

Carmen Peláez-Moreno

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Presentation

Carmen Peláez-Moreno earned her Eng. degree in Telecommunications from the Public Univ. of Navarre (1997) and her PhD from University Carlos III Madrid (2002). **She was a visiting researcher in several research institutions:** Univ. of Westminster, London, UK (pregraduate, 1996), Univ. of Strathclyde, Glasgow, UK (postdoctoral fellowship, 2003), International Computer Science Institute, Berkeley, EEUU (postdoctoral fellowship, 2004 and 2006) and Univ. of Trento, Italy (postdoctoral, 2013), and University of Vienna (postdoctoral, 2021) including two maternity gaps in 2005 and 2007.

She is currently, **associate professor** in the Signal Theory and Communications department of the Univ. Carlos III Madrid. In 2019, she earned the **Full Professorship National Habilitation** from ANECA.

Her research interests include speech recognition, perception and cognition, audio processing, affective computing, multimedia processing, machine learning and data analysis, information theory and formal concept analysis, artificial and biological neural networks and connectomics, and education. **Her interdisciplinary vocation and ambition to cross-fertilize ideas from very different research communities is reflected in the wide variety of publications.** She has coauthored 34 papers in JCR indexed journals and more than 70 conference communications. She has participated in 29 competitive research projects and 19 transfer contracts. She was PI of six National Research Framework funded projects and an industrial participated one.

She has received **various prizes and awards:** Best PhD. Thesis from the Spanish Official Telecommunication Engineering Association, 2002, Best Journal paper (2nd position), 2002, Aula Uni2-Univ. Carlos III prizes, Best Conference Paper, ECIR co-located workshop FCAIR (Formal Concept Analysis meets Information Retrieval), Moscow 2013, Best Conference paper, 2015, ICFCA (International Conference on Formal Concept Analysis), Winner project in the XIII Edition of the Vodafone Innovation Awards ‘Connecting for Good’, 2019.

Since 2017, she is a member of **UC3M4Safety**, a multidisciplinary group developing socio-technological solutions **to fight against gender-based violence**. She is deputy director of the Gender Studies Institute of the UC3M and a member of IEEE, COIT/AEI, RTTH (Speech Technologies Thematic Network) and AMIT (Research and Technologist Women Association).

In this line of work, she is participating in two projects (EMPATIA and SAPIENTIAE4Bindi, see details below), the last as IP. A Utility Model and several datasets’ open release (see details below) are also part of the achievements of this line of work.

She had also previously collaborated with CESYA (Center for Subtitling and Audiodescription) towards **improving the lives of disabled** (blind) people employing speech recognition technologies. She had also participated in other 18 technology transfer contracts.

She has participated in several **communication & out-reach activities:** European Researcher’s Night 2020, T3chFest 2019 (Talk: “Bindi: a technology to detect and prevent violence against women”), III Scientific Tourism Meeting Lerín Tierra Estrella 2019 (Round table “The future that is coming”), Seminar “Emotions and Victims of Gender based Violence: new horizons” 2020 (Talk: “Detección de miedo en la voz y de violencia en el entorno acústico”), and several press and radio

participations: Newtral (“The intelligent bracelet (...)”), Onda Cero Radio (“Artificial intelligence against gender-based violence”), 2021.

She has supervised more than 30 Final Year Projects (Master or Degree). Moreover, she has supervised 5 PhD students (30/01/2012, 04/02/2016 and 27/09/17-extraordinary mention-, 25/11/2019 -2nd best phd thesis government office against gender-based violence-) and is currently supervising 2 more. **Her students have been awarded with several prizes:** Best Journal Paper, Spanish Speech Technologies Thematic Network in the 2012, 2016 and 2019 Edition prizes, Best posters in summer school RTTH (Speech Tech. Thematic Network), 2013 y 2015, Best TFM in the IV Edition of the Research Awards Pilar Azcárate or also in innovation with the best project in the Santander Explorer UC3M Space 2021.

She has served as **proposal evaluation expert** for REA for the Horizon Europe, Artificial Intelligence and Robotics (Cluster 4), H2020 FET OPEN and MSCA IF programmes, for the Swiss National Science Foundation (SNSF), 2011, 2019, Natural Sciences and Engineering Research Council of Canada (NSERC), 2013, Quality Agency Castilla y León, 2020, and was a collaborator of the ICT panel of the Spanish Research Council (AEI, Agencia Estatal de Investigación) for evaluation of proposals from the National Research Programme (2018-2021).

