

**CURRICULUM VITAE ABREVIADO (CVA)**

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

**Part A. PERSONAL INFORMATION**

First name	José Manuel		
Family name	Rodríguez García		
e-mail	jomaro@math.uc3m.es		
Open Researcher and Contributor ID (ORCID) (*)	0000-0003-2851-7442		

(\*) Mandatory

**A.1. Current position**

Position	Full Professor		
Initial date	April 1, 2011		
Institution	Universidad Carlos III de Madrid		
Department/Center	Matemáticas	Escuela Politécnica Superior	
Country	Spain	Teleph. number	+34 916249098
Key words	Geometric function theory (Riemann surfaces, Poincaré metric, hyperbolic spaces), surfaces with negative curvature, graph theory, topological indices in math. chemistry, approximation theory.		

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

Period	Position/Institution/Country/Interruption cause
1994-2011	Professor Associate/UC3M/Spain
1993-1994	Tenure Track Professor /UC3M/Spain
1991-1993	Tenure Track Professor /UAM/Spain

**A.3. Education**

PhD, Licensed, Graduate	University/Country	Year
PhD	Universidad Autónoma de Madrid/Spain	1991
Graduate	Universidad Autónoma de Madrid/Spain	1986

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

My research work, with many collaborators, both national and international, focuses mainly on the relationship between geometric function theory, negative curvature geometry and graph theory, in the context of negatively curved manifolds (mainly Riemann surfaces), as well as in approximation theory and mathematical chemistry.

The following are some of my best results:

1. One of my main topics is the study of the asymptotic behavior of geodesics on manifolds with negative sectional curvature. In a paper by Fernández and Melián published in Acta Mathematica, they consider a Riemann surface  $R$  (with constant negative curvature), a point  $p$  in  $R$ , and study the size of the set of directions  $v$  such that the geodesic starting at  $p$  in the direction of  $v$  escapes to infinity, showing that this set has Hausdorff dimension 1. We have generalized this result to surfaces with pinched negative curvature. One of my medium-term objectives is to generalize this result to Riemannian manifolds of arbitrary dimension.

2. We have also shown that any surface with constant negative curvature can be constructed by "gluing" pieces that are only of 3 types. Years later we managed to prove a similar result for surfaces without any curvature restrictions. We have also obtained a similar result for plane domains with the quasi-hyperbolic metric, which is a metric that appears usually in geometric function theory and harmonic analysis.



3. In addition, I have developed intensive work in the study of hyperbolic graphs (in Gromov's sense). Hyperbolic spaces are important because they capture the essence (simply in terms of distances) of manifolds with negative curvature. Hyperbolic graphs play an important role in the theory since studying the hyperbolicity of a metric space is equivalent to studying the hyperbolicity of a graph associated with it. I have worked on some of the most important problems in the theory of hyperbolic graphs.

4. I have also worked on graph theory problems related to alliances, domination and, above all, mathematical chemistry.

5. I am currently working on the proofs of three important improvements of classical geometric results: the collar lemma for simple closed geodesics, the collar lemma for cusps, and the thick-thin decomposition, on surfaces with bounded nonpositive curvature.

I have supervised fourteen Doctoral Theses on these research topics and four Doctoral Theses currently in progress. Many of my former doctoral students work in different universities both in Spain and abroad. With most of them I continue to maintain scientific collaborations, and many of them are part of my current research project as well as the one I am applying for.

Author of 168 research papers appearing in MathSciNet, with 1224 citations and h index 21. In these publications I have had 56 co-authors, most of them foreigners.

Author of two research books and two chapters in research books.

Research stays:

Universidad Autónoma de Guerrero, Mexico, 18 times: 1 week in February 2023, 1 week in April 2023, 1 week in July 2023, 2 weeks in August 2023, 4.5 weeks in July/August 2022, 4.5 weeks in July 2021, 4.5 weeks in August 2020, 1 week in February 2020, 2 weeks in July 2019, 2 weeks in July 2017, 2 weeks in July 2016, 2 weeks in July 2015, 2 weeks in July 2014, 2 weeks in July 2013, 2 weeks in July 2012, 2 weeks in July 2011, 2 weeks in July 2010, and 2 weeks in July 2009.

