

Address: Institut  
Jean Le Rond  
D'Alembert, UPMC,  
Tour 55-65 Paris  
(France)

Postal code: 75005

☎ +33 1 44275527

✉ [fuster@dalembert.upmc.fr](mailto:fuster@dalembert.upmc.fr)

Webpage:

<http://danielfuster.com>

Date of birth:

22/02/1980

# Daniel Fuster

## Curriculum Vitae

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### Present position

Title CNRS Researcher: Chercheur de Recherche 1er classe  
Institut Jean Le Rond D'Alembert  
Universite Pierre et Marie Curie  
75252 Paris Cedex 05. France

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### Research Experience

- 2015–present **CNRS Researcher**, *Institut Jean Le Rond D'Alembert*, Chargé de recherche. 1er classe, Université Pierre et Marie Curie (France).
- 2010–2014 **CNRS Researcher**, *Institut Jean Le Rond D'Alembert*, Chargé de recherche. 2 classe, Université Pierre et Marie Curie (France).
- 2009–2010 **Postdoctoral Fellowship**, *California Institute of Technology*, Awarded by the Ministerio de Educacion y Ciencia (MEC), Pasadena (USA).  
Advisor: Tim Colonius
- 2007–2009 **Postdoctoral contract**, *Institut Jean Le Rond D'Alembert*, CNRS, University Pierre et Marie Curie, Paris (France).  
Advisor: Stephane Zaleski
- 2004–2007 **PhD. student in Fluid Mechanics**, *Area de Mecánica de Fluidos–LITEC, Centro Politécnico Superior*, University of Zaragoza, (Spain).  
Advisors: Cesar Dopazo and Guillermo Hauke

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### Papers published in international journals

- 31. "A two-phase mixing layer between parallel gas and liquid streams: multiphase turbulence statistics and influence of interfacial instability". S. Ling, **D. Fuster**, G. Tryggvason, S. Zaleski. *Journal of Fluid Mechanics*, (2018).
- 30. "An all-Mach method for the simulation of bubble dynamics problems in the presence of surface tension". **D. Fuster**, S. Popinet. *Journal of Computational Physics*, 374, 752–768 (2018).
- 29. "Shock Propagation Effects in Multilayer Assembly Including a Liquid Phase". J. Bourguille, L. Bergamasco, G. Tahan, **D. Fuster**, M. Arrigoni. *Key Engineering Materials*, 755, 181-189 (2017).

