 publications in journals from the JCR list and has led or participated in 13 R&D projects from competitive calls at European, national, and regional levels. Hallmarks of his career also include collaboration with industry and the private sector (including nine contracts with different companies and one patent). He completed research stays at the 'Institut für Biophysik und physikalische Biochemiede' of the University of Regensburg (Germany) and the 'Laboratoire d'Informatique, Signaux et Systèmes' of the 'Côte d'Azur' University (France). Since 2017, he is the Head of the 'Signal Processing and Communications Department' of the University of Seville. Dr. Martín Clemente was also awarded three 'sexenios de investigación' and one 'sexenio de transferencia' (a 'sexenio' is a Spanish official validation of substantial research and technological transference activity during a six-year period).



His most outstanding research results are in the field of Independent Component Analysis (ICA). ICA is an unsupervised machine-learning technique used for the removal of artifacts in biomedical signal processing and the identification of brain sources. Using Component Analysis methods, he has contributed to the problem of detecting the *antepartum* fetal electrocardiogram through skin electrodes attached to the mother's body. In addition to publications in scientific journals, this research has also given rise, by invitation, to a book chapter and, as an example of his outreach activity, the filming of an episode of the documentary series 'Ver la Ciencia', broadcasted on TV (<https://albertoredondo.tv/ver-la-ciencia/>, https://youtu.be/QOEUMN_NpyU). In connection with the present master, we have also recently demonstrated the mathematical equivalence between the L1-PCA technique for robust principal component analysis, independent component analysis (ICA) [10] and two of the most widely used supervised classification methods, Fisher's linear discriminant analysis [6] and the 'common spatial patterns technique' [1]. This theoretical research has been published in several top-level journals, most notably IEEE Transactions on Pattern Analysis and Machine Intelligence, which heads the 'computer science & artificial intelligence' category of the JCR and is the leading journal in the field of machine learning [10]. These results have been applied to the development of a fully unsupervised brain-machine interface, which detects Event-Related (De)Synchronization (ERD/ERS) patterns during motor imagery tasks without the need for a prior training of the user and the system [9]. Furthermore, without leaving the field of electroencephalography (EEG) processing, in [7] we have presented a pre-processing algorithm to minimize the effects of inter- and intra-subject variability in the estimation of the EEG covariance matrices associated with different trials of motor imagery tasks. Additionally, Dr. Martín Clemente has also collaborated intensively in recent years with Dr. Vazquez Marrufo in the detection of the non-phase modulations of the EEG by means of the Hilbert transform [2 – 5, 8].

Part C. RELEVANT MERITS (sorted by typology)

C.1. Publications (see instructions)

Recent Journal Publications related to the master (since 2011)

- [1] Camargo, José Luis, **Martín-Clemente, Rubén**, Hornillo Mellado, Susana y Zarzoso, Vicente. (2021). L1-norm unsupervised Fukunaga-Koontz transform. *Signal Processing*, vol. 182, [doi: 10.1016/j.sigpro.2020.107942](https://doi.org/10.1016/j.sigpro.2020.107942) (JCR-JIF: Q1) (Scopus: 1, WoS: 1)
- [2] Vázquez-Marrufo, Manuel, del Barco-Gavala, Alberto, Galvao Carmona, Alejandro y **Martín-Clemente, Rubén**. (2021). Reliability analysis of individual visual P1 and N1 maps indicates the heterogeneous topographies involved in early visual processing among human subjects. *Behavioural Brain Research*, vol. 397, [doi: 10.1016/j.bbr.2020.112930](https://doi.org/10.1016/j.bbr.2020.112930) (JCR-JIF: Q2) (Scopus: 0, WoS: 0)
- [3] Vázquez-Marrufo, Manuel, Sarrias-Arrabal, Esteban, García-Torres, M., **Martín-Clemente, Rubén** y Izquierdo, Guillermo. (2021). A systematic review of the application of machine-learning algorithms in multiple sclerosis. *Neurología*, [doi: 10.1016/j.nrl.2020.10.017](https://doi.org/10.1016/j.nrl.2020.10.017) (JCR-JIF: Q3) (Scopus: 0).
- [4] Vazquez-Marrufo, Manuel, Sarrias-Arrabal, Esteban, **Martín-Clemente, Rubén**, Galvao-Carmona, Alejandro, Navarro, Guillermo y Izquierdo, Guillermo. (2020). Altered phase and nonphase EEG activity expose impaired maintenance of a spatial-object attentional focus in multiple sclerosis patients. *Scientific Reports*, vol. 10 (1), [doi: 10.1038/s41598-020-77690-y](https://doi.org/10.1038/s41598-020-77690-y) (JCR-JIF: Q1) (Scopus: 1, WoS: 1)
- [5] Vázquez-Marrufo, Manuel, Caballero-Díaz, Rocío, **Martín-Clemente, Rubén**, Galvao-Carmona, Alejandro y González-Rosa, Javier. (2020). Individual test-retest reliability of evoked and induced alpha activity in human EEG data. *PLOS ONE*, vol. 15 (9), [doi:10.1371/journal.pone.0239612](https://doi.org/10.1371/journal.pone.0239612) (JCR-JIF: Q2) (Scopus: 1, WoS: 1)