She participates **habitually in paper evaluation** for several journals, conferences and awards such as PLOSONe, Springer Neural Computing and Applications, ESWA, EURASIP Elsevier Signal Processing, IEEE Transactions on Wireless Communications, Elsevier International Journal of Electronics and Communications, Springer Signal, Image and Video Processing, IEEE Trans. On Multimedia, IEE IET Computers & Digital Techniques, Best Final Year Project and PhD, Spanish Telecommunication Eng. Association (01/2005 - 04/2014), Best paper RTTH, 2020, INTERSPEECH (ISCA, 2007 - 2021), ICECS (IEEE, 08/2012), ICASSP (IEEE, 2018-2021), IberSpeech, (RTTH, 2012 - 2020), NOLISP (2011), EUSIPCO (2008), among others.

Selected Publications (Journals)

- González-Calabozo, Jose M., Francisco J. Valverde-Albacete, and Carmen Peláez-Moreno. ‘Interactive Knowledge Discovery and Data Mining on Genomic Expression Data with Numeric Formal Concept Analysis’. *BMC Bioinformatics* 17, no. 1 (15 September 2016): 374. <https://doi.org/10.1186/s12859-016-1234-z>.
- Miranda Calero, Jose A., Esther Rituerto-González, Clara Luis-Minguez, Manuel F. Canabal, Alberto Ramírez Bárcenas, Jose M. Lanza-Gutiérrez, Carmen Peláez-Moreno, and Celia López-Ongil. ‘Bindi: Affective Internet of Things to Combat Gender-Based Violence’. *IEEE Internet of Things Journal* 9, no. 21 (November 2022): 21174–93. <https://doi.org/10.1109/JIOT.2022.3177256>.
- Rituerto-González, Esther, and Carmen Peláez-Moreno. ‘End-to-End Recurrent Denoising Autoencoder Embeddings for Speaker Identification’. *Neural Computing and Applications* 33, no. 21 (November 2021): 14429–39. <https://doi.org/10.1007/s00521-021-06083-7>.
- Rodríguez-Hidalgo, Antonio, Carmen Peláez-Moreno, and Ascensión Gallardo-Antolín. ‘Echoic Log-Surprise: A Multi-Scale Scheme for Acoustic Saliency Detection’. *Expert Systems with Applications* 114 (December 2018): 255–66. <https://doi.org/10.1016/j.eswa.2018.07.018>.
- Silos, Fernando de-la-Calle-, Francisco J. Valverde-Albacete, Ascension Gallardo-Antolin, and Carmen Pelaez-Moreno. ‘Morphologically Filtered Power-Normalized Cochleograms as Robust, Biologically Inspired Features for ASR’. *IEEE/ACM Transactions on Audio, Speech, and Language Processing* 23, no. 11 (November 2015): 2070–80. <https://doi.org/10.1109/TASLP.2015.2464691>.
- Torres Gomez, Jorge, Antonio Rodriguez-Hidalgo, Yannelys Virginia Jerez Naranjo, and Carmen Pelaez-Moreno. ‘Teaching Differently: The Digital Signal Processing of Multimedia Content

- Through the Use of Liberal Arts’. *IEEE Signal Processing Magazine* 38, no. 3 (May 2021): 94–104. <https://doi.org/10.1109/MSP.2021.3053218>.
- Valverde-Albacete, F J, and C Peláez-Moreno. ‘The Spectra of Irreducible Matrices over Completed Idempotent Semifields’. *Fuzzy Sets and Systems* 271 (2015): 46–79. <https://doi.org/10.1016/j.fss.2014.09.022>.
- Valverde-Albacete, Francisco J., and Carmen Peláez-Moreno. ‘100% Classification Accuracy Considered Harmful: The Normalized Information Transfer Factor Explains the Accuracy Paradox’. *PLOS ONE* 9, no. 1 (10 January 2014): e84217. <https://doi.org/10.1371/journal.pone.0084217>.
- Valverde-Albacete, Francisco J., and Carmen Peláez-Moreno. ‘A Framework for Supervised Classification Performance Analysis with Information-Theoretic Methods’. *IEEE Transactions on Knowledge and Data Engineering* 32, no. 11 (November 2020): 2075–87. <https://doi.org/10.1109/TKDE.2019.2915643>.
- Valverde-Albacete, Francisco J., and Carmen Peláez-Moreno. ‘The Case for Quantifying Artificial General Intelligence with Entropy Semifields’. In *Artificial Intelligence: Theory and Applications*, edited by Endre Pap, 85–97. Studies in Computational Intelligence. Cham: Springer International Publishing, 2021. https://doi.org/10.1007/978-3-030-72711-6_5.

