

# CURRICULUM VITAE – JEZABEL CURBELO

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## PERSONAL INFORMATION

Jezabel Curbelo  
Assistant Professor  
Departamento de Matemáticas  
Universidad Autónoma de Madrid  
Facultad de Ciencias,  
Campus Universitario de Cantoblanco,  
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## STANDARD ACADEMIC RECORD

**PhD in Mathematics** (Cum Laude with international Mention) *October 2010- April 2014*  
Department of Mathematics, Universidad Autónoma de Madrid, Spain  
Thesis directed by Ana M. Mancho entitled “Instabilities in geophysical fluid dynamics: the influence of symmetry and the temperature dependent viscosity in convection”

**Master’s Degree in Mathematics and its Applications** *October 2009-September 2010*  
Department of Mathematics, Universidad Autónoma de Madrid, Spain.  
Master thesis directed by Ana M. Mancho entitled: “Numerical studies on a convection problem with temperature dependent viscosity”

**Certificate of Pedagogical Aptitude (CAP)-Teaching Certificate** *January 2009-July 2009*  
Universidad Alfonso X el Sabio, Instituto Canario Superior de Estudios, Spain

**Mathematics Bachelor’s Degree** *September 2005-July 2009*  
Universidad de La Laguna (ULL), Canary Islands, Spain

## RESEARCH RECORD

**Assistant Professor** (“Profesor Ayudante Doctor”) *September 2016-Present*  
Departamento de Matemáticas, Universidad Autónoma de Madrid, Spain

**Invited Professor ENS-LYON** *September - October 2017*  
École normale supérieure de Lyon  
Laboratoire de Géologie de Lyon : Terre, Planète, Environnement (CNRS, ENS, Lyon1)

**Visitor Scholar UCLA** *June - July 2017*  
University of California, Los Angeles  
Department of Atmospheric and Oceanic Sciences, California, USA.

**Visitor Scholar UCLA** *October 2016*  
University of California, Los Angeles  
Department of Atmospheric and Oceanic Sciences, California, USA.

**ICMAT member** *September 2016-Present*  
Instituto de Ciencias Matemáticas (ICMAT), Madrid, Spain

**Postdoc Juan de la Cierva Formación.** *April 2016 - September 2016*  
E.T.S.I.A Escuela Técnica Superior de Ingeniería Aeronáutica y del Espacio,  
Universidad Politécnica de Madrid, Madrid, Spain

**Postdoc LabEX LIO** (Laboratoire d’excellence, Lyon Institut des Origines.) *Dec 2014-March 2016*  
Laboratoire de Géologie de Lyon : Terre, Planète, Environnement (CNRS, ENS, Lyon1)

**Teaching assistant** (“Profesora Ayudante”) *March 2012-November 2014*  
Department of Mathematics, Universidad Autónoma de Madrid, Spain

**ICMAT member** *October 2009-November 2014*  
Instituto de Ciencias Matemáticas (ICMAT), Madrid, Spain

**PhD student in the JAE-Predoc fellowships program.** *October 2009-February 2012*  
Instituto de Ciencias Matemáticas ICMAT, Madrid, Spain.

AWARDS

- **2015 Donald L. Turcotte Award**,  
American Geophysical Union (AGU). Nonlinear Geophysics Focus Group  
*Citation: AGU (2015), Curbelo and Ghanbarian-Alavijeh receive the 2015 Donald L. Turcotte Award, Eos, 96, doi:10.1029/2015EO035601. Published on 21 September 2015.*
- **2015 “Vicent Caselles” award** , for mathematical researchers aged under thirty  
BBVA Foundation - RSME Real Sociedad Matemática Española.
- **2014 Editor’s Pick 2014 Physics of Fluids**  
Article: Symmetry and plate-like convection in fluids with temperature-dependent viscosity.
- **2005 High school award from the Government of Spain**

