Short Curriculum Vitae
Xavier Tolsa Domènech

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PERSONAL INFORMATION

Researcher unique identifier: ORCID 0000-0001-7976-5433
Place and date of birth: Barcelona, 2-11-1966
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EDUCATION

1998	PhD in Mathematics. Universitat Autònoma de Barcelona (UAB).
1995	PhD in Industrial Engineering. Universitat Politècnica de Catalunya.
1994	Degree in Mathematics. Facultat de Matemàtiques, Universitat de Barcelona.
1990	Industrial Engineer. ETS Enginyers Industrials, Universitat Politècnica de Catalunya.

CURRENT POSITION

2003 -	ICREA Research Professor at the Universitat Autònoma de Barcelona. Institució Catalana de Recerca i Estudis avançats, Catalonia

PREVIOUS POSITIONS

2001 - 2003	Ramón y Cajal researcher. Dept. of Mathematics, Universitat Autònoma de Barcelona.
2000 - 2001	Marie Curie Postdoctoral Fellow. Dept. of Mathematics, Université de Paris-Sud, France.
1999 - 2000	Postdoctoral Fellow. Dept. of Mathematics and Computer Science, Univ. of Göteborg, Sweden.
1994 - 1999	Assistant Professor. Dept. of Applied Mathematics and Analysis, Universitat de Barcelona.

INDIVIDUAL FELLOWSHIPS AND AWARDS

2021 - 2026	**ERC Advanced Grant** for the project "Geometric analysis and Potential Theory".
2019	**Prize Rei Jaume I of Basic Research**, yearly awarded by Generalitat Valenciana and Fundació Valenciana d'Estudis Avançats to a top scientist carrying out basic research in Spain.
2013	Ferran Sunyer i Balaguer Prize, for the book "Analytic capacity, the Cauchy transform, and non-homogeneous Calderón-Zygmund theory", published by Birkhäuser-Verlag in 2014.
2013 - 2018	**ERC Advanced Grant** for the project "Geometric analysis in the Euclidean space".

2004	**Prize of the European Mathematical Society** for young researchers, awarded for the solution of Painlevé's problem.
2002	**Salem Prize**, awarded by Princeton University and the IAS of Princeton for the proof of the semadditivity of analytic capacity and the solution of Painlevé's problem, open for more than 100 years.
2001 - 2003	Ramón y Cajal fellowship. Number 1 in Mathematics in the Ramón y Cajal program in 2001.
2000 - 2001	Marie Curie Postdoctoral Fellowship, at the Dept. of Mathematics of Université de Paris-Sud.
1999 - 2000	Postdoctoral Fellowship from the TMR network Harmonic Analysis (HARP), at the Dept. of Mathematics and Computer Science of Univ. of Göteborg.
1991 - 1994	Predoctoral grant from the Generalitat de Catalunya, at the Universitat Politècnica de Catalunya, for the PhD in Engineering.

P.I. OF FUNDED RESEARCH PROJECTS

2021 - 2026	**ERC Advanced Grant** "Geometric analysis and Potential Theory" (agreement 101018680). 1.476.000 Euros.
2017 - 2020	Anàlisi real i complexa, i equacions en derivades parcials, 2017-SGR-395 (AGAUR, Generalitat de Catalunya), 2017-2020. 65.896 Euros.
2017 - 2020	Análisis armonico, teoría geométrica de la medida y aplicaciones, MTM2016-77635-P (MINECO, Spain). 47.500 Euros.
2013 - 2018	**ERC Advanced Grant** "Geometric analysis in the Euclidean space" (agreement 320501). 1.105.000 Euros.
2014 - 2016	Integrales singulares, teoria geométrica de la medida, y espacios de Sobolev, MTM2013-44304-P (MINECO, Spain). 35.812 Euros.
2011 - 2013	Análisis geométrico en el espacio euclídeo, MTM2010-16232 (MEC, Spain). 57.800 Euros.
2008 - 2010	Las transformadas de Cauchy y de Riesz y la rectificabilidad, MTM2007-62817 (MEC, Spain). 65.400 Euros.

