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Decreto Rettore Università di Roma "La Sapienza" n 3192/2020 del 15.12.2020

AZAHARA DE LA TORRE PEDRAZA
Curriculum Vitae

Part I – General Information

Full Name	Azahara de la Torre Pedraza
Spoken Languages	Spanish, Italian, English

Part II – Education

Type	Year	Institution	Notes (Degree, Experience,…)
University graduation	2012	University of Granada, Spain	Degree in Mathematics
Post-graduate studies	2013	Universitat Politècnica de Calalunya, Barcelona, Spain	Master's Degree in Advanced Mathematics and Mathematical Engineering
PhD	2016	Universitat Politècnica de Calalunya, Barcelona, Spain	PhD in Mathematics Excellent, Cum Laude. International mention.

Part III – Appointments

IIIA – Academic Appointments

Start	End	Institution	Position
01/17	09/17	University of Basel (Switzerland)	Postdoctoral position (Research and teaching)
10/17	03/18	Università degli Studi di Padova	Assegno di ricerca
04/18	08/20	Albert-Ludwigs Universität Freiburg (Germany).	Research and Teaching assistant (Wissenschaftliche Mitarbeiterin),
09/20		Universidad de Granada, Spain	Postdoctoral Grant "Juan de la Cierva incorporación 2018"

Part IV – Teaching experience

Year	Institution	Lecture/Course
15/16	Universitat Politècnica de Calalunya, Barcelona (Spain)	Exercises for the course Calculus II (30 h)
16/17	Universität Basel, Basel (Switzerland)	Exercises course "Introduction to Fourier Analysis" (28 h)
17/18	Albert-Ludwigs. Universität Freiburg (Germany).	Assistant for the course "Elementary Differential Geometry" (30 h)
17/18	Albert-Ludwigs. Universität Freiburg (Germany).	Assistant for the Student seminar "Geometric Analysis" (30 h)

18/19	Albert-Ludwigs. Universität Freiburg (Germany).	Assistant for the Student seminar "Minimal Surfaces" (30 h)
18/19	Albert-Ludwigs. Universität Freiburg (Germany).	Assistant for the master course "Geometric Analysis" (30 h)
18/19	Albert-Ludwigs. Universität Freiburg (Germany).	Lecturer for the master course "Introduction to Parabolic Partial Differential Equations" (60 h)
19/20	Roma Tre University	Research Mini-course "Fractional Yamabe problem with singularities" (6 h)
19/20	Albert-Ludwigs. Universität Freiburg (Germany).	Assistant for the course "Analysis I" (30 h)
19/20	Albert-Ludwigs. Universität Freiburg (Germany).	Assistant for the course "Elementary Differential Geometry" (30 h)
19/20	Albert-Ludwigs. Universität Freiburg (Germany).	Lecturer for the master course "Non-local elliptic equations" (30 h)
20/21	Universidad de Granada (Spain)	Lecturer for the course "Matemáticas I" (75 h)

Part V - Society memberberships, Awards and Honors

Year	Title
2019	Premio Extraordinario de doctorado, Universitat Politécnica de Catalunya

Part VI - Funding Information [grants as PI-principal investigator or I-investigator]

Year	Title	Program	Role	Grant value
2020	Nonlocal and nonlinear PDEs: a geometric approach	Projekt DFG-GZ (german science fund) 3327/1-1	PI	156,800 + 34,500 €
2020	Nonlinear Elliptic Partial Differential Equations that appear in Mathematical Physics and Geometry	Juan de la Cierva-Incorporación 2018	PI	87,000 + 6,000 €
2020	Analisis no lineal y ecuaciones diferenciales	Junta de Andalucía - FQM116	I	
2020	Ecuaciones en derivadas parciales elípticas no lineales que surgen en física y geometría	Ministerio de Ciencia, Innovación y universidades - PGC2018-096422-B-I00	I	79.134,00 €
2017	Ecuaciones no lineales y no locales. Difusión y geometría	Ministerio de Economía, Industria y competitividad MTM2017-85757-P	I	16000 €
2016	Non-linear and non-local differential equations in functional and geometric analysis	Swiss National Fond - PP00P2_170588 and PP00P2_144669	I	CHF 546'387.00+ CHF 1'411'031.00
2015	Ecuaciones en derivadas parciales: problemas de reacción-difusión, integro-diferenciales y geométricos	Ministerio de Economía, Industria y competitividad - MTM2014-52402- C3-1-P	I	95,711.00 €

