Part A. PERSONAL INFORMATION

CV date	December-2021

First and Family name	**Guillermo CORTÉS MORENO**		
ID number	44276775G	Age	46
Researcher codes	SCOPUS Author ID	7004242242	
	Open Researcher and Contributor ID (ORCID)	0000-0003-2664-9564	

A.1. Current position

Name of University	Universidad de Granada (UGR)		
Department	Dept. de Física Teórica y del Cosmos (FTyC) – Física de la Tierra		
Address and Country	Facultad de Ciencias - 18071 Granada, España		
Phone number		E-mail	gcortes@correo.ugr.es
Current position	Postdoctoral researcher - JdC2020i	From	01/01/2022
Key words	Machine Learning, Pattern Recognition, Volcano-Seismic Recognition, Data Mining, Time-Series Analysis		

A.2. Education

Bachelor/Master/PhD	University	Year
Ph.D. - Multimedia Technologies	University of Granada	2015
M.Sc. (DEA) -Multimedia Technologies	University of Granada	2006
M.Sc. - Electronic Engineering	University of Granada	2004
B.Sc. - Physics Degree	University of Granada	2004

A.3. General quality indicators of scientific production

Research publications (most listed on ORCID)

16 peer-reviewed items, including IEEE works and conference proceedings, 3 ISBN international book chapters, 23 international conference proceedings, 6 international workshops (3 co-organised) and several international meetings and invited talks.

Impact metrics

Scopus → 11 *h*-index, 16 items, 365 citations (48.4 cit/year in 2016 → 2020 period)
GoogleScholar → 11 *h*-index, 28 items, 524 citations (70.6 cit/year in 2016 → 2020 period)
ResearchGate → 11 *h*-index, 31 items, 433 citations (52.6 cit/year in 2016 → 2020 period)

42% of the peer-reviewed journals indexed on the Journal Citation Report (JCR) belongs to the 1st (Q1-impact factor) quartile percentile, 50 % to the Q2.

Open Access development products & content creator

Zenodo/OpenAIRE → 7 entries, including *research, software, datasets* and *(video)manuals*

Part B. CV SUMMARY *(max. 3500 characters, including spaces)*

Guillermo Cortés Moreno received the M.Sc**.** degree in Electronic Engineering from the Univ. of Granada, Spain (**UGR**) in 2004. Since then, he has been researching in the area of statistical modelling from more than 16 years now. He has been employed by innovative institutions (Dept. *of Signal Theory, Telematics and Communications* - **TSTC**, *Instituto Andaluz de Geofísica* – **IAGPDS**, and *Instituto Andaluz de Astrofísica* – **CSIC-IAA**) working in international cooperative environments and developing systems for automatic recognition of structured signals (volcano-seismic events and speech recognition), engineering asteroseismic analysis software and designing, deploying and maintaining monitoring seismic networks. He is a member of international geophysical institutions (**EGU**, **IAVCEI**,...) and multidisciplinary research groups as *Geofísica y Sismología* (**RNM.104**, Spanish Council). As a collaborator in international and national research projects, he has published several referenced works in peer-reviewed journals and conferences regarding machine learning, volcano seismology and multi-modal signal processing topics.

After alternating several contracts, he received in 2015 the **Ph.D**. degree in Multimedia Technologies from the **TSTC@UGR** Dept. In 2017 he was granted with an **'excellence science' postdoctoral Marie Curie fellowship** (***VULCAN.ears*** project), affiliated to the Dept. *Politecnico di Ingegneria e Architettura* (**DPIA**) of the Università degli Studi di Udine (**UniUD**) - Italy, to build a *Volcano-Independent Seismic Recognition (VI.VSR)* system in

order to continuously monitor active volcanoes in real-time. Several Volcano Observatories of Latin-American countries are adopting the products designed in this project.

Nowadays, he is a **postdoctoral researcher** at the Dept. of Theoretical Physics and Cosmology - **FTyC@UGR** *designing a **Deep Learning framework for monitoring active volcanoes and to forecast eruptions***. Having 7 research and technical contracts, being an active researcher in pattern recognition and disseminating the VI.VSR technology worldwide (Italy, Mexico, Spain, Costa Rica, France..), Dr. Cortés has gained enough experience to lead and exploit new scientific trends under-covered in the **VULCAN.ears** international **ALUE partnership** which involves: 12 countries, 18 (research, academic and governmental) institutions. As a part of ALUE*,* he is currently participating in 5 international projects *implementing new Machine Learning* techniques and *disseminating portable Volcano-Seismic Recognition systems* at volcano-observatories whereas population safety is a priority.

Part C. RELEVANT MERITS

C.1. Publications (including books) – only the most relevant, complete list at ORCID.

