

**Part A. PERSONAL INFORMATION****CV date**

Sep 27, 2019

First and Family name	Teresa Encarnación Pérez Fernández		
Researcher numbers	Researcher ID		
	Orcid code		
	MathSciNet		

A.1. Current position

Name of University/Institution	University of Granada		
Department	Applied Mathematics		
Address and Country	Fuente Nueva Avenue		
Phone number	E-mail		
Current position	Full Professor	From	Dec. 26, 2013
Spec. UNESCO code	120202, 120223		
Key words	Approximation Theory, Special Functions, Standard and Non-standard Orthogonal Polynomials, Multivariate Orthogonal Polynomials		

A.2. Education

PhD	University	Year
Sciences Mathematics	University of Granada	1994

A.3. JCR articles, h Index, thesis supervised...

JCR articles in Q1 (Source WoS): 14 h-index (Source WoS): 11
Sum of Times Cited (WoS): 305
Average citations per item (WoS): 6.22
Thesis supervised (last 10 years): 1
Number of Positive Six-year Research Periods: 4
Last Positive Evaluated Period: 2009-2014 Data for the next evaluation: End of 2020

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

The main topic of my research is the study of the theory and applications of non-standard orthogonal polynomials. Since 2005 we have studied orthogonal polynomials in several variables, which have proven their applicability in the polishing of optic lenses and in the reconstruction of the shape of the cornea (Y. Xu, 2006), and whose mathematical theory remains open. Our research is devoted to the analytic, algebraic and structural properties of these kind of orthogonal polynomials since, nowadays, this theory is only partially known. We study several theoretical aspects: differential (classical / semiclassical character, partial difference-differential equations, asymptotics), algebraic (explicit expressions, connection formulas, zeros, cubatura formulas), modifications / perturbations of the moment functional that provides the orthogonality (Krall, Uvarov, Christoffel, Geronimus), multivariate orthogonal polynomials associated with the so-called Sobolev inner products, that is, inner products involving differential operators such as gradients, divergence, laplacian, etc. Moreover, applications of standard and non-standard multivariate orthogonal polynomials to the reconstruction of images (i.e. Zernike polynomials); as well as any other related topic are object of our study too.

Regarding Scopus database, a total of 309 citations is reported, 100 of them are only from 2014. We highlight that since 2015 (the first year of the next six-year period), 9 articles have been published in the journal included in JCR Impact factor, 6 of them in Q1. In the last ten years, a clear rise in the number and quality of published works has been done, as well as the internationalization of the team of which I am a part.

I was Plenary Speaker at the CNMAC-2012 (Congress of the Brazilian Society of Applied Mathematics), Plenary Speaker at the 13rd International Symposium On Orthogonal Polynomials, Special Functions and Applications (13rd OPSFA, Gaithersburg, 2015), I presented invited talks at SC2011 (Sardinia, Italy), 3rd RSME-SMM meeting (Zacatecas, 2014), I gave a mini-course of orthogonal polynomials in the V EIBPOA (Mexico, 2015),

Invited Speaker in the First Joint Meeting Brazil-Spain in Mathematics (Fortaleza , 2015), Invited Lecturer in the XI EITA (Ainsa, Huesca, 2016), Invited conference in OPCOP 2017 (Castro Urdiales, Cantabria).

I have participated or I participate in several research projects: the Spanish National Plan, since 1995; International (European Union 1993-2003, Spanish-Brazilian Cooperation 2008-2011); Regional Plan (GI since 1995, Excellence 2011-2014 and 2013-2017), Consolider I-Math (2006-2011); etc. In addition, I am the leader for the Consolidated Research Group of the Junta de Andalucía FQM-384.