2014	Equacions diferencials en derivades parcials i aplicacions	AGAUR - 2014SGR1083	I	
2012	Ecuaciones en derivadas parciales: problemas de reacción difusión y problemas geométricos	Ministerio de Economía, Industria y competitividad - MTM2011-27739-C04-01	I	192.995,00 €

Part VII – Research Activities

Keywords	Brief Description
Conformal Geometry Fractional curvature Non-local elliptic semi-linear pdes Critical power - exponential nonlinearity Pseudo-differential operators on the boundary Fractional Yamabe with singularities Non-local gluing methods	My research areas are Conformal Geometry and Partial Differential equations. In particular, I am interested in studying non-local elliptic semi-linear equations arising in Conformal Geometry and in using the tools developed in Conformal Geometry to deal with several PDE problems. Motivated by weakening the assumption of positive scalar curvature (convexity), I have focused on the quite recent notion of fractional curvature and I have extensively worked on the existence of singular solutions for the fractional Yamabe problem ("uniformization theorem"). That is the existence of metrics which are conformal to the Euclidean one, that are singular along prescribed sets (zero dimensional sets or smooth sub-manifold) and which have constant fractional curvature (an intrinsic concept defined from the conformal fractional Laplacian, a non-local operator defined on the conformal infinity "or boundary" of a conformally compact Einstein manifold). From the analytic point of view, this is a non-local semilinear equation with critical (for Sobolev embedding) power non-linearity. Moreover, I am interested on other possible generalisations of the Gaussian curvature working, for example, with the prescribed non-local Q-curvature equation (non-local semilinear equation with exponential non-linearity). The main underlying idea is treating a PDE as an infinite system of ODEs, which provided new tools (developed in Conformal Geometry) to solve several non-local and non-linear PDE problems arising in Geometric Analysis or Physics. For example, I have recently focused on the fractional Caffarelli-Kohn-Niremberg inequality. I have also dealt with the local Adams-Moser-Trudinger inequality and, inspired by the study of exponential non-linearities, in the non-local setting and using purely non-local methods, I have worked on the non-local mean-field equation on an interval and the construction of sign-changing solutions for the non-local sinh-Poisson equation. Currently, I continue working on most of the previous problems, since the work done is only the starting point to face many geometric PDEs or functional inequalities. But I have also started new ones where I expect the techniques used in my previous works to be quite useful. For example, I have recently developed an interest in the extrinsic notion of curvature, so I work on the construction of non-local Minimal surfaces, using the fractional curvature defined by Caffarelli, Roquejoffre and Savin.

Part VIII – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Papers [international]	9	Scopus	2017	2021

Total Impact factor	12.740
Total Citations	57
Average Citations per Product	6,33
Hirsch (H) index	4
Normalized H index*	1

*H index divided by the academic seniority.

Part IX– Selected Publications

List of the publications selected for the evaluation. For each publication report title, authors, reference data, journal IF (if applicable), citations, press/media release (if any).

1)

Title	On the fractional Yamabe problem with isolated singularities and related issues
Authors	A. DelaTorre
Reference data	PhD Thesis, Universitat Politécnica de Catalunya, Barcelona (Spain), 2016

2)

Title	Delaunay-type singular solutions for the fractional Yamabe problem
Authors	A. DelaTorre, M. del Pino, M.d.M González and J. Wei.
Reference data	Mathematische Annalen (2017),1-2, 597-626
DOI	10.1007/s00208-016-1483-1
IF	1.231(2017)
Citations	18 (Scopus)

3)

Title	Isolated singularities for a semilinear equation for the fractional fractional Laplacian arising in conformal geometry.
Authors	A. DelaTorre and M.d.M González
Reference data	Revista Matemática Iberoamericana 34 (2018), no. 4, 1645–1678. 35 (53A30)
DOI	10.4171/rmi/1038.
IF	1.540 (2018)
Citations	11 (Scopus)

4)

Title	On higher-dimensional singularities for the fractional Yamabe problem: A nonlocal Mazzeo-Pacard program.
Authors	W. Ao, A. DelaTorre H. Chan, M. Fontelos, M.d.M González and J. Wei.
Reference data	Duke Math. J. 168 (2019), no. 17, 3297--3411.
DOI	10.1215/00127094-2019-0034.
IF	2.194 (2019)
Citations	15 (Scopus)