- 28. "Oscillation regimes of gas/vapor bubbles.". L. Bergamasco, **D. Fuster**. International Journal of Heat and Mass Transfer, 112, 72-80 (2017).
- 27. "Investigation of the collapse of bubbles after the impact of a piston on a liquid free surface.". M.M. Daou, E. Igualada, H. Dutilleul, J.M. Citerne, J.R. Rodriguez, S. Zaleski, **D. Fuster**. AIChE Journal, 63(6), 2483-2495 (2017).
- 26. "Spray formation in a quasiplanar gas-liquid mixing layer at moderate density ratios: A numerical closeup.". Y. Ling, **D. Fuster**, S. Zaleski, G. Tryggvason. Physical Review Fluids, 2, 014005 (2017).
- 25. "Nonlinear acoustic propagation in bubbly liquids: multiple scattering, softening and hardening phenomena.". J.B. Doc, J.M. Conoir, R. Marchiano, **D. Fuster**. Journal of the Acoustical Society of America, 139(4), 1703-1712 (2016).
- 24. "Multi-scale simulation of rainwater morphology evolution on a cylinder subjected to wind.". C. Peng, L. Hui, **D. Fuster**, C. Wenli, S. Zaleski. Computers and Fluids, vol. 123, 112-121 (2015).
- 23. "Mass transfer effects on linear wave propagation in diluted bubbly liquids.". **D. Fuster**, F. Montel. Journal of Fluid Mechanics, 779, 598-621 (2015).
- 22. "Variational Multiscale a Posteriori Error Estimation for Systems: The Euler and Navier-Stokes Equations.". G. Hauke, **D. Fuster**, F. Lizarraga. Computers Methods in Applied Mechanics and Engineering, 283, 1493 (2015).
- 21. "Effect of direct bubble-bubble interactions on linear wave propagation in bubbly liquids.". **D. Fuster**, J.M. Conoir, T. Colonius. Physical Review E, 90, 063010. (2014).
- 20. "Physics of beer tapping.". J. Rodriguez, A. Casado, **D. Fuster**. Physical Review Letters, 113, 214501 (2014).
- 19. "Direct numerical simulations of capillary wave turbulence.". L. Deike, **D. Fuster**, M. Berhanu, E. Falcon. Physical Review Letters, 112, 234501 (2014).
- 18. "Multi-scale flow simulation of automotive catalytic converters". C. Ozhan, **D. Fuster\***, P. Da Costa. Chemical Engineering Science, 116, 161-171 (2014). (\* corresponding author).
- 17. "Stability of bubbly liquids and its connection to the process of cavitation inception.". **D. Fuster**, K. Pham, S. Zaleski. Physics of Fluids, 26, 042002, (2014).
- 16. "Instability regimes in the primary breakup region of planar coflowing sheets.". **D. Fuster**, JP Matas, S Marty, S Popinet, J Hoepffner, A Cartellier, S Zaleski. Journal of Fluid Mechanics 736, 150-176 (2013)
- 15. "An energy preserving formulation for the simulation of multiphase turbulent flows.". **D. Fuster**. Journal of Computational Physics. Vol. 235. pp. 114-128. (2013)
- 14. "Modeling bubble clusters in compressible liquids.". **D. Fuster**, and T. Colonius. Journal of Fluid Mechanics. Vol. 688 . pp. 352-389. ISSN 0022-1120 (2011)
- 13. "Parallel simulation of multiphase flows using octree adaptivity and the volume-of-fluid method.". G. Agbaglah, S. Delaux, **D. Fuster** J. Hoepffner, C. Josserand, S. Popinet, P. Ray, R. Scardovelli and S. Zaleski. C. R. Acad. Sci. Paris, 339, Pages 194-207, doi: 10.1016/j.crme.2010.12.006. (2011)
- 12. "Liquid compressibility effects during the collapse of a single cavitating bubble". **D. Fuster**, C. Dopazo, and G. Hauke. Journal of the Acoustical Society of America 129, 122 (2011)
- 11. "Multiscale simulations of primary atomization using Gerris". G. Tomar ,**D. Fuster**, S. Zaleski, and S. Popinet. Computers and Fluids. 39 (10), 1864-1874 (2010)
- 10. "Instability growth rate of two-phase mixing layers from a linear eigenvalue problem and an initial value problem". A. Bagué , **D. Fuster**, S. Popinet , R. Scardovelli and S. Zaleski. Physics of Fluids. 22, 092104 (2010)

- 9. "Influence of the accommodation coefficient on nonlinear bubble oscillations". Journal of the Acoustical Society of America. **D. Fuster**, G. Hauke and C. Dopazo. Vol. 5. pp 1–10, (2010).
- 8. "Numerical Simulation Of Droplets, Bubbles And Waves: State Of The Art". **D. Fuster**, G. Agbaglah, C. Josserand, S. Popinet and S. Zaleski. Fluid Dynamics Research. Vol. 41, pp 065001-065045, (2009)
- 7. "Variational Multiscale a-Posteriori Error Estimation for Quantities of Interest". G. Hauke, **D. Fuster**. Journal of Applied Mechanics. Invited edition. Vol 76, pp 021201-021207, (2009).
- 6. "Simulation of primary atomization with an octree adaptive mesh refinement and VOF method". **D. Fuster**, A. Bague, T. Boeck, L. Le Moyne, A. Leboissetier, S. Popinet, P. Ray, R. Scardovelli, S. Zaleski. International Journal of Multiphase Flow. Vol 35, pp 550-565, (2009)
- 5. "Parametric analysis for a single collapsing bubble". **D. Fuster**, G. Hauke, C. Dopazo. Journal of Flow, Turbulence and Combustion Vol. 82, pp 25-46, (2008)
- 4. "Variational Multiscale a-Posteriori Error Estimation for Multi-dimensional Transport Problems". G. Hauke, **D. Fuster**, M.H. Doweidar. Computer Methods in Applied Mechanics and Engineering. Volume 197, Issues 33-40, pp 2701-2718. (2008)
- 3. "Dynamics of a single cavitating and reacting bubble". G. Hauke, **D. Fuster**, C. Dopazo. Phys. Rev. E 75, 066310 (2007).
- 2. "Application of Variational a-Posteriori Multiscale Error Estimator to High Order Elements". G. Hauke, M.H. Doweidar, **D. Fuster**, A. Gomez, J. Sayas. Computational Mechanics. Vol. 38(4-5), pp. 382-389, (2006).
- 1. "Thermodynamics of Void Fraction in Saturated Flow Boiling". F.J. Collado, C. Monne, A. Pascau, **D. Fuster**, A. Medrano. Journal of Heat Transfer. Volume 128, Issue 6, pp. 611-615, (2006).