FELLOWSHIPS

- Travel grant** to attend of the conference “2015 AGU Fall Meeting” *December 2015*  
Awarded by American Geophysical Union’s Paleoclimatology and Paleoclimatology Focus Group.
- Travel grant** to attend of “International Congress of Mathematicians SEOUL 2014” *August 2015*  
Awarded by ICMAT, Instituto de Ciencias Matemáticas (ICMAT), Madrid, Spain
- Mobility grant for a stay in USA** *March 2013 - May 2013*  
Awarded by Universidad Autónoma de Madrid, Spain.
- Mobility grant for a stay in USA** *March 2011 - May 2011*  
Awarded by CSIC (“Spanish National Research Council”), Spain.
- JAE-Predoc fellowships** *October 2009-February 2012*  
Awarded by CSIC (“Spanish National Research Council”), Spain.
- Excellence Grant** (Given to the top 10 students in Sciences) *September 2008- June 2009*  
Awarded by Government of the Canary Islands, Spain.
- Collaboration Grant in the Dept. of Mathematical Analysis** *September 2008-June 2009*  
Universidad de la Laguna.  
Awarded by the Government of Spain, Universidad de la Laguna, Spain.
- Introduction to Research Scholarship JAE-INTRO** *July 2008-September 2008*  
Awarded by CSIC, Spain.

TEACHING  
ACTIVITIES

**Teaching Experience** (Facultad de Ciencias, Universidad Autónoma de Madrid, Spain):

- Calculus, Computer Science (UG). First year of Computer Science (60 hours) *Spring 2018*
- Calculus, Math(UG), First year of Mathematics (60 hours) *Spring 2018*
- Calculus, Computer Science (UG). First year of Computer Science (60 hours) *Spring 2017*
- Calculus, Math(UG), First year of Mathematics (60 hours) *Spring 2017*
- Numerical analysis I Math(UG) First year of Mathematics (60 hours) *Spring 2014*
- Mathematical analysis Math(UG) Second year of Mathematics (60 hours) *Fall 2012*
- Numerical analysis II Math-Computer Science (UG). Fourth year of Mathematics (UG) and Fifth year of Mathematics-Computer science (UG) (60 hours) *Spring 2012*
- Mathematics I Biology (UG). First year of Biology (60 hours) *Fall 2010*

**Teacher training and teaching resources courses:** more than 15 courses, for instance: Digital online resources for teaching, Problem-based learning, Study of cases, Competency evaluation, Cooperative learning, Moodle 2.0, etc. *2009-Present*

**Applied Mathematics Seminars** (ICMAT - UAM)

2018 -

Coordinator  
Instituto de Ciencias Matemáticas, Madrid, Spain

**3rd International Workshop on Nonlinear Processes in Oceanic and Atmospheric Flows** (International Workshop)

06/07/2016 - 08/07/2016

Organizing committee and local committee  
Instituto de Ciencias Matemáticas, Madrid, Spain

**III Congress of young researchers. Spanish Royal Mathematical Society (RSME)**

(National Conference)

07/09/2015 - 11/09/2015

Organizer of the Special Session: Numerical Analysis and computation  
Murcia, Spain

**The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications**

(International Conference)

07/07/2014 - 11/07/2014

Organizer of the Special Session: Instabilities and bifurcations in geophysical fluid dynamics  
Instituto de Ciencias Matemáticas, Madrid, Spain

**6th JAE School of Mathematics** (National School)

July 2013

School for undergraduate and graduate students who are interested in Mathematics research  
Secretary. Instituto de Ciencias Matemáticas, Madrid, Spain

**2nd International Workshop on Nonlinear Processes in Oceanic and Atmospheric Flows**

(International Workshop)

06/07/2016 - 08/07/2016

Organizing local committee  
Instituto de Ciencias Matemáticas, Madrid, Spain

**Organizer of I Multidisciplinary Week (SM)** (National Workshop)

2/07/2010 - 22/07/2010

Research Workshop for undergraduate and Master students.  
Organizer  
Universidad Autónoma de Madrid, UAM, Spain