5)

Title	The nonlocal mean-field equation on an interval.
Authors	A. DelaTorre , A. Hyder, L. Martinazzi and Y. Sire
Reference data	Communications in Contemporary Mathematics (CCM), Vol. 22, No. 5 (2020) 1950028
DOI	10.1142/S0219199719500287
IF	1.278 (2019)
Citations	1 (Scopus)

6)

Title	A gluing approach for the fractional Yamabe problem with isolated singularities.
Authors	W. Ao, A. DelaTorre M.d.M González and J. Wei
Reference data	Journal für die reine und angewandte Mathematik (Crelle journal), 2020 (763), 25-78
DOI	10.1515/crelle-2018-0032.
IF	1.486 (2019)
Citations	8 (Scopus)

7)

Title	An analytic construction of singular solutions related to a critical Yamabe problem
Authors	H. Chan and A. DelaTorre
Reference data	Communications in Partial Differential Equations, Vol 45, Issue 11, (2020)
DOI	10.1080/03605302.2020.1784209
IF	1.079 (2019)
Citations	0 (Scopus)

8)

Title	Improved Adams-type inequalities and their extremals in dimension 2m.
Authors	A. DelaTorre and G. Mancini
Reference data	(Online ready)To appear in Communications in Contemporary Mathematics (CCM).
DOI	10.1142/S0219199720500431.
IF	1.278 (2019)
Citations	4 (Scopus)

9)

Title	ODE methods in non-local equations
Authors	W. Ao, H. Chan, A. DelaTorre, M. Fontelos, M.d.M González and J. Wei
Reference data	Journal of Mathematical Study, Vol. 53, No. 4, pp. 370-401, (2020).
DOI	10.4208/jms.v53n4.20.01
IF	ND
Citations	0

10)

Title	Sign-changing solutions for the one-dimensional non-local sinh-Poisson equation
Authors	DelaTorre, G. Mancini and A. Pistoia.
Reference data	Advanced Nonlinear Studies, Vol 20, Issue 4, (2020)
DOI	10.1515/ans-2020-2103.
IF	1.533 (2019)
Citations	0 (Scopus)

11)

Title	Concentration phenomena for the fractional Q-curvature equation in dimension 3.
Authors	A. DelaTorre , M.d.M González, A. Hyder and L. Martinazzi
Reference data	Journal of the London Mathematical Society, Vol 2, No 0, pp 1–29 (2021).
DOI	10.1112/jlms.12437
IF	1.121 (2019)
Citations	0 (Scopus)

12)

Title	Symmetry and symmetry breaking for the fractional Caffarelli-Kohn-Nirenberg inequality
Authors	W. Ao, A. DelaTorre and M.d.M González
Reference data	Preprint. Available at arXiv:2010.06004

Part X – Invited talks

- ***Colloquium*** *talk* at "Mathematical Institute Albert Ludwigs", **University of Freiburg,** Germany (23rd October 2020). "*Some tools for non-local PDEs from conformal geometry*"
- ***MATRIX Program:*** *"Early Career Researchers Workshop on Geometric Analysis and PDEs". MATRIX Creswick, Victoria, Australia (*22nd January 2020*). "Concentration phenomena for the fractional Q-curvature equation in dimension 3 and fractional Poisson formulas ."*
- "Nonlinear Geometric PDE's" **BIRS–BANFF,** Canada (8th May 2019) "*The non-local mean-field equation on an interval.*"
- "Fourth Meeting for Young Women in Mathematics", **University of Freiburg**, Germany (2nd May 2019) "*On the fractional Yamabe problem with singularities.*"
- Winter meeting on nonlocal PDEs and applications, **UAM Madrid**, Spain (11th December 2018) "*On higher dimensional singularities for the fractional Yamabe problem.*"