Florida International University, USA, 4.5 weeks in August 2019.

Benemérita Universidad Autónoma de Puebla, Mexico, 2 weeks in July 2018.

Waseda University, Tokyo, Japan, 2 weeks in April 2014.

Universidad del Atlántico, Colombia, 2 times: 2 weeks in August 2013, and 2 weeks in October 2014.

Universidad de La Habana, Cuba, 4 weeks in February/March 2009.

Okayama University, Okayama, Japan, 1.5 weeks in January 2008.

Member of the Scientific-Executive Committee of the Projects associated to the Thematic Networks: MTM 2007-30904-E, MTM 2008-02829-E, MTM 2015-69323-REDT and MTM 2017-90584-REDT (2009-2019).

Participation in the organization of conferences: XI Encuentros de Análisis Real y Complejo EARCO 2009 (Chairman of the Organizing Committee), Workshops of Young Researchers in Mathematics (2014-2022), IV Summer School in Complex Analysis and Operator Theory 2017 (Chairman of the Organizing Committee) and XXII Encuentros de Análisis Real y Complejo EARCO 2024 (Chairman of the Organizing Committee).

I have been referee and member of the Editorial Board of several international research journals in the area of Mathematics.

I have been evaluator for ANEP on four occasions, for ANECA on two occasions and for ACCUA once.

Head of the Department of Mathematics at UC3M, February 2024.

Secretary of the Department of Mathematics at UC3M for three years.



Director of the Master's Program in Mathematical Engineering at UC3M during the eight academic years 2011-2012, 2014-2015, 2015-2016, 2018-2019, 2019-2020, 2020-2021, 2021-2022 and 2022-2023.

Director of the PhD Program in Mathematical Engineering at UC3M during the seven academic years 2011-2012, 2014-2015, 2015-2016, 2015-2016, 2018-2019, 2019-2020, 2020-2021 and 2021-2022.

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

#### **C.1. Publications** (see instructions)

From my 168 papers in international mathematical journals which appear in MathSciNet, I choose the 10 following papers:

1. R. Abreu-Blaya, J. M. Rodríguez, J. M. Sigarreta, On the generalized Fourier transform, *Mathematical Methods in the Applied Science* 46 (2023) 16709-16733.  
IF(2022): 2.9, **Q1** in Mathematics, Applied.
2. J. Gonzalo, A. Portilla, J. M. Rodríguez, E. Tourís, A decomposition for plane domains with the quasihyperbolic metric, *Journal of Mathematical Analysis and Applications*, 502 (2021) 125227.  
IF(2021): 1.417, **Q1** in Mathematics.
3. F. Marcellán, J. M. Rodríguez, Lupas-type inequality and applications to Markov-type inequalities in weighted Sobolev spaces, *Bulletin of Mathematical Sciences* 11:01 (2021) 1950022.  
IF(2021): 1.485, **Q1** in Mathematics.
4. J. C. Hernández-Gómez, R. Reyes, J. M. Rodríguez, J. M. Sigarreta, Fractional model for the study of the tuberculosis in Mexico, *Mathematical Methods in the Applied Sciences* 45 (2022) 10675-10688.  
IF(2021): 2.321, **Q1** in Mathematics Applied.
5. C. T. Martínez-Martínez, J. A. Méndez-Bermúdez, J. M. Rodríguez, J. M. Sigarreta, Computational and analytical studies of the Randic index in Erdos-Rényi models, *Applied Mathematics and Computation* 377 (2020) 125137.  
IF(2020): 4.091, **Q1,D1** in Math. Applied.
6. M. V. Melián, J. M. Rodríguez, E. Tourís, Escaping geodesics in Riemannian surfaces with variable negative curvature, *Advances in Mathematics* 345 (2019) 928-971.  
IF(2019): 1.494, **Q1** in Mathematics.
7. A. Martínez-Pérez, J. M. Rodríguez, Cheeger isoperimetric constant of Gromov hyperbolic manifolds and graphs, *Communications in Contemporary Mathematics* Vol. 20, No. 5 (2018) 1750050, 1-33.  
IF(2018): 1.394, **Q1** in Mathematics.
8. J. M. Rodríguez, J. M. Sigarreta, Spectral properties of geometric-arithmetic index, *Applied Mathematics and Computation* 277 (2016), 142-153.  
IF(2016): 1.738, **Q1** in Mathematics Applied.
9. J. M. Rodríguez, J. M. Sigarreta, Spectral Study of the Geometric-Arithmetic Index, *MATCH Communications in Mathematical and in Computer Chemistry* 74 (2015), 121-135.  
IF(2015): 3.858, **Q1,D1** in Mathematics Interdiscipl. Applications.
10. Y. Quintana, J. M. Rodríguez, Measurable diagonalization of positive definite matrices, *Journal of Approximation Theory* 185 (2014), 91-97.  
IF(2014): 0.951, **Q1** in Mathematics.



