



Jesús Bonilla

PhD Candidate

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About me

Jesús Bonilla holds a degree in mechanical engineering and a MSc in numerical methods in engineering both by the Technical University of Catalonia, UPC. Since September 2014, he is a predoctoral researcher at the Large Scale Scientific Computing team at CIMNE.

The objective of his PhD is to develop efficient finite element solvers for fluid models of plasma. He is focused in the development of monotonicity-preserving schemes for hyperbolic problems. He aims to apply these schemes to one and two-fluid magnetohydrodynamic equations. Which model problems of interest in fusion reactors design. All his research is done by developing the LSSC in-house code, FEMPAR, a massively parallel finite element Fortran library.

Languages

Catalan	Native
Spanish	Native
English	Full professional comp.

IT Skills

Fortran OO	MatLAB
Python	L ^A T _E X
Linux & Windows	MS Office

Education

- 2015–present **PhD in Computational Mechanics**, *Universitat Politècnica de Catalunya*
- 2013–15 **MSc in Numerical methods in Engineering**, *Universitat Politècnica de Catalunya*
- 2009–13 **Bachelor in Mechanical Engineering**, *Universitat Politècnica de Catalunya*

Thesis

- PhD thesis** Ongoing
 - title Monotonicity preserving stabilization techniques for hyperbolic problems with application to nuclear fusion reactors design (*provisional*).
 - advisor Santiago Badia Rodríguez
- Master thesis** 2015
 - title Implementation of Finite Element Solvers for the Compressible Navier-Stokes Equations.
 - advisor Santiago Badia Rodríguez
- Bachelor thesis** 2013
 - title Simulation of a water drop impact over a flat surface using finite differences.
 - advisors M. Dolors Riera Colom and Gonzalo Varela Castro

Honors, awards & grants

- 2015 "la Caixa" Foundation PhD scholarship (Rate of success 4%).

Experience

- 2015–present **Predocctoral Researcher**, *Universitat Politècnica de Catalunya*, Castelldefels.
- 2014–present **Predocctoral Researcher**, *Centre Internacional de Mètodes Numèrics a l'Enginyeria (CIMNE)*, Castelldefels.
- 2012–2014 **Researcher (Intern)**, *Fundació CTM Centre Tecnològic, Simulation and Innovative Design department*, Manresa.
- 2010–2012 **Intern**, *Universitat Politècnica de Catalunya, Applied Math department*, Manresa.

Vocational

- 2016–2018 **Organizer**, *JIPi Conference*, Barcelona. *Jornades d'Investigadors Predocctorals Interdisciplinaries (JIPi)* is the meeting point for all predoctoral researchers in Catalonia of all academic fields. Jesús tasks include web maintenance and fundraising, as well as general coordination in the latter years.

Publications

International peer reviewed journals

- [1] S. BADIA AND J. BONILLA, *Monotonicity-preserving finite element schemes based on differentiable nonlinear stabilization*, Computer Methods in Applied Mechanics and Engineering **313** (2017) 133–158.
- [2] S. BADIA, J. BONILLA AND A. HIERRO, *Differentiable monotonicity-preserving schemes for discontinuous Galerkin methods on arbitrary meshes*, Computer Methods in Applied Mechanics and Engineering **320** (2017) 582–605.

Conference proceedings

- [1] J. BONILLA AND S. BADIA, *High-order monotonicity preserving finite element methods for scalar convection-diffusion problems*, European Conference on Numerical Mathematics and Advanced Applications (2017).
- [2] S. BADIA AND J. BONILLA, *Finite element methods preserving maximum principles*, Finite Elements in Fluids Conference (2017).
- [3] S. BADIA AND J. BONILLA, *Monotonicity preserving finite element methods for scalar convection-diffusion problems*, European Workshop on High Order Nonlinear Numerical Methods for Evolutionary PDEs (2017).
- [4] S. BADIA AND J. BONILLA, *Monotonicity preserving nonlinear stabilization for hyperbolic scalar problems*, Conference on the Mathematics of Finite Elements and Applications (2016).

Indicators

(Google Scholar) Citations: 14, h-index: 2, i-10: 1.
 (Scopus) Citations: 7, h-index: 1.

Supervised works

Simulació de l'atomitació de metalls fosos.

Degree: Master in Modelling for Science and Engineering (Universitat Autònoma de Barcelona).

Student: Gerard Corominas Auguets.

Advisor at the university: Tomàs Margalef.

Advisor at the research institution: Jesús Bonilla.

Mark: 9.5 (out of 10).

Defense: 07-2014.