Short stays have been made in several national and international centers, although there are few stays of more than one month, due to family responsibilities. In spite of this, in 1995, 2009, 2012 there were stays of one month in the UNESP (Brazil), and stays of one month in the University of Oregon (USA) in 2012 and 2016. Recently, from July 21 to August 3, 2019, I spent 15 days research stay in the MFO Institute at Oberwolfach, in the frame of a Research in Pairs grant. Moreover, we usually receive prestigious national and international researchers whose appointments can be seen in the collaborations of the most recent publications. More information at <http://www.ugr.es/local/tperez>

Part C. RELEVANT MERITS

C.1. Publications (including books)

- [1] F. Marcellán, M. E. Marriaga, T. E. Pérez, M. A. Piñar, Coherent pairs of bivariate orthogonal polynomials. *J. Approx. Theory* 245 (2019), 40-63. JCR Impact Factor: 2.097 (2018). Position 88/313 (T1). Category: Mathematics.
- [2] F. Marcellán, M. Marriaga, T. E. Perez, M. A. Piñar, On bivariate classical orthogonal polynomials, *Appl. Math. Comput.* 325 (2018), 340-357. JCR Impact Factor: 3.092 (2018). Position 14/254 (Q1). Category: Mathematics, Applied.
- [3] M. Marriaga, T. E. Pérez, M. A. Piñar, Three term relations for a class of bivariate orthogonal polynomials. *Mediterr. J. Math.* 14 (2017), Art. 54, 26 pp. JCR Impact Factor: 1.000 (2017). Position: 68/309 (Q1). Category: Mathematics. Times cited: 1 (WoS).
- [4] C. F. Bracciali, T. E. Pérez, Bivariate orthogonal polynomials, 2D Toda lattices and Lax-type pairs. *Appl. Math. Comput.* 309 (2017), 142-155. JCR Impact Factor: 2.300 (2017). Position 21/252 (Q1). Category: Mathematics, Applied.
- [5] C. F. Bracciali, J. H. McCabe, T. E. Pérez, A. Sri Ranga, A class of orthogonal functions given by a three term recurrence formula. *Math. Comp.* 85 (2016), 1837-1859. JCR Impact Factor: 1.569 (2016). Position 47/255 (Q1). Category Mathematics, Applied. Times cited: 5.
- [6] A. M. Delgado, L. Fernández, D. S. Lubinsky, T. E. Pérez, M. A. Piñar, Sobolev orthogonal polynomials on the unit ball via outward derivatives. *J. Math. Anal. Appl.* 440 (2016), 716-740. JCR Impact Factor: 1.064 (2016). Position 53/310 (Q1). Category: Mathematics. Times cited: 6 (WoS).
- [7] L. Fernández, F. Marcellán, T. E. Pérez, M. Piñar, Y. Xu, Sobolev orthogonal polynomials on product domains. *J. Comput. Appl. Math.* 284 (2015), 202-215. JCR Impact Factor: 1.266 (2015). Position 59/257 (Q1). Category: Mathematics, Applied. Times cited: 9 (WoS).
- [8] M. Alfaro, A. Peña, T. E. Pérez, M. L. Rezola, On linearly related orthogonal polynomials in several variables. *Numer. Algorithms* 66 (2014), 537-553. JCR Impact Factor: 1.477 (2014). Position 46/251 (Q1). Category: Mathematics, Applied. Times cited: 2 (WoS).
- [9] A. M. Delgado, T. E. Pérez, M. A. Piñar, Sobolev-type orthogonal polynomials on the unit ball, *Journal of Approximation Theory* 170 (2013), 94-106. JCR Impact Factor: 0.755 (2013). Position 59/299 (Q1). Category: Mathematics. Times cited: 1 (WoS).
- [10] T. E. Pérez, M. A. Piñar, Y. Xu, Weighted Sobolev orthogonal polynomials on the unit ball, *Journal of Approximation Theory* 171 (2013), 84-104. JCR Impact Factor: 0.755 (2013). Position 59/299 (Q1). Category: Mathematics. Times cited: 11 (WoS).