Indexed peer-reviewed research, with JCR impact factor and quartile percentile (Q1→Q4):

1   F. Di Luccio, P. Persaud, L. Cucci, A. Esposito, R. Carniel, **G. Cortés**, D. Galluzzo, R. W. Clayton, G. Ventura, "*The Seismicity of LIPARI, Aeolian Islands (Italy) From One-Month Recording of the LIPARY Array*", Frontiers in Earth Science, *FEART 2021,* 9:678581. doi:`10.3389/feart.2021.678581`, ***JCR 3.50 – Q2.***

2   **G. Cortés**, R. Carniel, M. Á. Mendoza, P. Lesage, I. Della Lucia, "*Practical Volcano-Independent Recognition of Seismic Events: VULCAN.ears project*", Frontiers in Earth Science, *FEART 2020*, 8:616676. doi:10.3389/feart.2020.616676, ***JCR 3.50 – Q2.***

3   **Guillermo Cortés**, Roberto Carniel, M. Ángeles Mendoza, Philippe Lesage, "*Standardization of Noisy Volcanoseismic Waveforms as a Key Step toward Station-Independent, Robust Automatic Recognition*", Seismological Research Letters, *SRL 2019*, 90(2A):581-590. doi:https://doi.org/10.1785/0220180334, ***JCR 3.73 – Q1.***

4   A. Boué, P. Lesage, **G. Cortés**, B. Valette, G. Reyes-Dávila, R. Arámbula-Mendoza, A. Budi-Santoso, "*Performance of the 'Material Failure Forecast Method' in real-time situations: a Bayesian approach applied to effusive and explosive eruptions*", Journal of Volcanology and Geothermal Research, *JVGR 2016,* 9:622-633. doi: 10.1016/j.jvolgeores.2016.10.002, ***JCR 2.49 – Q2.***

5   **G. Cortés**, C. Benítez, I. Álvarez, L. García, J. Ibáñez, "*A Comparative Study of Dimensionality Reduction Algorithms Applied to Volcano-Seismic Signals*", IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, *JSTARS 2016*, 9(1):253-263. doi: 10.1109/JSTARS.2015.2479300, ***JCR 3.03 – Q1***.

6   A. Boué, P. Lesage, **G. Cortés**, B. Valette, G. Reyes-Dávila, "*Real-time eruption forecasting using the material Failure Forecast Method with a Bayesian approach*", Journal of Geophysical Research, *JGR:SE 2015*, 120(4):2143-2161, ***JCR 3.43 – Q1***.

7   **G. Cortés**, L. García, I. Álvarez, C. Benítez, Á. De la Torre, and J. Ibáñez, "*Parallel System Architecture (PSA): An efficient approach for automatic recognition of volcano-seismic events*", Journal of Volcanology and Geothermal Research, *JVGR 2014*, 271(0):1-10, ***JCR 2.54 – Q2***.

8   E. Carmona, J. Almendros, R. Martín, **G. Cortés**, G. Alguacil, J. Moreno, B. Martín, A. Martos, I. Serrano, D. Stich, J. M. Ibáñez, "*Advances in seismic monitoring at Deception Island volcano (Antarctica) since the International Polar Year*", Annals of Geophysics, *AG 2014*, 57(3), ***SJR** (SCImago) **1.23 – Q2***.

9   Álvarez, I.; García, L.; Mota, S.; **Cortés, G.**; Benítez, C.; De la Torre, A., "*An Automatic P-Phase Picking Algorithm Based on Adaptive Multiband Processing*", IEEE Geoscience and Remote Sensing Letters, *LGRS 2013*, 10(6):1488-1492. doi: 10.1109/LGRS.2013.2260720, ***JCR 1.81 – Q2***.

10   Álvarez, I., García, L., **Cortés, G.**, Benítez, C., & De la Torre, A. (2012). "*Discriminative feature selection for automatic classification of volcano-seismic signals*", IEEE Geoscience and Remote Sensing Letters, *LGRS 2012*, 9(2):151-155, ***JCR 1.82 – Q1***.

11   J.M. Ibañez, C. Benítez, L.A. Gutiérrez, **G. Cortés**, A. García-Yeguas, and G. Alguacil, "*Classification of seismo-volcanic signals using Hidden Markov Models as applied to*

Stromboli and Etna volcanoes", Journal of Geothermal and Geophysical Research, *JVGR 2009*, 187(3):218-226, **JCR 1.92 – Q2**.

12 **G. Cortés**, R. Arámbula, L.A. Gutiérrez, C. Benítez, J.M. Ibañez and P. Lesage, *"Evaluating robustness of a hmm-based classification system of volcano-seismic events at Colima and Popocatépetl volcanoes",* IEEE International Geoscience and Remote Sensing Symposium, *IGARSS 2009*, (2):1012–1015*.