Selected publications (conference proceedings)

- Luis-Minguez, Clara, Esther Rituerto-González, and Carmen Peláez-Moreno. ‘Bridging the Semantic Gap with Affective Acoustic Scene Analysis: An Information Retrieval-Based Approach’. In *IberSPEECH 2022*, 91–95. ISCA, 2022. <https://doi.org/10.21437/IberSPEECH.2022-19>.
- Peláez-Moreno, Carmen. ‘Keynote 1: Re-Thinking Engineering for Inclusiveness’. Keynote presented at the German Education Conference 2023, Berlin, 8 February 2023. <https://www.gecon2023.org/>.
- Reyner-Fuentes, Emma, Esther Rituerto-González, Isabel Trancoso, and Carmen Peláez-Moreno. ‘Prediction of the Gender-Based Violence Victim Condition Using Speech: What Do Machine Learning Models Rely On?’ In *INTERSPEECH 2023*, 1768–72. ISCA, 2023. <https://doi.org/10.21437/Interspeech.2023-1771>.
- Rituerto-González, Esther, Clara Luis-Minguez, and Carmen Peláez-Moreno. ‘Using Audio Events to Extend a Multi-Modal Public Speaking Database with Reinterpreted Emotional Annotations’. In *IberSPEECH 2021*, 61–65. ISCA, 2021. <https://doi.org/10.21437/IberSPEECH.2021-13>.
- Rodríguez-Hidalgo, Antonio, Carmen Peláez-Moreno, and Ascension Gallardo-Antolin. ‘Towards Multimodal Saliency Detection: An Enhancement of Audio-Visual Correlation Estimation’. In *2017 IEEE 16th International Conference on Cognitive Informatics & Cognitive Computing (ICCI*CC)*, 438–43. Oxford: IEEE, 2017. <https://doi.org/10.1109/ICCI-CC.2017.8109785>.
- Valverde-Albacete, Francisco J., and Carmen Peláez-Moreno. ‘Representing Informational Harmoniums Using Semifield-Valued Formal Concept Analysis.’ In *CLA*, 159–70, 2020. <http://ceur-ws.org/Vol-2668/paper12.pdf>.
- Valverde-Albacete, Francisco J, Carmen Peláez-Moreno, Inma P Cabrera, Pablo Cordero, and Manuel Ojeda-Aciego. ‘Can FCA Provide a Framework for AGI?’ In *10th International Workshop ‘What Can FCA Do for Artificial Intelligence?’*, 3233:6. Vienna Austria: CEUR, 2022.
- Valverde-Albacete, Francisco J, Carmen Peláez-Moreno, Inma P Cabrera, Pablo Cordero, and Manuel Ojeda-Aciego. ‘Exploratory Data Analysis of Multi-Label Classification Tasks with Formal Context Analysis’. In *Proceedings of the Fifteenth International Conference on Concept Lattices and Their Applications*. Tallin: CEUR, 2020.

Selected Research projects (principal investigator)

- **mEidida y representacion de flujos de información En Redes neuronales biológicas y artificiales - mEasureMent and rEpresentation of information flows in aRtificial and bioLogical neural nEtworks (EMERGE).** Referencia: PID2021-125780NB-I00. Institution: University Carlos III Madrid. PI: Carmen Peláez Moreno & Francisco J. Valverde Albacete. Funding: AGENCIA ESTATAL DE INVESTIGACIÓN. From: 01/09/2022, 3 years. Budget: 69.817,00€ (Provisionally approved)
- **Cyberphysical System for accompaniment and prevention of gender-based violence** - Sistema Ciberfísico para el seguimiento y prevención de casos de violencia de género (SAPIENTIAE4Bindi). Referencia: PDC2021-121071-I00. Institution: University Carlos III Madrid. Funding: AGENCIA ESTATAL DE INVESTIGACIÓN. From: 01/12/2021, 2 years. Budget: 143,750.00€
- **Saliency and Attention: rePresentation, Interpretation and EmergenCy (SAPIENS).** Institution: University Carlos III Madrid. Funding: AGENCIA ESTATAL DE INVESTIGACIÓN. From: 01/01/2018, 3 years. Budget: 143,000.00€
- **Saliency and attention: multimodality, context-awareness, self-adaptation and bio-inspiration (SAMURAI).** Institution: University Carlos III Madrid. Funding: ECONOMY & COMPETITIVENESS MINISTRY From: 01/01/2015, 3 years. Budget: 154,200.00€
- **Cogito, ergo maxplus: are our thoughts idempotent?** Institution: University Carlos III Madrid. Funding: ECONOMY & COMPETITIVENESS MINISTRY (EXPLORA CALL). From: 01/09/2015, 2 years. Budget: 50,000.00 €
- **Context-aware automatic speech recognition under cognitive stress aided by multimodal biometric detection (REF.: TD-10).** Funding: EADS CONSTRUCCIONES AERONAUTICAS S.A.U. From: 20/11/2013, 4 years. Budget: 200.000€
- **Digital School 4.0.** Funding: ELingua S.L. From: 19/05/22, 8 months. Budget: 21.000€