- [6] **Martín-Clemente, Rubén** y Zarzoso, Vicente. (2020). LDA via L1-PCA of Whitenened Data, *IEEE Transactions on Signal Processing*. vol. 68, pp. 225 – 240, [doi: 10.1109/TSP.2019.2955860](https://doi.org/10.1109/TSP.2019.2955860) (JCR-JIF: Q1) (Scopus: 5, WoS: 3)
- [7] Olias, Javier, **Martín-Clemente, Rubén**, Sarmiento, Auxiliadora y Cruces, Sergio. (2019). EEG Signal Processing in MI-BCI Applications With Improved Covariance Matrix Estimators. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol. 27 (5), pp. 895 – 904, [doi:10.1109/TNSRE.2019.2905894](https://doi.org/10.1109/TNSRE.2019.2905894) (JCR-JIF: Q1) (Scopus: 12, WoS: 12)
- [8] Vaizquez-Marrufo, Manuel, García-Valdecasas, Macarena, Caballero-Díaz, Rocío, **Martín-Clemente, Rubén** y Galvao-Carmona, Alejandro. (2019). Multiple evoked and induced alpha modulations in a visual attention task: Latency, amplitude and topographical profiles. *PLOS ONE*, vol. 14 (9), [doi:10.1371/journal.pone.0223055](https://doi.org/10.1371/journal.pone.0223055) (JCR-JIF: Q1)(Scopus: 4, WoS: 4)
- [9] **Martín-Clemente, Rubén**, Olias, Javier, Cruces, Sergio y Zarzoso, Vicente. (2019). Unsupervised Common Spatial Patterns. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol. 27 (10), pp. 2135 – 2144, [doi:10.1109/TNSRE.2019.2936411](https://doi.org/10.1109/TNSRE.2019.2936411) (JCR-JIF: Q1) (Scopus: 2, WoS: 2)
- [10] **Martín-Clemente, Rubén** y Zarzoso, Vicente. (2017). On the Link Between L1-PCA and ICA. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 39 (3), pp. 515 – 528, [doi: 10.1109/TPAMI.2016.2557797](https://doi.org/10.1109/TPAMI.2016.2557797) (JCR-JIF: Q1) (Scopus: 20, WoS: 16)

C.3. Research projects

Projects in which I have been principal investigator:

- *Name of the project:* Análisis de Componentes Aplicado a Comunicaciones e Imágenes.
Type of participation: Principal investigator
Number of researchers: 11
Funding Entity: Junta de Andalucía (Consejería de Economía y Conocimiento) - Proyectos I+D+i FEDER Andalucía 2014-2020
Duration: 01/02/2020 - 30/04/2022 (2 years - 2 months - 29 days)
Total amount: 70.000 €
- *Name of the project:* Análisis agronómico basado en técnicas de visión artificial y distribución térmica para determinar y predecir la calidad del cultivo y la posible aparición de riesgos bióticos (iAgri 4.0)
Type of participation: Principal investigator
Number of researchers: 6
Funding Entity: Ministerio de Industria, Energía y Turismo
Duration: 01/04/2021 - 31/03/2022 (1 year)
Total amount: 58 695 €
- *Name of the project:* Desarrollo de una Plataforma Inteligente para la Implantación de un nuevo Modelo Productivo de Agricultura Ecosostenible (iAgri)
Type of participation: Second principal investigator
Number of researchers: 6
Funding Entity: Ministerio de Industria, Energía y Turismo
Duration: 26/06/2020 - 31/03/2021 (9 months - 5 days)
Total amount: 72 670 €
- *Name of the project:* Motor de Procesamiento Digital para Separación de Voz y Electrocardiogramas
Type of participation: Principal investigator
Number of researchers: 4



Funding Entity: Junta de Andalucía (Consejería de Innovación Ciencia y Empresas) -
Proyectos de Excelencia de la Junta de Andalucía

Duration: 31/01/2008 - 31/12/2012 (4 years - 11 months - 1 day)

Total amount: 119 701,68 €

Selected projects in which I have been researcher:

- *Name of the project:* Inteligencia artificial aplicada al reconocimiento de emociones
Type of participation: Researcher
Number of researchers: 6
Funding Entity: Junta de Andalucía (Consejería de Economía, Conocimiento, Empresas y Universidad)
Duration: 05/10/2021 - 31/12/2022 (1 year – 2 months – 26 days)
Total amount: 79 200 €
- *Name of the project:* Smart glasses for multifaceted visual loss mitigation and chronic disease prevention indicator for healthier, safer, and more productive workplace ageing population (seeFAR)
Type of participation: Researcher
Number of researchers: 13
Funding Entity: European Union (Horizonte 2020)
Duration: 01/12/2018 - 30/11/2021 (2 years – 11 months – 29 days)
Total amount: 407 487,5 €
- *Name of the project:* Métodos de Procesado de Señales Complejas para el Modelado y el Análisis de Sistemas Lineales y no Lineales
Type of participation: Researcher
Number of researchers: 13
Funding Entity: Ministerio de Economía y Competitividad (Plan Estatal 2013-2016 Excelencia - Proyectos I+D)
Duration: 01/01/2015 - 30/06/2018 (2 years – 11 months – 29 days)
Total amount: 130 680,0 €

C.4. Contracts, technological or transfer merits

Selected technology transfer contracts in which I have been principal researcher

- *Name of the project:* Sistema para la detección de plomo en gases mediante análisis de imágenes
Type of participation: Principal investigator
Number of researchers: 1
Funding Entity: Siderúrgica Sevillana, S.A.
Duration: 12/07/2016 - 31/12/2017 (1 year – 5 months – 20 days)
Total amount: 7 260,0 €
- *Name of the project:* Smart Business Park (SBP): Estimación de la Evolución a Corto Plazo de la Cubierta Nubosa y su Afección a la Producción
Type of participation: Principal investigator
Number of researchers: 1
Funding Entity: Endesa Ingeniería S.L.
Duration: 01/11/2013 - 31/03/2015 (1 year – 4 months – 21 days)
Total amount: 25 500,0 €