13 Álvarez, **G. Cortés**, A. De la Torre, C. Benítez, J.M. Ibañez, P. Lesage, R. Arámbula and M. González-Amezcua, *"Improving feature extraction in the automatic classification of seismic events. Application to Colima and Arenal volcanoes",* IEEE International Geoscience and Remote Sensing Symposium, *IGARSS 2009*, (4):526.

14 L. Gutiérrez, J.M. Ibañez, **G. Cortés**, J. Ramírez, C. Benítez and V. Tenorio *"Volcano-seismic signal detection and classification processing using Hidden Markov Models. Application to San Cristóbal volcano",* IEEE International Geoscience and Remote Sensing Symposium, *IGARSS 2009*, (4):522*.

15 Benítez, C., Ramírez, J., Segura, J.C., Ibáñez, J.M., Almendros, J., García-Yeguas, A. and **Cortés, G**., 2007. *"Continuous HMM-based seismic event classification at Deception Island, Antarctica*", IEEE Transactions on Geothermal Research and Remote Sensing, *TGRS 2007*, **JCR 2.34 – Q1**.

16 **G. Cortés**, L. García, C. Benítez, J.C. Segura, *"HMM-Based Continuous Sign Language Recogniton using a Fast Optical Flow Parameterization of Visual Information"*. IEEE 9th International Conference on Spoken Language Processing. *INTERSPEECH-ICSLP 2006,* 1288-1291*, Pittsburgh, U.S.A, September 2006*.

Books:

1 **Guillermo Cortés Moreno**, *"Reconocimiento de señales sismo-volcánicas mediante canales específicos basados en Modelos ocultos de Markov"*. 2015, ISBN: 978-8-491254-49-2, Ed: Univ. Granada. http://hdl.handle.net/10481/42050.

Book chapters:

1 **G. Cortés**, R. Arámbula, I. Álvarez, M.C. Benítez, J. M. Ibáñez, P. Lesage, M. González and G.Reyes *"Analysis of Colima, Popocatépetl and Arenal volcanic seismicity using an automatic Continuous Hidden Markov Models based recognition"*. In: *VOLUME Project: VOLcanoes, Understanding Subsurface Mass MoveMEnt.* 2009. ISBN: 978-1-905254-39-2. Bean, C.J., Braiden, A.K., Lokmer, I., Martini, F. and O'Brien, G.S. Eds: Bean, C.J. Braiden A.K., 6th Framework, European Commission Programme: 150-160.

2 M.C. Benítez, P. Lesage, **G. Cortés**, J.C. Segura, J. M. Ibáñez, A. de la Torre. *"Automatic recognition of volcano-seismic events based on Continuous Hidden Markov Models based recognition".* In: *VOLUME Project: VOLcanoes, Understanding Subsurface Mass MoveMEnt.* 2009. ISBN: 978-1-905254-39-2. Bean, C.J., Braiden, A.K., Lokmer, I., Martini, F. and O'Brien, G.S. Eds: Bean, C.J. Braiden A.K., 6th Framework, European Commission Programme: 130-140.

3 M.C. Benítez, J. M. Ibáñez, L. García, L. Gutiérrez, **G. Cortés**, I. Álvarez. *"Analysis of volcano seismicity at Deception Island, Stromboli volcano and Mt Etna using an automatic CHMM based recognition method".* In: *VOLUME Project: VOLcanoes, Understanding Subsurface Mass MoveMEnt.* 2009. ISBN: 978-1-905254-39-2. Bean, C.J., Braiden, A.K., Lokmer, I., Martini, F. and O'Brien, G.S. Eds: Bean, C.J. Braiden A.K., 6th Framework, European Commission Programme: 140-150.

C.2. Participation in R&D and Innovation projects and grants

Research and Development projects

1 **FEMALE**: *Forecasting volcanic Eruptions using signal processing and Machine LEarning techniques on seismic signals*. (MICINN-Spanish Council, PID2019-106260GB-100), PI: J. Ibáñez & M. C. Benítez Ortúzar (Univ. Granada). 2020-2023. Funded with 190.000 €.

2 *Investigating hydrothermal areas*. (INGV-Italian Council), PI: Francesca Di Luccio (INGV-Rome, Section of Seismology and Tectonophysics). 2018-2021.

3 **VULCAN.ears**: *Volcano-seismic Unsupervised Labelling and ClAssificatioN Embedded in A Real-time Scenario* (MSCA-IF-2016, nr.749249), PI: **Guillermo Cortés Moreno**. (Università degli Studi di Udine). 01/11/2017-31/10/2019. Funded with 180.277 €.

