

CURRICULUM VITAE ABREVIADO (CVA)**Part A. PERSONAL INFORMATION**

First name	Pedro Jesús		
Family name	Martínez Aparicio		
Open Researcher and Contributor ID (ORCID) (*)	0000-0002-7018-420X		

(*) Mandatory

A.1. Current position

Position	Professor		
Initial date	14/10/2019		
Institution	University of Almería		
Department/Center	Matemáticas	University of Almería	
Country	Spain	Teleph. number	
Key words	Nonlinear Analysis, Elliptic PDEs, Homogeneization		

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

Period	Position/Institution/Country/Interruption cause
2004-2007	Research Contract, U. Granada, Spain
2007-2007	FPU fellowship, U. Granada, Spain
2007-2011	FPI fellowship, U. Granada, Spain
2011-2011	Prof. Ayudante Doctor, U. Politécnica Cartagena, Spain
2011-2018	Prof. Contratado Doctor, U. Politécnica Cartagena, Spain
2018-2018	Prof. Titular Universidad, U. Politécnica Cartagena, Spain
2018-2018	Prof. Ayudante Doctor, U. Almería, Spain
2018-2019	Prof. Contratado Doctor, U. Almería, Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Licensed in Mathematics	Almería / Spain	2004
PhD in Mathematics	Granada / Spain	2009

(Include all the necessary rows)

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

I am Professor at the University of Almería since 2018. My work is concerned with Nonlinear Functional Analysis and Elliptic Partial Differential Equations, homogenization of PDEs, and bifurcation of elliptic equations as a member of a consolidated group in the training of researchers for more than 30 years.

Among others, I have 29 JCR publications, 4 non-JCR, a book and several book chapters. In all cases these are original results with relevant achievements. I have contributed significantly to the generation of knowledge as can be seen in MathSciNet, with 418 citations by 212 different authors. 21 publications in JCR Q1.

My research contributions can be summarized as follows. In the analysis of quasilinear elliptic partial differential equations, I have played a pivotal role in the development of methods for addressing problems involving lower-order terms and singularities. This line of research, initiated in my doctoral thesis, has since been expanded by various international research groups, leading to numerous PhD dissertations across different institutions.

Additionally, I have collaborated with leading experts in the field on topics such as the homogenization of semilinear PDEs with singularities. In the study of strongly singular semilinear problems, investigated in collaboration with these experts, we introduced a new solution space that has sparked numerous studies on the existence of solutions to singular

equations. I have also conducted an in-depth study of the bifurcation analysis of semilinear problems with zeros in the nonlinearity. I have made significant contributions to bifurcation theory by deriving abstract theorems that describe solution sets as continua of solutions.

I have advanced the understanding of solution regularity for both quasilinear and semilinear problems, focusing on regularizing effects in elliptic PDEs. This includes studying the impact of lower-order terms and singularities, both in singular and non-singular cases, enhancing the qualitative understanding of solutions.

I also conducted in-depth studies on a priori estimates for non-coercive Dirichlet problems with subquadratic gradient terms, using advanced techniques such as the integral Bernstein and moving plane methods.

These contributions have resulted in high-impact publications in leading journals, significantly advancing knowledge in this field. My most recent publications are in some of the top journals in the field, such as the *Journal of Functional Analysis*, *Journal de Mathématiques Pures et Appliquées*, *Annales della Scuola Normale Superiore di Pisa*, *Journal of Differential Equations*, *Nonlinear Analysis*, *Advances in Nonlinear Analysis*, *Mathematical Modelling and Analysis*, *Milan Journal of Mathematics*, *Communications in Contemporary Mathematics*, *Annales de l'Institut Henri Poincaré*, *Communications in Partial Differential Equations*.

The communication of my research results has been carried out through participation as a guest speaker and participant at national and international conferences and seminars. I have been a guest speaker at several congresses. To name a few locations, I have presented at international conferences in Rome, São Carlos, São Paulo, Buenos Aires, Alhucemas, Belém, and at national conferences in Castellón, Madrid, Seville, Granada, Gijón, Zaragoza, Cádiz, Toledo, Ciudad Real, Alicante, Valencia, Cartagena, among others.

I have organized multiple sessions at conferences such as CEDYA, including one as part of the organizing committee in Cartagena. Additionally, I have organized workshops on Partial Differential Equations in Almería, with participation from leading international experts, made possible by recent research project funding. I have also conducted research stays at renowned centers like Università di Roma I 'Sapienza', Paris VI, Buenos Aires, Granada, Seville, among others.

