

# Curriculum vitae

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## Personal information

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## Current position

01/10/2021 - present	<b>Post-doctoral researcher</b> Department of Mathematics "Tullio Levi Civita", Università degli Studi di Padova, Italy Development of numerical approaches for particle methods in the Lagrangian framework.
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## Previous positions

01/09/2016 - 22/09/2021	<b>Pre-doctoral researcher</b> CIMNE, Universitat Politècnica de Catalunya, Barcelona, Spain <i>Development of mathematical and numerical methods to simulate viscoelastic fluid flows with high elasticity in a finite element framework, including thermal effects. These models are implemented in a high performance computing environment in Fortran objected-oriented language.</i>
01/12/2015 - 31/08/2016	<b>Solutions Assistant (SA-N1)</b> EVERIS, Barcelona, Spain <i>Technical support for a high technological databases system.</i>
01/09/2014 - 28/02/2015	<b>Research Assistant</b> Department of Applied Mathematics, Unidersidade de Santiago de Compostela, Santiago de Compostela, Spain <i>Study and numerical simulation of electromagnetic processes with hysteresis.</i>

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## Education

23/09/2021 - 22/09/2021	<b>Doctor of Philosophy (Ph.D.) in Structural Analysis</b> Department of Civil Engineering, Universitat Politècnica de Catalunya, Barcelona, Spain Title: <i>Numerical modelling of viscoelastic flows based on a log-conformation formulation.</i> Supervisors: Ramon Codina i Rovira and Joan Baiges Aznar. Qualification: Excellent <i>cum laude</i> .
01/09/2013 - 25/07/2015	<b>M.Sc. Industrial Mathematics</b> Department of Applied Mathematics, Universidade de Santiago de Compostela, Spain <i>Numerical methods in the finite element framework to compute different physical problems related to industry processes.</i>
01/09/2008 - 05/07/2013	<b>B.Sc. Mathematics</b> Universidad de Alicante, Spain

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## Fellowships and awards

2021 - 2022	Post-doc fellowship awarded in UNIPD.
2017 - 2021	PhD thesis mark with honors (Excellent Cum Laude)
2017 - 2021	4-years Spanish government PhD scholarship. FPI: DPI2015-67857-R.

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## Participation in research projects

### a) National and International projects:

1. **SID2020-NEMESIS**. NumErical MEthods for the SIMulation of the impact of extreme hazards on Structures and landscape Founded by: University of Padova PI: Antonia Larese. From 18/11/2020 to 31/12/2022. (39.376,70 €)
2. **ELASTIC-FLOW**. Aumento de la eficiencia en procesos de mezcla y transmisión de calor utilizando fluidos viscoelásticos en régimen laminar y turbulento. Funded by Spanish Ministry. PI: Ramon Codina and Joan Baiges. Reference: DPI2015-67857-R. From 01/01/2016 to 31/12/2018. (125.840,00 €)
3. **FORJACEMIC**. Investigación de nuevos procesos y aleaciones de aceros microaleados para la forja en caliente de cigüeñales de automoción. Funded by CIE-GALFOR (Innterconecta). PI: Alfred Bermúdez. From 22/10/2013 to 31/12/2014.

### b) Private consulting:

1. **ENIPROGETTI**. Development of a mathematical and numerical model for the sensitivity analysis of the model of the physical channel to the material parameters and to the geometry of the perforation well. Founded by ENI s.p.a. Ref. 2500042110 PI: Mario Putti From 03/05/2022 to 20/10/2022 (50.000 €)
2. Numerical analysis to estimate the optical quality degradation generated by the future European Solar Telescope (EST) over WHT (William Hershell Telescope) at Observatorio del Roque de Los Muchachos (ORM). PI: Ramon Codina and Joan Baiges. From 01/03/2020 to 31/08/2020.
3. Proyecto de consultoría con el metro de Montreal, EWE+ para el diseño de pantallas ignífugas en el metro de Montreal. Numerical analysis to determine the aerodynamic loads on the tunnel Mont-Royal wall separation. PI: Ramon Codina and Joan Baiges. From 01/03/2020 to 31/08/2020.

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## Memberships of scientific societies

Since 2019 Member of the Spanish Association for Numerical Methods in Engineering (SEMNI).

Since 2011 Member of National Association of Mathematic's Students (ANEM).

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## Courses and workshops

1. *Workshop "Numerical Analysis of protected systems"*, in Geobruigg installations, Romanshorn, Switzerland and organized by Geobruigg company. 20/06/2022 - 22/06/2022
2. *Fortran Modernisation Workshop Programme* in Universitat Politècnica de Catalunya BarcelonaTech (Spain) and organized by NAG. 24/07/2017 - 26/07/2017
3. *X Foro de Interacción Matemática Industria* in Universidade de Santiago de Compostela, Spain. 21/11/2014

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## Publications

### a) Submitted articles:

1. **Moreno L.**, Castañar I., Codina R., Baiges J. & Cattoni D. Numerical simulation of Fluid-Structure Interaction problems with viscoelastic fluids using a log-conformation reformulation. *Computer Methods in Applied Mechanics and Engineering*. (Q1 – Impact Factor: 6.588). (July 2022).
2. Codina R., Baiges J., Castañar I., Martínez-Suárez I., **Moreno L.** & Parada S. An embedded strategy for large scale incompressible flow simulations in moving domains. *Journal of Computational Physics*. (Q1 – Impact Factor: 4.645). (July 2022).