C.2. Research projects and grants

Funded by Spanish Government: National Plan of I+D+i

- [1] PGC2018-094932-B-I00: Multivariate Orthogonal Polynomials. Theoretical aspects and Application. Funding entity: Ministerio de Ciencia, Innovación y Universidades and the

European Regional Development Fund (ERDF), call 2018. Leaders: Miguel Piñar and Teresa E. Pérez (Univ. Granada). Granted amount: 34.606 €. Start date: 01/01/2019, end date: 12/31/2022. Role: Leader and full time researcher.

[2] MTM2014-53171-P: Properties of orthogonal polynomials in several variables. Applications. Funding entity: Ministerio de Ciencia e Innovación and the European Regional Development Fund (ERDF), call 2014. Leader: Miguel Piñar González (Univ. Granada). Granted amount: 35.090 €. Start date: 01/01/2015, end date: 12/31/2018. Role: Full time researcher.

[3] MTM2011-28952-C02-02: Multivariate orthogonal polynomials. Structural properties and applications. Funding entity: Ministerio de Ciencia e Innovación and the European Regional Development Fund (ERDF), call 2011. Leader: Miguel Piñar González (Univ. Granada). Granted amount: 33.275 €. Start date: 01/01/2012, end date: 12/31/2015. Role: Full time researcher.

Funded by Junta de Andalucía (Spain). Excellence Projects

[1] P11-FQM-7276: Approximation theory, special functions and mathematical models: from the theory to the Ophthalmologic applications. Funding entity: Junta de Andalucía, call 2011. Leader: Andrei Martínez Finkelshtein (Univ. Almería). Granted amount: 239.478,30 €. Start date: 04/30/2013, end date: 03/31/2018. Role: Full time researcher.

[2] P09-FQM-4643: Orthogonality, approximation and quantum complexity: theory and scientific and technological applications. Funding entity: Junta de Andalucía, call 2009. Leader: Antonio Durán Guardado (Univ. Sevilla). Granted amount: 293.939,68 €. Start date: 01/01/2010, end date: 12/31/2012. Role: Full time researcher.

International Research Projects

[1] PHB2007-0078-PC/CAPES-Brasil 160/08: Polinomios Ortogonales, Funciones Especiales y Aplicaciones / Polinômios Ortogonais, Funções Especiais e Aplicações. Funding entity: Ministerio de Educación y Ciencia (Spain) and Brazilian Government (CAPES), call 2006. Leaders: Eduardo Godoy Malvar (Univ. Vigo)/ Dimitar K. Dimitrov (UNESP, Brazil). Granted amount: 9.050€ / 6.050€. Start date: 01/01/2008, end date: 12/31/2011. Role: Full time researcher/Researchers host.

Research Group of Junta de Andalucía (Spain)

[1] FQM-384: Orthogonality and Applications. Funded entity: Junta de Andalucía, call 2017. Leader: Teresa E. Pérez. Granted amount: 4.800€. Role: Leader and full time researcher.

Research Nets

[1] MTM2015-68988-REDT: Orthonet. Spanish Net on Orthogonal polynomials and applications. Funding entity: Ministerio de Economía y Competitividad, call 2015. Leader: Antonio Durán (Univ. Sevilla). Granted amount: 24.000€. Start date: 01/01/2016, end date: 12/31/2017. Role: Full time researcher and Secretary.

[2] MTM2017-90694-REDT: Orthonet. Spanish Net on Orthogonal polynomials and applications. Funding entity: Ministerio de Economía y Competitividad, call 2015. Leader: Óscar Ciaurri (Univ. La Rioja). Granted amount: 12.000€. Start date: 07/01/2018, end date: 06/30/2020. Role: Full time researcher.

C.5. Thesis supervised

Doctoral Dissertations

[1] M. Álvarez de Morales Mercado, Ortogonalidad no estándar para familias de polinomios clásicas. Co-advisor: M. Piñar. UGR, 1998. Apto Cum Laude (unanimity).

[2] M. Marriaga, On semiclassical families of bivariate orthogonal polynomials. Co-advisors: F. Marcellán, M. Piñar. Univ. Carlos III, 2017. Apto Cum Laude (unanimity).