**C.2. Congress**, indicating the modality of their participation (invited conference, oral presentation, poster)

From my more than 170 participations in conferences I refer 4 of the last participations in international conferences:

1. Edil D. Molina, José M. Rodríguez, José L. Sánchez, José M. Sigarreta. Applications of the inverse degree index to molecular structures. 23th International Conference Computational and Mathematical Methods in Science and Engineering CMMSE 23. Rota, Cádiz, July 3-8, 2023. Oral presentation.
2. R. Abreu-Blaya, J. M. Rodríguez, J. M. Sigarreta. On the generalized Fourier transform. 22th International Conference Computational and Mathematical Methods in Science and Engineering CMMSE 22. Rota, Cádiz, July 3-8, 2022. Oral presentation.
3. J. Gonzalo, A. Portilla, J. M. Rodríguez, E. Tourís. Structure theorem for quasihyperbolic metric. Mediterranean International Conference of Pure and Applied Mathematics and related areas, dedicated to Professor Gradimir V. Milovanovic on the Occasion of his 70th anniversary. Antalya-Turkey. October 26-29, 2018. Oral presentation.
4. A. Granados, A. Portilla, D. Pestana, J. M. Rodríguez, E. Tourís. Estabilidad de propiedades geométricas y analíticas mediante quasiisometrías. VIII Simposio de Matemáticas. Universidad Antonio Nariño (Bogotá). February 9-10, 2018. Invited conference.

**C.3. Research projects**, indicating your personal contribution. In the case of young researchers, indicate lines of research for which they have been responsible.

1. Geometric Function Theory PID2019-106433GB-I00  
Ministerio de Economía, Industria y Competitividad, Agencia Estatal de Investigación, Proyectos Estatales de Investigación Fundamental No Orientada  
Principal Investigator: José Manuel Rodríguez García, UC3M  
01/01/2020 - 30/09/2023  
61.300 Euros. **Principal Investigator.**
2. Geometric Function Theory MTM2016-78227-C2-1-P  
Ministerio de Economía y Competitividad, Proyectos Estatales de Investigación Fundamental No Orientada  
Principal Investigator: José Manuel Rodríguez García, UC3M  
01/01/2017 - 31/12/2019  
36.000 Euros. **Principal Investigator.**
3. Geometric Function Theory MTM2013-46374-P  
Ministerio de Economía y Competitividad, Proyectos Estatales de Investigación Fundamental No Orientada  
Principal Investigator: José Manuel Rodríguez García, UC3M  
01/01/2014 - 31/12/2016  
37.000 Euros. **Principal Investigator.**
4. Programa de consolidación de Grupos Emergentes  
CONACYT-UAG I0110/62/10 FON.INST.8/10  
CONACYT, México  
Principal Investigator: José María Sigarreta Almira, Universidad Autónoma de Guerrero, México  
01/11/2010 - 31/10/2012  
2.000.000 Mexican Pesos. Investigator.
5. Geometric Function Theory MTM 2009-07800  
Ministerio de Ciencia e Innovación, Proyectos Estatales de Investigación Fundamental No Orientada  
Principal Investigator: José Manuel Rodríguez García, UC3M  
01/01/2010 - 31/12/2012  
48.000 Euros. **Principal Investigator.**