Selected Research projects (participation)

- **Integral protection of gender-based violence by multimodal affective computing** - ProtEcción integral de las víctimas de violencia de género Mediante comPutación AfecTIva multimodal (**EMPATIA**). Institution: Universidad Carlos III de Madrid. Principal Investigator: María Celia López Ongil. Funding: COMUNIDAD DE MADRID. From: 01/01/2019, 3 years. Budget: 814,000.00 €.
- **BINDI: combating gender-based violence with smart sensor networks** - BINDI: combatiendo la violencia de género con redes de sensores inteligentes. Institution: University Carlos III Madrid. PI: Celia López Ongil. Funding: Fundación Vodafone a la Innovación (Connecting for Good). From: 28/02/2020, 1 years. Budget: 15.000€
- **Integration of disabled persons in aeronautic environments.** Institution: **University Carlos III Madrid.** PI: J.M. Sánchez-Pena; M.B. Ruiz Mezcua. Funding: **FUNDACIÓN ADECCO.** From: 10/10/2012, 1 año - 2 months - 21 days. Budget: 60.000€

Intellectual Property

- **Utility model U202130953(3) - SISTEMA PARA DETERMINAR UN ESTADO EMOCIONAL DE UN USUARIO, Inventores:** Rosa San Segundo Manuel, Clara Sainz de Baranda, Marian Blanco Ruiz, David Larrabeiti López, Manuel Urueña Pascual, Jose Carlos Robledo García, Carmen Peláez Moreno, Ascensión Gallardo Antolín, Alba Mínguez Sánchez, Teresa Riesgo Alcaide, Jose Manuel Lanza Gutiérrez, Rodrigo Mariño Andrés, Jose Ángel Miranda Calero, Manuel Felipe Canabal, Marta Portela

García, Isabel Pérez Garcilópez, Jose Antonio García Souto, Celia López Ongil, Emilio Olías Ruiz, Mario García Valderas. **Publication number:** ES1269890. **Publication date:** 09/06/2021. **Grant date:** 20/09/2021 (Spain). **Owner institutions:** Universidad Carlos III de Madrid (85%) and Universidad Politécnica de Madrid (15%).

Open Datasets and software

- Blanco Ruiz, María Ángeles, Laura Gutiérrez Martín, José Angel Miranda Calero, Manuel Felipe Canabal Benito, Elena Romero Perales, Clara Sainz de Baranda Andújar, Rosa San Segundo Manuel, David Larrabeiti López, Carmen Peláez Moreno, and Celia López Ongil. 'UC3M4Safety Database - List of Audiovisual Stimuli'. e-cienciaDatos, 3 June 2022. <https://doi.org/10.21950/CXAAHR>.
- . 'UC3M4Safety Database - List of Audiovisual Stimuli (Video)'. e-cienciaDatos, 3 June 2022. <https://doi.org/10.21950/LUO11Z>.
- Miranda Calero, José Angel, Laura Gutiérrez Martín, Manuel Felipe Canabal Benito, Alba Paez Montoro, Alberto Ramírez Bárcenas, José Manuel Lanza Gutiérrez, Elena Romero Perales, and Celia López Ongil. 'UC3M4Safety Database - WEMAC: Physiological Signals'. e-cienciaDatos, 2 June 2022. <https://doi.org/10.21950/FNUHKE>.
- Miranda Calero, José Angel, Laura Gutiérrez Martín, Eva Martínez Rubio, María Ángeles Blanco Ruiz, Clara Sainz de Baranda Andújar, Elena Romero Perales, Bárbara Alboreca Fernández-Barredo, Rosa San Segundo Manuel, and Celia López Ongil. 'UC3M4Safety Database - WEMAC: Emotional Labelling'. e-cienciaDatos, 2 June 2022. <https://doi.org/10.21950/RYUCLV>.
- Miranda Calero, José Angel, Laura Gutiérrez Martín, Eva Martínez Rubio, María Ángeles Blanco Ruiz, Clara Sainz de Baranda Andújar, Elena Romero Perales, Rosa San Segundo Manuel, and Celia López Ongil. 'UC3M4Safety Database - WEMAC: Biopsychosocial Questionnaire and Informed Consent'. e-cienciaDatos, 2 June 2022. <https://doi.org/10.21950/U5DXJR>.
- Rituerto González, Esther, José Angel Miranda Calero, Clara Luis Minguenza, Laura Gutiérrez Martín, Manuel Felipe Canabal Benito, José Manuel Lanza Gutiérrez, Carmen Peláez Moreno, and Celia López Ongil. 'UC3M4Safety Database - WEMAC: Audio Features'. e-cienciaDatos, 2 June 2022. <https://doi.org/10.21950/XKHCCW>.