Master's Thesis (TFM)

[1] A. Puertas Cazorla, Aproximación uniforme de funciones. Análisis teórico y experimentos numéricos. Master in Physics and Mathematics, Univ. Granada, 2019. Co-advisor: A. M. Delgado. Mark: 7.5/10.

[2] A. J. Campos Hernández, Redes de Toda y Polinomios ortogonales. Master in Physics and Mathematics, Univ. Granada, 2019. Mark: 8/10.

- [3] M. T. Calvo Muñoz, Polinomios ortogonales en dos variables. Polinomios de Zernike. Master in Mathematics, Univ. Granada, 2018. Co-advisor: L. Fernández. Mark: 7.5/10.
- [4] F. Lizarte, Polinomios de Appell bivariados. Carácter clásico. Master in Mathematics, Univ. Granada, 2017. Mark 10/10.
- [5] M. Marriaga, Polinomios de Koornwinder en dos variables. Master in Physics and Mathematics, Univ. Granada, 2012. Co-advisor: M. Piñar. Mark 9.5/10.
- [6] M. Recarte Castellanos, Una teoría básica de polinomios ortogonales en varias variables sobre la bola. Master in Physics and Mathematics, Univ. Granada, 2011. Mark 9/10.
- [7] A. M. Delgado, Operadores de Bernstein-Laguerre. Master in Physics and Mathematics, Univ. Granada, 2002. Mark 10/10.

C.6. Organization of Scientific Events:

- [1] Thematic minisymposia "Multivariate Orthogonal Polynomials: Theory and Applications", in ICIAM2019, International Congress on Industrial and Applied Mathematics. Valencia, July 2019.
- [2] Special Session "Special functions and Approximation Theory", in II Joint Meeting Spain-Brazil in Mathematics, RSME-SEMA-SBM-SBMAC, Cádiz, December, 2018.
- [3] Workshop "Two days on Orthogonal Polynomials (D2PO)", IEMath-GR, Granada, December 2018.
- [4] Mini-symposia "On Multivariate Orthogonal Polynomials and their Applications", in "IX Jaén Conference on Approximation Theory", Úbeda (Jaén), 2018.
- [5] Jornada IEMath-GR/RSME sobre Investigación Matemática, Instituto de Matemáticas de la Universidad de Granada, 28/04/2017.
- [6] Mini-symposium "Orthogonal Polynomials in Approximation Theory", in "V Jaén Conference on Approximation Theory", in Úbeda (Jaén), 2014.
- [7] Workshop on Generalized Special Functions of Mathematical Physics, UGR, February, 2012.
- [8] Mini-symposium "Non standard Orthogonal Polynomials", in "I Jaén Conference on Approximation Theory", Úbeda (Jaén), 2010.
- [9] Exhibition and workshop day "MIT: Mujeres en la Informática y la Telecomunicación", ETSIT, Univ. de Granada, 2009.

C.7. Memberships of scientific societies

Member of the American Mathematical Society (AMS), Society for Industry and Applied Mathematics (SIAM), Real Sociedad Matemática Española (RSME), Sociedad Española de Matemática Aplicada (SEMA).

Member of the IEMath-GR (Institute of Mathematics of the University of Granada).

C.8 Other merits

Evaluator for the National Agency ANEP.

Secretary of the Commission A1-Mathematics of Acreditación Nacional para el Acceso a los Cuerpos Docentes Universitarios (ANECA).

Referee for AA, BBMS, JCAM, JAT, LAA, MJM, MAA, NA, RM, Bulletin of the RSME, etc.;

Reviewer of the AMS.

Participation (as inviter speaker/speaker/poster presentation) in more than 40 international meetings related to Orthogonal polynomials and Approximation Theory.

Eighteen invited seminars in national and international institutions. Six research stays in national and international institutions of at least one month.

Invited talk in "A Pint of Science Festival" (Science in Pubs), May, 2017. Titled: Sólo para sus ojos. OO7: Ortogonalidad, Óptica y 7 cosas más.