### b) Published articles:

1. **Moreno L.**, Codina R. & Baiges J. (2021) Numerical simulation of non-isothermal viscoelastic fluid flows using a VMS stabilized Finite Element formulation. *Journal of Non-Newtonian Fluids Mechanics*, 104640. Impact factor 2.538 (JCR) Q1. GS Citations: 0.
2. Castillo E., **Moreno L.**, Codina R. & Baiges J. (2021) Stabilised Variational Multi-Scale Finite Element Formulations for Viscoelastic Fluids. *Archives of Computational Methods in Engineering*, 1-33. Impact factor 7.351 (JCR) Q1. GS Citations: 6.
3. Codina R. & **Moreno L.** (2021) Analysis of a stabilized finite element approximation for a linearized logarithm reformulation of the viscoelastic flow problem. *ESAIM. Mathematical Modelling and Numerical Analysis*, 55, 279-300. Impact factor 1.992 (JCR) Q1. GS Citations: 3.
4. **Moreno L.**, Codina R. & Baiges J. (2020). Solution of transient viscoelastic flow problems approximated by a term-by-term VMS stabilized finite element formulation using time-dependent subgrid-scales. *Computer Methods in Applied Mechanics and Engineering*, 367, 113074. Impact factor 5.763 (JCR) Q1. GS Citations: 8.
5. **Moreno L.**, Codina R., Baiges J. & Castillo E. (2019). Logarithmic conformation reformulation in viscoelastic flow problems approximated by a VMS-type stabilized finite element formulation. *Computer Methods in Applied Mechanics and Engineering*, 354, 706-731. Impact factor 5.763 (JCR) Q1. GS Citations: 14.

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## Conferences

- SEP 2022     **L. Moreno**, Alessandro Contri, A. Larese. *A VMS-Stabilized Mixed Formulation for Non-Linear Incompressible Solid Mechanics Problems Using the Implicit Material Point Method*. Congress on Numerical Methods in Engineering (CMN Congress 2022), Las Palmas de Gran Canaria, Spain, September 12th – 15 th 2022
- JUN 2022     **L. Moreno**, Alessandro Contri, A. Larese. *Stabilized mixed formulation for an implicit MPM for viscoplastic fluids by using a variational subgrid-scale framework*. 8th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS Congress 2022), Oslo, Norway, June 5th - 9th 2022.
- NOV 2021     **L. Moreno**, J. Baiges, R. Codina. *Computation of transient flow problems approximated by a VMS stabilized Finite Element formulation using time-dependent subgrid-scales for monolithic and fractional step schemes*. XLII Ibero-Latin-American Congress on Computational Methods in Engineering (CILAMCE-2021) — 3rd Pan American Congress on Computational Mechanics Computational Mechanics. Virtual Congress, Río de Janeiro, Brazil, November 9th-12th 2021.
- AUG 2021     **L. Moreno**, J. Baiges, R. Codina. *Simulation of transient viscoelastic flow problems approximated by a VMS stabilized FE formulation using time-dependent subrid-scales*. Poster presentation and short oral talk in 25th International Congress of Theoretical and Applied Mechanics (ICTAM 2020+1). Virtual Congress, Milano, Italy, August 22-27 2021.
- JAN 2021     **L. Moreno**, J. Baiges, R. Codina. *Solution of transient viscoelastic flow problems approximated by a VMS stabilized finite element formulation using time-dependent subrid-scales*. Oral conference speaker in 14th World Congress on Computational Mechanics (WCCM 2020). Virtual Congress, Paris, France, 11-15 January 2021.T
- DEC 2019     Oral presentation in a CIMNE Coffee Talk, Barcelona, Spain. Title: *Simulating viscoelastic fluid flows with high Weissenberg number*.
- JUN 2019     **L. Moreno**, J. Baiges, R. Codina. *Simulation of non-isothermal viscoelastic fluid flow problem using a VMS stabilized Formulation*. Oral conference speaker in the VIII International Conference on Coupled Problems in Science and Engineering (COUPLED PROBLEMS 2019), Sitges, Spain.
- FEB 2018     Oral presentation in Lecture Series: Women researchers at CIMNE for the International Day of Women and Girls in Science, Barcelona, Spain. Title: *Heat transfer processes using viscoelastic fluids in laminar and turbulence regimes*.
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## Language skills

**Spanish:** Native, **Catalan:** Fluent, **English:** Fluent, **Italian:** Beginner

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## Software Competences

**Languages:** Fortran, C++, Python. **Mathematical:** Maple, Matlab. **Parallel computing:** Open MP, MPI. **Simulation:** ANSYS Fluent, COMSOL Multiphysics.

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## Leadership

**Master thesis co-supervisor (1):** An Updated Lagrangian displacement-based formulation for free surface incompressible fluids using MPM (2021), Alessandro Contri.

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## International collaborations

- Prof. Ramon Codina and Dr. Joan Baiges, CIMNE-UPC, Spain.
- Prof. Roland Wuechner, Technical University of Braunschweig, Germany.
- Prof K.W. Bletzinger, Chair for Structural Analysis, Technical University of Munich, Germany.