

# CURRICULUM VITAE – Francisco Marques

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**Education:** Universitat de Barcelona, Spain    Physics    B.Sc. (Distinction)    1975  
Universidad de Barcelona, Spain    Theoretical Physics    Ph.D.    1980

**Professional Experience:** 2005–2011    Chair of the Department of Applied Physics,  
Universitat Politècnica de Catalunya (UPC), Spain.  
2003–present    Professor, Department of Applied Physics, UPC, Spain.  
since 1998    Visiting Professor, Arizona State University, Tempe, USA,  
Department of Mathematics.  
1985–2002    Associate Professor, Department of Applied Physics, UPC, Spain.

**GUEST EDITOR:** Special issues of *Theoretical and Computational Fluid Dynamics*, and *Fluid Dynamics Research*

**REFEREE FOR:** Physical Review, Journal of Fluid Mechanics, Physics of Fluids, Physica D, Theoretical and Computational Fluid Dynamics, Int. Journal of Numerical Methods in Fluids, Acta Mechanica, Applied Scientific Research, DGICYT, DGU, AQU (Spanish Government) and European Proposals.

**ORGANIZER:** XIII Taylor-Couette meeting, UPC Barcelona, Spain, July 3–5, 2003.  
Nonlinear2008 meeting, UPC, Barcelona, Spain, June 16–19, 2008.  
BIFD2011 meeting, Barcelona, Spain, July 18–21, 2011.

## Recent Research Grants

- MCI (FIS2009-08821), *Coherent structures and turbulence in simple domains*, 2009-2013 (PI).
- MEC-DGI (FIS2007-61585), *Centrifugal effects in thermal and shear instabilities*, 2007/09 (PI).
- AGAUR, SGR-00024, *Fluid dynamics: pattern formation and geophysical applications*, 2006/08 (PI).
- NSF (USA) DMS-05052705, *Stochastic parametric forcing in hydrodynamics*, 2005/08 (researcher).
- Accion Integrada MEC/DAAD, HA2005-0087, *Spatio-temporal complexity and pattern formation in hydrodynamics*, 2006/07 (PI).
- MEC-DGI, FIS2004-01336, *Hydrodynamics under Stochastic Boundary Forcing*, 2005/2007 (PI).

## Selected Refereed Journal Papers

- Marques, F., Meseguer, A., Lopez, J. M. et. al. *Bifurcations with imperfect  $SO(2)$  symmetry and pinning of rotating waves*, Proceedings of the Royal Society A, in press (2013).
- Panades, C., Marques, F. & Lopez, J. M. *Transitions to three-dimensional flows in a cylinder driven by oscillations of the sidewall*, Journal of Fluid Mechanics, **681**, 193-204, 2011.
- Do, Y., Lopez, J. M. & Marques, F. *Optimal harmonic response in a confined crossflow boundary layer flow*, Physical Review E, **82**, 036301-1/8, 2010.

- Lopez, J. M. & Marques, F. *Centrifugal effects in rotating convection: nonlinear dynamics*, Journal of Fluid Mechanics, **628**, 269-297, 2009.
- Marques, F. & Lopez, J. M., *Influence of wall modes on the onset of bulk convection in a rotating cylinder*, Physics of Fluids, **20**, 024109, 2008.
- Marques, F., Mercader, I., Batiste, O. & Lopez, J. M., *Centrifugal effects in rotating convection: Axisymmetric states and three-dimensional instabilities.*, Journal of Fluid Mechanics, **580**, 303–318, 2007.
- Marques, F. & Lopez, J.M., *Onset of three-dimensional unsteady states in small aspect-ratio Taylor-Couette flow.*, Journal of Fluid Mechanics, **561**, 255-277, 2006.
- Marques F., Lopez, J.M., Blackburn, H.M., *Bifurcations in systems with  $Z_2$  spatio-temporal and  $O(2)$  spatial symmetry.*, Physica D, **189**, 247-276, 2004.
- Marques, F., Gelfgat, A.Y., Lopez, J.M., *A tangent double Hopf bifurcation in a differentially rotating cylinder flow.*, Physical Review E, **68**, 016310-1/13, 2003.
- Marques, F., Lopez, J.M., Shen, J., *Mode interactions in an enclosed swirling flow: A double Hopf between azimuthal wavenumbers 0 and 2.*, J. of Fluid Mechanics, **455**, 263-281, 2002.
- Marques, F., Lopez, J.M., *Precessing vortex breakdown mode in an enclosed cylinder flow*, Physics of Fluids, **13**, 1679–1682, 2001.
- Marques F., Lopez, J.M., *Spatial and temporal resonances in a periodically forced extended system.*, Physica D, **136** 340–352, Febrero 2000.
- Marques F., Sanchez J., Weidman P.D., *Generalized Couette-Poiseuille flow with boundary mass transfer.*, Journal of Fluid Mechanics, **374**, 221–249, 1998.
- Marques F., Lopez J.M., *Taylor-Couette flow with axial oscillations of the inner cylinder: Floquet analysis of the basic flow.*, Journal of Fluid Mechanics. **348**, 153–175, 1997.
- Meseguer A., Marques F., Sanchez J., *Feigenbaum’s Universality in a Low-Dimensional Fluid Model.*, International Journal of Bifurcations and Chaos. **6**, 1587-1594, 1996.
- Marques F., *On Boundary Conditions for Velocity Potentials in confined Flows. Application to Couette Flow.*, The Physics of Fluids A, **2**, 729-737, 1990.

#### PhD Thesis supervision

- Vicente Iranzo Fernández, *Hamiltonian systems and quantization in Predictive Relativistic Mechanics*, May 1983, Physics, Barcelona University.
- Juan Sánchez Umbría, *Numerical simulation in confined flows: preturbulent structures*, September 1994, Mathematics, Barcelona University.
- Daniel Crespo Arteaga, *Characterization of the flow between concentric cylinders using Digital Image Processing*, Decembre 1994, Applied Physics, Polytechnical University of Catalonia.
- Alvaro Meseguer Serrano, *Bifurcations in Fluid Systems: Petrov-Galerkin Schemes*, June 1998, Applied Physics, Polytechnical University of Catalonia.
- Marc Avila Canyellas, *Nonlinear dynamics of mode competition in annular flows*, June 2008, Applied Physics, Polytechnical University of Catalonia.
- Fernando Mellibovsky Epstein, *Subcritical transition in shear flows*, June 2008, Applied Physics, Polytechnical University of Catalonia.