PUBLICATIONS

1. Dynamic of plumes and scaling during the melting of a Phase Change Material heated from below, with S. Madruga. *International Journal of Heat and Mass Transfer*, 126 Part B, 206-220 (2018).
2. Insights on the three-dimensional Lagrangian geometry of the Antarctic Polar Vortex, with V. J. Garcia-Garrido, C. R. Mechoso, A. M. Mancho; S. Wiggins and C. Niang. *Nonlinear Processes in Geophysics*, 24, 379-392 (2017).
3. A Simple Kinematic Model for the Lagrangian Description of Relevant Nonlinear Processes in the Stratospheric Polar Vortex, with V. J. Garcia-Garrido, C. R. Mechoso, A. M. Mancho and S. Wiggins. *Nonlinear Processes in Geophysics*, 24, 265-278 (2017).
4. Beautiful geometries underlying Ocean nonlinear processes, with A. M. Mancho; S. Wiggins; V. J. Garcia-Garrido; C. Mendoza. *A VOYAGE THROUGH SCALES The Earth System in Space and Time*. pp. 86 - 91. European Geosciences Union, (2015).
5. Spectral numerical schemes for time-dependent convection with viscosity dependent on temperature, with A. M. Mancho. *Communications in Nonlinear Science and Numerical Simulation*, 19 (2014), 3, 538-553.
6. Symmetry and plate-like convection in fluids with temperature-dependent viscosity, with A. M. Mancho. *Physics of Fluids* 26, 016602 (2014) (Editor's Pick)
7. Confined rotating convection with large Prandtl number: Centrifugal effects on wall modes, with J. M. Lopez, A.M. Mancho, and F. Marques. *Phys. Rev. E* 89, 013019 (2014)
8. Bifurcations and dynamics of a convection problem with temperature-dependent viscosity under the presence of the  $O(2)$  symmetry, with A. M. Mancho. *Phys. Rev. E* 88, 043005(2013)

9. Square functions in the Hermite setting for functions with values in UMD spaces, with J.J. Betancor, A.J. Castro, J.C. Fariña and L. Rodríguez-Mesa. *Annali di Matematica Pura ed Applicata*, 2014
10. Lagrangian descriptors: A method for revealing phase space structures of general time dependent dynamical systems with Ana M. Mancho, Stephen Wiggins and Carolina Mendoza. *Communications in Nonlinear Science and Numerical Simulation*, 18(2013) 12, 3530-3557
11. Characterization of UMD Banach spaces by imaginary powers of Hermite and Laguerre operators, with J.J. Betancor, A.J. Castro and L. Rodríguez-Mesa. *Complex Anal. Oper. Theory* 7 (2013) 4, 1019–1048
12. Harmonic analysis operators associated with multidimensional Bessel operators, with J.J. Betancor and A.J. Castro. *Proc. Roy. Soc. Edinburgh Sect. A* 142 (2012), 5, 945–974
13.  $\gamma$ -radonifying operators and UMD-valued Littlewood-Paley-Stein functions in the Hermite setting on BMO and Hardy spaces, with J.J. Betancor, A.J. Castro, J.C. Fariña and L. Rodríguez-Mesa. *J. Funct. Anal.* 263 (2012) 12, 3804-3856
14. Spectral multipliers for multidimensional Bessel operators, with J.J. Betancor and A.J. Castro. *J. Fourier Anal. Appl.* 17 (2011), 5, 932–975