TOP 10 PUBLICATIONS (out of more than 80)

1. B. Jaye, X. Tolsa, and M. Villa. *A proof of Carleson's ε^2-conjecture.* **Ann. of Math.** (2) 194 (2021), no. 1, 97–161. This work solves the ε^2-conjecture regarding the characterization of tangent points of Jordan cuves, posed by Chris Bishop and Lennart Carleson around 1990.
2. X. Tolsa. *Unique continuation at the boundary for harmonic functions in C^1 domains and Lipschitz domains with small constant.* Preprint arXiv:2004.10721 (2020). To appear in **Comm. Pure Appl. Math.** Solution of a problem posed by Fang-Hua Lin in 1991 in the particular case of Lipschitz domains with small constant (the original question, still open, is for general Lipschitz domains).
3. J. Azzam, S. Hofmann, J.M. Martell, M. Mourgoglou, and X. Tolsa. *Harmonic measure and quantitative connectivity: geometric characterization of the L^p-solvability of the Dirichlet problem.* **Invent. Math.** 222 (2020), 881–993.
4. J. Azzam, M. Mourgoglou and X. Tolsa. *Mutual absolute continuity of interior and exterior harmonic measure implies rectifiability.* **Comm. Pure Appl. Math.** Vol. LXX (2017), 2121–2163. This work solves the so-called two-phase problem for harmonic measure posed by C. Bishop in 1992, assuming the CDC condition.
5. J. Azzam, M. Mourgoglou, X. Tolsa., and A. Volberg. *On a two-phase problem for harmonic measure in general domains.* **Amer. J. Math.** 141(5) (2019), 1259–1279. Full

solution of Bishop's two-phase problem for harmonic measure from 1992.

6. F. Nazarov, X. Tolsa and A. Volberg. *On the uniform rectifiability of AD-regular measures with bounded Riesz transform operator: the case of codimension 1.* **Acta Math.** 213:2 (2014), 237–321. Solution of the David-Semmes problem about Riesz transforms and rectifiability in codimension 1, proposed by David and Semmes around 1990.
7. X. Tolsa. *Bilipschitz maps, analytic capacity, and the Cauchy integral.* **Ann. of Math.** 162:3 (2005), 1241–1302. This work shows that analytic capacity is bilipschitz invariant modulo multiplicative estimates, solving a problem posed by J. Verdera in 1994.
8. X. Tolsa. *The semiadditivity of continuous analytic capacity and the inner boundary conjecture.* **Amer. J. Math.** 126 (2004), no. 3, 523–567.
9. J. Mateu, X. Tolsa and J. Verdera. *The planar Cantor sets of zero analytic capacity and the local $T(b)$ theorem.* **J. Amer. Math. Soc.** 16 (2003), 19–28.
10. X. Tolsa. *Painlevé's problem and the semiadditivity of analytic capacity.* **Acta Math.** 190:1 (2003), 105–149. This work proves the semiadditivity of analytic capacity (posed by Vituskkin in the 1960's) and gives a solution of the Painlevé problem (from the 1900's) about removable singularities for bounded analytic functions in terms of Melnikov's curvature of measures.

BOOK

- X. Tolsa, "Analytic capacity, the Cauchy transform, and non-homogeneous Calderón-Zygmund theory", Progress in Mathematics, Vol. 307, Birkhäuser-Verlag, 2014, 396 p.

OTHER 10 SELECTED PUBLICATIONS FROM THE LAST 5 YEARS (out of more than 30)