- Talk at the **session** "Advances in Nonlinear Elliptic and Parabolic PDEs: from local to nonlocal problems" in the joint meeting "**2018 UMI-SIMAI-PTM**" Wroclaw, Poland "*On higher dimensional singularities for the fractional Yamabe problem.*"
- "**INDAM**-Non linear PDEs in Geometry and Physics" Palazzone di Cortona, Italy (13th June 2018) "*On higher dimensional singularities for the fractional Yamabe problem.*"
- "*Variational and PDE problems in Geometric Analysis, **Università di Bologna**, Italy (*31st May 2018*) "Non local methods for the fractional Yamabe problem with singularities.*"
- "Summer School 2018 **EWM-EMS**" Institut Mittag Leffler, Sweden (22nd May 2018) "*Improved Adams-type inequalities and their extremals in dimension 2m.*"
- "**Young PDE's @ Roma**", Dipartimento SBAI, **La Sapienza Università di Roma**, Italy (21st February 2018) "*Improved Adams-type inequalities and their extremals in dimension 2m.*"
- Talk at **session** "IV Congreso de Jóvenes Investigadores **RSME**" held at Universitat de Valencia, Spain (8th September 2017) "*Gluing methods for the fractional Yamabe problem with isolated singularities.*"
- "Nonlinear Analysis in Rome" held at the University of **Notre Dame's Rome Global Gateway, in Rome,** Italy (28th June 2017) "*Gluing methods for the fractional Yamabe problem with isolated singularities.*"
- "Geometric Properties of Local and non-Local PDEs (17w5047)" held in Casa Matemática Oaxaca (**CMO-BIRS**), Mexico (23rd May 2017) "*Gluing methods for the fractional Yamabe problem with isolated singularities.*"
- Communication in **JISD2016** – 14th Workshop on Interactions between dynamical system and PDEs held in FME (**UPC**), Barcelona, Spain (1st July 2016) "*Delaunay-type solutions for a fractional Laplacian equation arising in conformal geometry.*"
- **EWM-EMS** summer school "Geometric and Physical aspects of Trudinger-Moser type inequalities" held at Institut Mittag-Leffler. Auravägen, Djursholm, Sweden (13th July 2016) "*Delaunay-type solutions for the singular fractional Yamabe problem.*"
- "Conferences on Recent Trends on Elliptic Nonlocal Equations" held at **Fields institute** (University of Toronto), Toronto, Canada (6th June 2016) "*Some results on the singular fractional Yamabe problem.*"
- "Pacific Northwest Geometry Seminar" held at the **University of Washington in Seattle**, USA (17th October 2015) "*Delaunay-type solutions for a fractional Laplacian equation arising in conformal geometry*".
- Talk at the **session** "III Congreso de Jóvenes investigadores **RSME**". Universidad de Murcia, Murcia, Spain (7th September 2015) "*ODE solutions for the fractional Laplacian equations arising in conformal geometry.*"
- "International workshop on conformal geometry and geometric PDE (Part I)". **Beijing International Center for mathematical Research** (Peking University), Peking, China (23rd June 2015) "*ODE solutions for the fractional Laplacian equations arising in conformal geometry*".
- Princeton-Tokyo workshop on Geometric analysis", **University of Tokyo**, Tokyo, Japan (16th March 2015) "*Delaunay-type solutions for the fractional Yamabe problem: the variational approach*".

Part XI – Invited seminars

- Angewandte Mathematik, Institute of Mathematics, **University of Freiburg** (16th June 2020) "*ODE methods in non-local equations*"
- **Roma Tre University**, Italy (9th October 2019) "*Concentration phenomena for the fractional Q-curvature equation in dimension 3 and fractional Poisson formulas.*"
- **IEMath-GR**, Universidad de Granada, España (5th September 2019) "*Concentration phenomena for the fractional Q-curvature equation in dimension 3 and fractional Poisson formulas .*"
- Dipartimento SBAI, **Sapienza Università di Roma**, Italy (3rd April 2019) "*Concentration phenomena for the fractional Q-curvature equation in dim 3 and fractional Poisson formulas.*"
- Mathematics department of Pontificia Universidad Católica de Chile, Santiago de Chile, Chile (19th March 2019) "*On higher dimensional singularities for the fractional Yamabe problem.*"
- "Departamento de Matemáticas", **Universidad de Córdoba,** Córdoba, Spain (5th February 2018) "*Non-local Gluing methods for the fractional Yamabe problem with singularities.*"
- "Mathematical institute Albert Ludwigs", **University of Freiburg**, Germany (23rd January 2018) "*Improved Adams-type inequalities and their extremals in dimension 2m.*"
- **ICMAT**, Madrid, Spain (10th January 2018) "*Non-local Gluing methods for the fractional Yamabe problem with singularities.*"
- Analysis group seminar at **Freiburg University,** Germany (7th August 2017) "*On the fractional Yamabe problem with isolated singularities and related issues.*"
- Joint Seminar (**UAM, UC3M, UCM,UPM and URJC**) "Difusión no lineal en Madrid" held in Universidad Autónoma de Madrid, Spain (30th November 2016) "*On the fractional Yamabe problem with isolated singularities.*"
- Invited lecture in the "seminar in PDE, Differential Geometry, Mathematical Physics". **University of British Columbia**, Vancouver, Canada (13th October 2015) "*ODE solutions for the fractional Laplacian equations arising in conformal geometry.*"
- GREDPA (Research group in partial differential equations and applications), **Universitat Politécnica de Catalunya,** Barcelona, Spain (11th December 2014) "*ODE solutions for the fractional Laplacian equations arising in conformal geometry.*"
- Geometry Seminar, **University of Granada**, Granada, Spain (7th November 2014) "*ODE solutions for the fractional Laplacian equations arising in conformal geometry*".