STAYS AT  
RESEARCH  
CENTERS

- LGLTPE, Laboratoire de Géologie de Lyon** (7 weeks) *November - December 2017*  
 Visitor Scholar invited by Prof. Thierry Alboussière,  
 Laboratoire de Géologie de Lyon : Terre, Planètee, Environnement (CNRS, ENS, Université Lyon1),  
 Lyon, France
- ENS LYON, École normale supérieure de Lyon** (1 month) *September - October 2017*  
 Invited Professor  
 Laboratoire de Géologie de Lyon : Terre, Planètee, Environnement (CNRS, ENS, Université Lyon1),  
 Lyon, France
- UCLA, University of California, Los Angeles** (7 weeks) *June - July 2017*  
 Visitor Scholar invited by Prof. Carlos R. Mechoso,  
 Department of Atmospheric and Oceanic Sciences, California, USA.
- LGLTPE, Laboratoire de Géologie de Lyon** (1 month) *November - December 2016*  
 Visitor Scholar invited by Prof. Thierry Alboussière,  
 Laboratoire de Géologie de Lyon : Terre, Planètee, Environnement (CNRS, ENS, Université Lyon1),  
 Lyon, France
- UCLA, University of California, Los Angeles** (1 month) *October 2016*  
 Visitor Scholar invited by Prof. Carlos R. Mechoso,  
 Department of Atmospheric and Oceanic Sciences, California, USA.
- ASU, Arizona State University** (6 months) *March– May, 2011 and March – May, 2013*  
 Two short predoctoral stays. Under the supervision of Juan Lopez  
 School of Mathematical and Statistical Sciences, Arizona, USA

SEMINARS

- Geolunch** *(10/11/2017)*  
 Laboratoire de Géologie de Lyon : Terre, Planètee, Environnement (CNRS, ENS, Université Lyon1)  
 Seminar talk: Lagrangian descriptors: construction, performance and applications.
- NASA, JPL. 2016 Earth Science Seminar** *(27/10/2016)*  
 NASA - Jet Propulsion Laboratory JPL, California Institute of Technology, California, USA  
 JPL Contact: Kyo Lee  
 Seminar talk: “Lagrangian Descriptors: Construction and Application in the Antarctic Polar Vortex ”
- Geolunch** *(18/03/2016)*  
 Laboratoire de Géologie de Lyon : Terre, Planètee, Environnement (CNRS, ENS, Université Lyon1)  
 Seminar talk: “Compressible convection in geophysical fluids”.
- Geolunch** *(20/02/2015)*  
 Laboratoire de Géologie de Lyon : Terre, Planètee, Environnement (CNRS, ENS, Université Lyon1)  
 Seminar talk: The influence of symmetry and temperature dependent viscosity in convection.

**Applied mathematics seminar ICMAT-UAM 2014** (02/04/2014)  
Madrid, Spain.  
Seminar talk: "Instabilities in geophysical fluid dynamics: the influence of symmetry and temperature dependent viscosity in convection"

**Junior Seminar ICMAT-UAM 2012** (21/11/2012)  
Madrid, Spain.  
Seminar talk: "How to solve numerically a convection problem?"

INVITED  
PRESENTATION

Plenary talk

**IV Congress of young researchers. Spanish Royal Mathematical Society RSME 2017**  
*September 2017*  
Valencia, Spain  
Plenary talk: "Numerical studies of geophysical flows"

Conference talk

**ICOSAHOM 2018 The International Conference On Spectral and High Order Methods**  
*July 9th-13rd, 2018*  
London, United Kingdom  
Conference talk: Spectral numerical schemes for time-dependent convection with viscosity dependent on temperature.

**CCC 2017 Compressible Convection Conference** *September 18th-21st, 2017*  
Lyon, France  
Conference talk: Numerical solutions of compressible convection with different levels of approximation for infinite Prandtl numbers.