Currently, I am directly supervising two doctoral theses. One is by Antonio Jesús Martínez Aparicio, focused on the study of semilinear problems with zeros, and the other is by Natalia Expósito Salmerón, which explores significant advances in numerical methods for solving nonlinear equations. Both theses are scheduled for defense shortly. My collaboration with several top-tier experts in the field has fostered a robust scientific network between my research group and theirs. This partnership has provided substantial opportunities for the young researchers in our group, as we have integrated them into these academic networks, enabling them to carry out research stays at prestigious institutions. These include the Università di Roma I 'Sapienza', Université Paris VI, Universidad de Buenos Aires and Politecnico di Bari.

I have been a member of numerous research projects, and recently I served as PI of one of them, which reflects the continuous development of young researchers within the group, and I am a reviewer for top-tier scientific journals.

Three CNEAI six-year research periods (2006-2011, 2012-2017, 2018-2023).

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

C.1. Publications

1. D. Arcoya, S. Barile, P. J. Martínez-Aparicio, *Singular quasilinear equations with quadratic growth in the gradient without sign condition*, *J. Math. Anal. Appl.*, 350 (2009), 401-408.
2. D. Arcoya, J. Carmona, T. Leonori, L. Orsina, P. J. Martínez-Aparicio, F. Petitta, *Existence and nonexistence of solutions for singular quadratic quasilinear equations*, *J. Differential Equations*, 246 (2009), no 10, 4006-4042.
3. D. Arcoya, J. Carmona, P. J. Martínez-Aparicio, *Bifurcation for quasilinear elliptic singular BVP*, *Comm. Partial Differential Equations*, 36, 670-692, 2011.

4. S. Cingolani, J. Carmona, P. J. Martínez-Aparicio, G. Vannella, *Regularity and More index of the solutions to critical quasilinear elliptic problems*, Comm. Partial Differential Equations 38 (2013), no. 10, 1675-1711.
- 5 J. Carmona, P. J. Martínez-Aparicio, A. Suárez, *Existence and non-existence of positive solutions for nonlinear elliptic singular equations with natural growth*, Nonlinear Anal. 89 (2013), 157-169.
6. D. Arcoya, J. Carmona, P. J. Martínez-Aparicio, *Gelfand type quasilinear elliptic problems with quadratic gradient terms*, Ann. Inst. H. Poincaré Anal. Non Linéaire 31 (2014), no. 2, 249-265.
7. D. Giachetti, P. J. Martínez-Aparicio, F. Murat, *A semilinear elliptic equation with a mild singularity at $u = 0$: Existence and homogenization*, J. Math. Pures Appl. (9) 107 (2017), no. 1, 41-77.
8. D. Giachetti, P. J. Martínez-Aparicio, F. Murat, *Homogenization of a Dirichlet semi-linear elliptic problem with a strong singularity at $u = 0$ in a domain with many small holes*, J. Funct. Anal. 274 no. 6 (2018), 1747-1789.
9. J. Carmona, S. López-Martínez. P. J. Martínez-Aparicio, *A priori estimates for non-coercive Dirichlet problems with subquadratic gradient terms*, J. Differential Equations, 366 (2023), 292-319.
10. J. Carmona, A. J. Martínez Aparicio, P. J. Martínez-Aparicio, *Intervals of bifurcation points for semilinear elliptic problems*. Adv. Nonlinear Anal. 14 (2025), no. 1, 25 pp..
11. P. J. Martínez-Aparicio, *On the stability of the PPH subdivision scheme on nonuniform grids*. Mathematics and Computers in Simulation. 236 (2025) 154-169.

C.2. Congress

I have organized several conferences; in particular, I was a member of the Organizing Committee of the “CEDYA”, held in Cartagena in 2017. Moreover I have participated in the following conferences, among others:

1. **Title:** Quasilinear equations with quadratic growth in $\text{grad}(w)$ and large solutions for semilinear equations. **Conference:** International Congress of Mathematicians ICM2006. Madrid, from August 22 to 30, 2006. **Type of Presentation:** International communication.
2. **Title:** Continuity of Solutions for quasilinear elliptic problems with natural growth and Gelfand-type equations. **Conference:** Second Workshop in Mathematical Analysis in Alicante, from May 18 to 20, 2011. **Type of Presentation:** International invited lecture.
3. **Title:** Homogenization for singular semilinear elliptic equations in domains with small holes **Conference:** Nonlinear Partial Differential Equations on the Occasion of J.M. Mazón's 60th Birthday, Valencia, from July 1 to 5, 2013. **Type of Presentation:** International invited lecture.
4. **Title:** Homogenization for singular semilinear elliptic equations in domains with small holes **Conference:** International Workshop on Variational Problems and PDEs. São Paulo (Brazil), from September 2 to 6, 2013. **Type of Presentation:** International invited lecture.
5. **Title:** Quasilinear elliptic operators with quadratic gradient terms and related Gelfand-type problems. **Conference:** ICMC Summer Meeting on Differential Equations. São Carlos (Brazil), from February 3 to 7, 2014. **Type of Presentation:** International communication.
6. **Title:** A semilinear elliptic problem with a singularity at $u=0$. **Conference:** ICMC Summer Meeting on Differential Equations. São Carlos (Brazil), from February 2 to 4, 2015. **Type of Presentation:** International communication.
7. **Title:** Singular quasilinear elliptic problems with a changing sign datum. **Conference:** II IMDE Conference Amazon-Andalusia on PDEs. Belém (Brazil), from June 10 to 13, 2019. **Type of Presentation:** International invited lecture.
8. **Title:** Elliptic equations with subquadratic growth in the gradient. **Conference:** A Day in Elliptic and Parabolic PDEs. Rome (Italy), September 8, 2022. **Type of Presentation:** International invited lecture.
9. **Title:** Unexpected phenomena for an elliptic equation involving the divergence of a singular term. **Conference:** XXVIII CEDYA / XVII CMA. Leioia, Spain, June 2024. **Type of Presentation:** National Communication.
10. **Title:** Unexpected results for a singular elliptic problem. **Conference:** Second Edition of the International Conference on Artificial Intelligence and Applied Mathematics, Al-Hoceima, (Morocco), May 2024. **Type of Presentation:** International Communication.