1. L. Prat, C. Puliatti, and X. Tolsa. *L^2-boundedness of gradients of single layer potentials and uniform rectifiability.* Analysis & PDE 14 (2021), no. 3, 717–791.
2. A. Chang and X. Tolsa. *Analytic capacity and projections.* **J. Eur. Math. Soc.** (JEMS) 22 (2020), no. 12, 4121–4159.
3. J. Garnett, M. Mourgoglou and X. Tolsa. *Uniform rectifiability from Carleson measure estimates and ε-approximability of bounded harmonic functions.* **Duke Math. J.** Vol. 167 (2018), No. 8, 1473-1524.
4. D. Girela-Sarrión and X. Tolsa. *The Riesz transform and quantitative rectifiability for general Radon measures.* Calc. Var. PDE 57 (2018), no. 1, 57:16 (63 p.).
5. B. Jaye, F. Nazarov, and X. Tolsa. *The measures with an associated square function operator bounded in L^2.* Adv. Math. 339 (2018), 60–112.
6. X. Tolsa. *Rectifiable measures, square functions involving densities, and the Cauchy transform.* Mem. Amer. Math. Soc. 1158 (2017).
7. J. Azzam, S. Hofmann, J.M. Martell, S. Mayboroda, M. Mourgoglou, X. Tolsa, and A. Volberg. *Rectifiability of harmonic measure.* Geom. Funct. Anal. (GAFA). Vol. 26, Issue 3 (2016), 703–728.
8. X. Tolsa, *Characterization of n-rectifiability in terms of Jones' square function: Part I.* Calc. Var. PDE. Vol. 54(4) (2015), 3643–3665.
9. J. Azzam and X. Tolsa. *Characterization of n-rectifiability in terms of Jones' square function: Part II.* Geom. Funct. Anal. (GAFA). Vol. 25, Issue 5 (2015), 1371–1412.
10. A. Mas and X. Tolsa. *Variation for Riesz transforms and uniform rectifiability.* **J. Eur. Math. Soc.** 16(11) (2014), 2267–2321.

10 SELECTED PLENARY ADDRESSES (about 5 per year in the last five years)

2020	Analysis, Dynamics, Geometry and Probability (in honor of Chris Bishop). Simons Center for Geometry and Physics, Stony Brook, New York.
2019	Modern Aspects of Complex Analysis and Its Applications (in honor of Don Marshall and John Garnett). University of Washington, Seattle.
2018	Geometric Aspects of Harmonic Analysis (in honor of F. Ricci), Cortona, Italy.
2017	Geometry, Analysis and Probability. Conference in honor of Peter Jones. Seoul, South Korea.
2017	Recent Developments in Harmonic Analysis. MSRI, Berkeley.
2016	Harmonic analysis, complex analysis, spectral theory and all that (in honor of A. Volberg). Bedlewo (Poland).
2013	26^{th} Nordic and 1^{st} European-Nordic Congress of Mathematicians (Lund, Sweden).
2007	Lars Ahlfors Centennial Celebration, Helsinki.
2006	**International Congress of Mathematicians**, Madrid. (Invited speaker).
2004	**Fourth European Congress of Mathematics**, Stockholm.

EDITORIAL WORK

2019 -	Member of the Editorial Board of "Publicacions Matemàtiques".
2014 - 2016	Member of the Editorial Board of the **Journal of the European Mathematical Society**.
2012 -	Member of the Editorial Board of "Annales de la Faculté des Sciences de Toulouse. Mathématiques".
2003 -2005	Member of the scientific committee of the journal "Collectanea Mathematica".

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

2009 - 2018	Completion of the direction of 7 PhD theses in UAB: Aleix Ruiz de Villa (2009), Albert Mas (2011), Martí Prats (2015), Daniel Girela Sarrión (2016), Petr Chunaev (2018), Carmelo Puliatti (2019), Damian Dabrowski (2021).
2009 - 2018	Supervision of 11 Postdoctoral fellows in the Dept. of Mathematics of Univ. Autònoma de Barcelona: D. Karp (2006), V. Feuvrier (2009-2010), V. Chousionis (2010-2012), M.C. Reguera (2012-2013), A. Mas (2013-2014), J. Azzam (2014-2016), M. Mourgoglou (2014-2016), J. Conde-Alonso (2015-2017), A. Kauranen (2017-2019), G. Sakellaris (2017-2020), M. Prats (2017-2019).

SELECTED MANAGERIAL ACTIVITIES

2019	Member of the Program Committee of the Barcelona Analysis Conference 2019 (BAC19).
2017	Member of the Scientific Committee of the Joint Meeting of the Catalan, the Royal Spanish and the Swedish Mathematical Societies, Umeå (Sweden).
2016	President of the Scientific Committee of the Barcelona Analysis Conference 2016.
2014 - 2017	Member of the Scientific Committee of the **MFO (Oberwolfach)**.
2013 - 2015	Member of the Scientific Committee of the Barcelona Graduate School of Mathematics.
2010	Member of the scientific committee of the analysis section of the **ICM 2010** (International Conference of Mathematicians).
2009	Coordinator of the research program "Harmonic Analysis, Geometric Measure Theory and Quasiconformal Mappings", in the CRM (Centre de Recerca Matemàtica).