**2015 AGU Fall Meeting** *December 2015*  
San Francisco, USA.  
Conference talk: Plate-like convection in fluids with temperature-dependent viscosity

**III Congress of young researchers. Spanish Royal Mathematical Society 3CJI R.S.M.E 2015**  
*September 2015*  
Murcia, Spain  
Conference talk: Numerical models of compressible convection in geophysical and astrophysical flows

**The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications**  
Instituto de Ciencias Matemáticas, Madrid, Spain *July 2014*  
Conference talk: Plate-like convection induced by symmetries in fluids with temperature-dependent viscosity

CONTRIBUTIONS  
TO CONFERENCES

Conference talk

**Seventh Meeting of Young Researchers in Mathematics VII PEJIM 2017** *December 21st-22th, 2017*  
Universidad de La Laguna, Canary Island, Spain.  
Conference talk: "Following the Gulf Stream"

**21st Conference on Atmospheric and Oceanic Fluid Dynamics**  
**19th Conference on Middle Atmosphere** *June 26th-30th, 2017*  
Portland, Oregon USA  
Conference talk: "The Final Warming of the Southern Stratosphere from a Lagrangian Perspective"

**21st Conference on Atmospheric and Oceanic Fluid Dynamics**  
**19th Conference on Middle Atmosphere** *June 26th-30th, 2017*  
Portland, Oregon USA  
Conference talk: "Filamentation and Breakdown of the Southern Polar Vortex"

- Sixth Meeting of Young Researchers in Mathematics VI PEJIM 2016** *December 21st-22th, 2016*  
 Universidad de La Laguna, Canary Island, Spain.  
 Conference talk: “Lagrangian descriptors in the Antarctic polar vortex”
- Fifth Meeting of Young Researchers in Mathematics V PEJIM 2015** *December 21st-22th, 2015*  
 Universidad de La Laguna, Canary Island, Spain.  
 Conference talk: “Compressible Convection”
- The 68th Annual Meeting of the American Physical Society’s Division of Fluid Dynamics (DFC)** *November 22th-24th, 2015*  
 Boston, Massachusetts, USA.  
 Conference talk “Compressible convection in geophysical fluids: comparison of anelastic, anelastic liquid and full numerical simulations”
- Third Meeting of Young Researchers in Mathematics III PEJIM 2013** *October 17th – 18th, 2013*  
 Universidad de La Laguna, Canary Island.  
 Seminar talk: Numerical studies in aqueous mixtures of glycerin.
- SIAM Conference on Applications of Dynamical Systems** *May 19th – 23rd, 2013*  
 Snowbird Ski and Summer Resort, Snowbird, Utah USA  
 Conference talk: “Numerical Integration of a convection problems with temperature dependent viscosity: Simulations and Result”.
- Second Meeting of Young Researchers in Mathematics II PEJIM 2012** *September 2012*  
 Universidad de La Laguna, Canary Island, Spain.  
 Seminar talk: “Numerical Integration of convection problem with temperature dependent viscosity: simulations and results”
- First Meeting of Young Researchers in Mathematics I PEJIM 2011** *September 28th – 30th, 2011*  
 Universidad de La Laguna, Canary Island, Spain.  
 Seminar talk: “Numerical study of geophysical flows: effects of temperature dependent viscosity, rotation and symmetry”
- I Congress of young researchers.** *September 5th – 9th, 2011*  
 Spanish Royal Mathematical Society R.S.M.E, Soria, Spain  
 Conference talk: “Large Prandtl number confined rotating convection: centrifugal and temperature-dependent viscosity effects”
- Workshop of young researchers 2010** *September 22nd – 24th, 2010*  
 Universidad Complutense de Madrid, Madrid, Spain.  
 Conference talk: “A convection problem with temperature dependent viscosity and SO(2) symmetry”.
- I Spanish Young Researchers Meeting in Mathematics I ENJIM 2010** *September 1st–3rd, 2010*  
 Sevilla, Spain  
 Conference talk: “Numerical studies on a convection problem with temperature dependent viscosity”.
- Poster
- 2015 AGU Fall Meeting** *December 14th-18th, 2015*  
 San Francisco, California, USA  
 Poster: “Compressible convection with different levels of approximation”
- ICMAT-China Exploratory Workshop** *November 17th – 21st, 2014*  
 ICMAT, Madrid, Spain.  
 Poster presentation: Lagrangian descriptors: construction, performance and applications.  
 Poster presentation: The influence of symmetry and temperature dependent viscosity in the instabilities developed in fluid convection.
- International Congress of Mathematicians SEOUL ICM 2014** *August 13rd - 21st, 2014*  
 Coex, Seoul, Korea  
 Poster presentation: “The influence of symmetry and temperature dependent viscosity in the instabilities developed in fluid convection”