C.3. Research projects

1. Title: Ecuaciones no lineales en derivadas parciales de tipo elíptico. Métodos topológicos y variacionales. BFM2003-03772. **Funding body:** Ministerio de Educación y Ciencia.

Date: from December 2003 to November 2006. **Amount:** 92110 euros.

Principal Investigator: David Arcoya.

2. Title: Análisis no lineal y ecuaciones en derivadas parciales elípticas, MTM2006-09282.

Funding body: Ministerio de Educación y Ciencia.

Date: from October 2006 to December 2009. **Amount:** 76072,7 euros.

Principal Investigator: David Arcoya.

3. Title: Red de ecuaciones elípticas y parabólicas no lineales, MTM2005-24578. **Funding body:** Ministerio de Educación y Ciencia. **Date:** from January 2005 to December 2007.

Amount: 18000 euros. **Principal Investigator:** Irene Peral.

4. Title: Metodi Variazionali e Topologici in Analisi Nonlineare e Geometria con Applicazioni, HI2008-0106 y IT09L719F1. **Funding body:** Ministero Dell'Università della Ricerca (Italia).

Date: from January 2009 to December 2010. **Amount:** 11700 euros (spanish researchers).

Principal Investigators: Miguel Sánchez Caja and Giovanna Cerami.

5. Title: Análisis no lineal y ecuaciones en derivadas parciales, MTM2009-10878. **Funding body:** Ministerio de Ciencia e Innovación. **Date:** from January 2010 to December 2012.

Amount: 110715,02 euros. **Principal Investigator:** David Arcoya.

6. Title: Análisis no lineal y ecuaciones en derivadas parciales, MTM2012-31799. **Funding body:** Ministerio de Economía y Competitividad. **Date:** from January 2013 to December 2015.

Amount: 49140 euros+ FPI. **Principal Investigator:** David Arcoya.

7. Title: Análisis No Lineal y Ec. en Derivadas Parciales Elípticas, MTM2015-68210- P.

Funding body: Ministerio de Economía y Competitividad.

Date: from January 2016 to December 2018. **Amount:** 60000 euro + 1 PhD fellowship.

Principal Investigators: David Arcoya and David Ruiz.

8. Title: Ecuaciones en derivadas parciales elípticas no lineales que surgen en física y geometría, PGC2018-096422-B-I00. **Funding body:** Ministerio de Ciencia, Innovación y Universidades.

Date: from January 2019 to September 2022. **Amount:** 65.400 euros + FPI.

Principal Investigators: David Arcoya and José Carmona.

9. Title: Ecuaciones en Derivadas Parciales Locales, No Locales y Homogeneización.

UAL2020-FQM-B2046. **Funding body:** Proyectos de I+D+I UAL-FEDER Andalucía 2014-2020. **Date:** from January 2021 to June 2023. **Amount:** 30.000 euros.

Principal Investigators: Pedro J. Martínez-Aparicio and Alexis Molino.

10. Title: Analisis no lineal y EDPs elípticas de la Física y la Geometría. PID2021-122122NB-I00. **Funding body:** Ministerio de Ciencia e Innovación.

Date: from September 2022 to September 2025. **Amount:** 90750 euros.

Principal Investigators: José Carmona and David Ruiz.

I participate also in several regional projects and many other older projects.

C.4. Contracts, technological or transfer merits

1. Research contract with the University of Granada from 2004 to 2007 funded by the research project entitled Ecuaciones no lineales en derivadas parciales de tipo elíptico. Métodos topológicos y variacionales, BFM2003-03772.