4 *MEDiterranean SUpersite Volcanoes* (**MED-SUV**, EC-FP7), PI: G. Puglisi. (European Comission). 01/06/2013-31/05/2016. 7.727.299 €.

5 **EPHESTOS**: *Desarrollo de modelos de propagación de ondas sísmicas en medios altamente heterogéneos y sus efectos: aplicación a regiones volcánicas activas* (CGL2011-29499 C0201), PI: J. Ibáñez (Univ. Granada). 2011-2014. 363.214 €.

6 **HISS**: *Modelos Sísmicos De Alta Resolución De Volúmenes Sismogenéticos De Volcanes Activos, Islas De Tenerife Y Decepción, Impacto En La Valoración Del Peligro Volcánico* (CGL200801660), PI: J. Ibáñez (Univ. Granada). 2009-2011. 284.713 €.

7 **VOLUME**: *VOLcanoes: Understanding subsurface mass moveMEnt*. (EC, FP6-2004 Global-3-018471), PI: C. Bean. (European Commission). 2005-2009. 3.545.625 €.

Projects of innovative teaching

1 *Adquisición y Tratamiento de datos de los satélites GOCE y GRACE: Aplicación en la docencia de la geofísica* (UGR-ID15-47), PI: I. Serrano Bermejo. (Funded by the University of Granada, Spain). 09/2015-08/2017.

Grants

1 **Postdoctoral Juan de la Cierva incorporation fellowship** (MICINN-Spanish Council, IJC2020-045865-I), grant to obtain a tenure position at the FTyC Dept., directed by Jesús Ibáñez at FTyC@UGR (Spain), 01/01/2022-31/12/2024. Funded with 97.800 €.

2 **Postdoctoral EU '*scientific excellence*' Marie Curie individual fellowship** (H2020-MSCA-IF-749249), main researcher of the ***VULCAN.ears*** project directed by Roberto Carniel at DPIA@UniUD (Italy) and co-directed by Philippe Lesage (ISTerre@USMB - France), 01/11/2017-31/10/2019. Funded with 180.277 €.

C.3. Participation in R&D and innovation contracts

1 (01/2017-11/2017):**Technical contract as software developer** of asteroseismic models and programs used in stellar physics, working for the Spanish Council at the CSIC-IAA.

2 (03/2015-06/2015):**Research contract** at the IAGPDS@UGR working as **statistician** for modelling volcano-seismic signals.

3 (05/2009-06/2011):**Technical position** at the IAGPDS **as electronic engineer** leading a survey campaign in the Teide Volcano (Spain) deploying a monitoring seismic network.

4 (05/2008-09/2008):**Research contract** at the IAGPDS to work **as data analyst and software developer**.

5 (03/2007-08/2007):**Research contract** at the TSTC Dept. @UGR **as IT expert**, to build a large-vocabulary speech recognition system performing language modelling.

6 (11/2006-12/2006):**Freelance (as software developer)** for the IAGPDS, designing 2D source location tools in seismic arrays and graphical user interfaces in Python.

C.5, C.6, C.7… (e. g., Institutional responsibilities, memberships of scientific societies)

(co)organiser of international workshops & advanced seminars for expert training:

- "*Software for automatic Volcano-Seismic Recognition (VSR) Systems*", USGS-USAID's Volcano Disaster Assistance Program (VDAP) and the Association of Latin American Volcano Seismologists (LAVAS), *LAVAS 6*, Sept 2-11th, 2019, Colombia.
- "*Tools for practical Volcano-Independent Seismic Recognition (VI.VSR): pyVSR and geoStudio*", *VSR-ALUE*, May 13-17th, 2019, S. José (Costa Rica).
- *Taller sobre clasificación automática de señales sismo-volcánicas.* Cities On Volcanoes, 2012, *CoV.7*, November 24-27th, 2012, Colima (Mexico).

(co)supervisor of M.Sc. thesis: "*Toward a Volcano-Independent Seismic Event Detection and Classification System",* Ivo della Lucia, Università degli Studi di Udine (Italia), Oct, 2019.

IEEE reviewer of JCR – indexed **international journals & conferences**
(2016-present) GRSL: *IEEE Geoscience and Remote Sensing Letters.* Scientific referee.
(2016-present) JSTARS: Scientific referee for several papers.
(2009 & 2010) IGARSS: *IEEE International Geoscience and Remote Sensing Symposium*.

Participation in international scientific committees
(August 2018) UGR: *PhD – Universidad de Granada.* External expert referee.
(June 2018) UCR: *Redes Temáticas – Univ. de Costa Rica.* Scientific reviewer.

Dissemination on non-scientific media: InnovaSpain@Spain, fabiodisconzi@Italy, cliacnno@France, UCR.news@CostaRica, UCR.press@CostaRica, CeNAT@Facebook.