**Mathematics and Geosciences: Global and Local Perspectives**

GEOMATH

November 4th – 8th, 2013

Instituto de Ciencias Matemáticas, Madrid, Spain

Poster presentation: “Lagrangian descriptors: construction, performance and applications”

**Fourth International Symposium. Bifurcations and instabilities in fluid Dynamics**

BIFD

July 18th – 21st, 2011

Barcelona, Spain.

Poster presentation: “Time-dependent solutions of a fluid which viscosity depends on temperature”

**SIAM Conference on Applications of Dynamical Systems SIAM DS11**

May 22nd – 26th, 2011

Snowbird Ski and Summer Resort, Snowbird, Utah USA

Poster presentation: “Time-dependent Solutions of a Convection Problem with Temperature Dependent Viscosity”.

**XII Encuentros de Análisis Real y Complejo. EARCO 2010**

April 22nd – 24th, 2010

Universidad de La Rioja, Haro, Spain

Poster presentation: “Harmonic Analysis Operators Associated with Multidimensional Bessel Operators”.

PARTICIPATION  
IN RESEARCH  
PROJECTS  
FUNDED IN  
COMPETITIVE  
CALLS

SEV-2015-0087 MINECO: ICMAT Severo Ochoa project

MTM2014-56392-R Dinamica de fluidos geofisicos: una perspectiva Computacional y aplicada.

ANR-10-LABX-0066 LABEX Lyon Institute of Origins

MTM2011-26696. Analysis in Fluid Mechanics, ICMAT, 2011-2014

SEV-2011-0087 MINECO: ICMAT Severo Ochoa project

MEMBERSHIPS  
OF SCIENTIFIC  
SOCIETIES

2015 Member of Joint Programmes de EERA

2015 Member of the AGU (American Geophysical Union)

2015 Member of the APS (American Physical Society)

2014 Member of the AMS (American Mathematical Society)

SYNERGISTIC  
ACTIVITIES AND  
PUBLIC  
ENGAGEMENT**MatEsElla-MathIsShe (RSME - EJE&CON)**

2018

Mentor

**Matemática contemporánea por matemáticas contemporáneas**

2018

[Participation](#)**Las matemáticas invitan a pensar en los enigmas del interior de la Tierra**

(30/10/2015)

[Interview SINC](#)**El boom de las Matemáticas** (Collaboration in national newspaper ABC)

(15/11/2015)

[ABC](#)**Mathematics for animation in films and the fight against crime.** (Author)

(2014)

Profile of Standley Osher, Gauss 2014 Prize winner.

ICMAT Newsletter - Seventh Number ([English version](#)).BBVA OPEN MIND ([Spanish version](#))**Mujeres Matemáticas en primera línea.** (Author)

(15/08/2014)

Press release on the national newspaper "[El Mundo](#)" about the International Congress of Mathematicians, ICM 2014 Seoul.**Meeting with Young Mathematicians** (Participation in the activity)

AULA 2013

21st edition Exhibition of International Student and Educational offer

Madrid, Spain.

**Graffiti and math 2013: Fluid Mathematics** (Participation as collaborator)

2013

Madrid, Spain.

## SKILLS

**Operating systems:** Windows and Linux.**Programming languages:** Fortran, Python, Scratch, OpenMP, MPI, Pascal.**Office softwares:** LaTeX, Open Office, Microsoft Office.**Scientific softwares** Matlab, Maple, Mathematica, OpenFoam, R.**Languages:** Spanish (mother tongue), English and French.