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## Patents

- 1. "Dispositif et procede de traitement de liquide par cavitation". **D. Fuster**, H. Dutilleul, P. Da Costa, P. Guibert, S. Zaleski. FR 1558892. 21/09/2015. France.

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## Peer reviewed conference proceedings

- 7. "The non-linear response of bubble clouds to pressure excitations". **D. Fuster**, L. Bergamasco. 9th International Symposium on Cavitation, Dec. 6-10, 2015, EPFL, Lausanne, Switzerland.
- 6. "A skew symmetric formulation for the simulation of multiphase turbulent flows". **D. Fuster**. ICTAM. Beijing. August 2012.
- 5. "Stability of bubble clusters in a slightly compressible liquid". **D. Fuster**, K. Pham, S. Zaleski. Proceedings of the 8th International Symposium on Cavitation. Singapore. August 2012.
- 4. "Investigation of a new model for bubbly cavitating flow". T. Colonius, **D. Fuster**. Proceedings of the 8th International Symposium on Cavitation. Singapore. August 2012.
- 3. "Parallel simulation of multiphase flows using the volume-of-fluid method". **D. Fuster**, J. Hoepffner, S. Popinet, S. Zaleski. Joint Fluid Engineering Conference. Hamamatsu (Japan). July 2011.

- 2. "The importance of liquid evaporation on rectified diffusion processes.". **D. Fuster**, and S. Zaleski. 7th International Conference on Multiphase Flow, ICMF 2010, Tampa, FL, May 30 - June 4. PDF.
- 1. "Coupled heat transfer phenomena in cavitating bubble dynamics". G. Hauke, **D. Fuster**, C. Dopazo. Summer Heat Transfer Conference 2005. Westin St. Francis, San Francisco, USA.

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## Chapters in books

- 1. "A Posteriori Error Estimation for Computational Fluid Dynamics. The Variational Multiscale Approach". G. Hauke, M.H. Doweidar, **D. Fuster** Multiscale Methods in Computational Mechanics (Eds.: E. Ramm, R. Borst), Series: Lecture Notes in Applied and Computational Mechanics, Springer, Vol 55 pp. 1–20, 2010. ISSN 1613-7736. ISBN 978-90-481-9808-5

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## Scholarships

- 2009 **Postdoctoral grant. MEC-Fulbright Program, California Institute of Technology.**  
Funded by the Spanish Ministry of Education and Science
- 2007 **FPU PhD Research Grant, University of Zaragoza.**  
Funded by the Spanish Ministry of Education and Science
- 2004 **Socrates-Erasmus grant, Technical University of Denmark, DTU, Copenhagen, Master degree.**
- 2003 **Collaboration grant awarded by the Spanish Ministry of Education and Science, University of Zaragoza.**  
Collaboration with the Fluid Mechanics department as research assistant

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## Diffusion in mass media

- 2014: Physics of beer tapping. *Science Magazine* (<http://www.sciencemag.org/news/2014/11/tapping-science-beer-volcano>)
- 2013: Physics of beer tapping. Le Figaro, Daily Mail, Le Monde, NPR, El Mundo...

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## Languages

Spanish	<b>Mother language</b>
English	<b>High written and spoken level</b>
French	<b>High written and spoken level</b>