Outreach and communication

- Herrera, Francisco, Carmen Peláez-Moreno, and Matilde Barón. 'El futuro que llega'. Presented at the III Jornadas de turismo científico Lerín Tierra Estrella 2019, Lerín, Navarra, 27 July 2019. <https://www.turismotierraestrella.com/es/experiencias/experiencia.php?id=267>.
- Jiménez Camacho, Cristina. 'Podcast - 10/11/2021 - La Brújula | Inteligencia artificial contra la violencia de género' (eng. *Artificial intelligence against gender-based violence*). Accessed 9 January 2024. <https://www.ondaceromadridsur.es/todos-podcasts/8430>.
- Lopez-Ongil, Celia, Clara Sainz De Baranda Andújar, and Carmen Peláez-Moreno. 'Bindi: tecnología para detectar y prevenir la violencia contra las mujeres' (eng. *Bindi: a technology to detect and prevent violence against women*). Presented at the TechFest 2019, Leganés, Madrid, Spain, 14 March 2019. <https://t3chfest.es/2019/programa/bindi-tecnologia-para-detectar-prevenir-violencia-contra-las-mujeres>.
- Peláez-Moreno, Carmen. 'El sonido y la voz en la comunicación online'. Presented at the ¿Qué pueden aportarte la investigación y las artes escénicas para comunicarte mejor? *European Researcher's Night 2020*, Leganés, Madrid, Spain, 27 November 2020. https://www.uc3m.es/ss/Satellite/UC3MInstitucional/es/TextoDosColumnas/1371299912210/¿Que_pueden_aportarte_la_investigacion_y_las_artes_escenicas_para_comunicar_mejor?.
- Peláez-Moreno, Carmen. 'Keynote 1: Re-Thinking Engineering for Inclusiveness'. Keynote presented at the German Education Conference 2023, Berlin, 8 February 2023. <https://www.gecon2023.org/>.

- Peláez-Moreno, Carmen, José Ángel Miranda Calero, David Larrabeiti López, Laura Gutiérrez Martín, and María Ángeles Blanco Ruiz. 'Prevención de La Violencia de Género Desde Un Prisma Tecnológico y Proyecto Sinérgico EMPATIA de La Comunidad de Madrid'. Presented at the Seminario Emociones y víctimas de violencia de género: nuevos horizontes (eng. *Emotions and Victims of Gender based Violence: new horizons*), Getafe, Madrid, 12 January 2020. <https://media.uc3m.es/series/5fc9f3838f420871488b458a>.
- Trujillo, Noemí López. 'Una pulsera inteligente que podría salvarte la vida en caso de agresión sexual' (eng. "The intelligent bracelet (...)"). Newtral, 30 November 2019 (interview). <https://www.newtral.es/una-pulsera-inteligente-que-podria-salvarte-la-vida-en-caso-de-agresion-sexual/20191130/>.
- Valverde-Albacete, Francisco José, and Carmen Peláez-Moreno. 'Filosofía de la Tecnología y de la Inteligencia Artificial'. Presented at the XXII Semana de la Ciencia y la Innovación de Madrid, Universidad Rey Juan Carlos, 20 November 2022. <https://eventos.urjc.es/89439/detail/filosofia-de-la-tecnologia-y-de-la-inteligencia-artificial.html>.
- Sanchez-Reillo, Raul, Carmen Peláez-Moreno, De-la-Vega Justribó, Bárbara, María Lázaro, Monique Jansen, and Antonio Artés-Rodríguez. 'RETO I+D+I: La Biometría Para Dar Confianza (Online)'. Presented at the RETO I+D+I: La biometría para dar confianza (online), Universidad Carlos III de Madrid, 20 June 2023. <https://eventos.uc3m.es/100480/detail/reto-idi-la-biometria-para-dar-confianza-online-online.html>.
- Peláez-Moreno, Carmen. 'Sesgos de Género En La Inteligencia Artificial' (eng. Gender-based biases in Artificial Intelligence). Universidad Carlos III de Madrid, 23 November 2022. <https://eventos.uc3m.es/88781/detail/la-incorporacion-de-la-perspectiva-de-genero-en-las-stem.html>.