Part XII - Long term research visits

- Dipartimento di Matematica e Fisica **"Università degli studi Roma Tre",** Italy, following an invitation by **Dr. Luca Battaglia and Prof. Pierpaolo Esposito (**15th September - 16th October **2019).**

- Departamento de Matemáticas, "**Universidad Autónoma de Madrid**", Spain, following an invitation by **Prof. María del Mar González (**24th July - 5th August and 1st September - 16th September **2016).**

- Department of Mathematics, "**University of British Columbia**" (Vancouver), Canada, following an invitation by **Prof. Juncheng Wei (**19th September – 20th December **2015).**

- Department of Mathematics, "**Princeton University, USA,** following an invitation by **Prof. Alice Chang (**9th September – 26th October and 9th November – 18th December **2013).**

Part XIII - Short term research visits

- Dipartimento SBAI Sapienza, **Università di Roma, Italy,** following an invitation by **Prof. Angela Pistoia (**4th -22nd March **2020).**

- Departamento de Análisis, **Universidad de Granada,** following an invitation by **Prof. David Ruiz,**
  (3rd -13th September **2019).**

- Dipartimento SBAI Sapienza, **Università di Roma, Italy,** following an invitation by **Prof. Angela Pistoia (**1st -5th April **2019).**

- Facultad de Matemáticas, **"Universidad Católica de Chile",** Chile, following an invitation by **Prof. Mariel Saéz (**8th March - 28st March **2019).**

- Mathematics department**, "Wuhan University", China**, following an invitation by **Profe. Weiwei Ao (**11th - 21st October **2018).**

- Mathematisches Institut, **Albert-Ludwigs-Universität Freiburg**, Germany, following an invitation by **Prof. Ernst Kuwert (**22nd - 27th January **2018).**

- Departamento de Matemáticas, "**Universidad Autónoma de Madrid**", Spain, following an invitation by **Prof. María del Mar González (**14th - 29th October **2017** & 19th - 21st December 2017 & 7th January - 14th January 2018 & 2nd February **2018** & 15th - 25th June 2018 & 28th February - 8 March **2019**).

- Sciences Research Institute **(MSRI)** in Berkeley, CA, USA, following an invitation by **Prof. María del Mar González,** while she was visiting member at MSRI (23rd January - 1st February **2016**)

- Departamento de Matemáticas, "**Universidad Autónoma de Madrid**", Spain, following an invitation by **Prof. María del Mar González (**27th - 30th November **2016**).

Part XV - Events organized

- **Special Session "From Nonlinear to Nonlocal Differential Equations"at "V Congreso de Jóvenes Investigadores" Casttelló 2020.**
  Real Sociedad Matemática Española y Universidad Jaume I, Castellón, Spain (27th -31st January 2020).

- **"II Junior Meeting" arranged by Barcelona Graduate School of Mathematics.**
  Institut d'Estudis Catalans (IEC), Barcelona, Spain (13th May 2016).

- **"I Junior Meeting" arranged by Barcelona Graduate School of Mathematics.**
  Facultat de Matemàtiques, Universitat de Barcelona, Barcelona, Spain (11th December 2015).

Part XVI – Service

Referee for several journals, including: Acta Applicandae Mathematicae, Communications on Pure and Applied Analysis, Journal of functional Analysis, Communications in Analysis and Geometry, Calculus of Variations and Partial Differential Equations, The Royal Society of Edinburgh: Proceedings A…