



Curriculum Vitae - Prof. Yuri Dumaresq Sobral

1 Personal Information

Full Name: *Yuri DUMARESQ SOBRAL*

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Gender: male

Date and Place of Birth: 30/05/1978, Brasília-DF, Brazil

Nationality: Brazilian

2 Professional Positions

2018 **Professor Associado I.**

2016 - 2018 **Professor Adjunto IV.**

2014 - 2016 **Professor Adjunto III.**

2012 - 2014 **Professor Adjunto II.**

2009 - 2012 **Professor Adjunto I.**

Departamento de Matemática, Universidade de Brasília, Brazil.

2008 - 2009 **Post-Doctoral Researcher.**

Group of Fluid Mechanics of Complex Flows, Universidade de Brasília.

Sponsored by PNPd/CNPq - Ministry of Science and Technology, Brazil.

3 Visiting professorships

November 2013 - July 2014 **University of California Santa Barbara.**

Department of Mathematics, funded by CAPES/MEC/Brazil

August 2013 - October 2013 **École Normale Supérieure de Lyon.**

Laboratoire de Physique, funded by Atosym/CNRS/France.

4 Academic Background

2004 - 2008 **PhD in Applied Mathematics.**

Department of Applied Mathematics and Theoretical Physics, DAMTP.

University of Cambridge, United Kingdom.

2002 - 2004 **MSc in Fluid Dynamics.**

Department of Mechanical Engineering.

Universidade de Brasília, Brazil.



- 1999 - 1999 **Visiting undergraduate student.**
École Centrale de Lyon, France.
- 1996 - 2001 **BSc in Mechanical Engineering.**
Universidade de Brasília, Brazil.
- 1993 - 1995 **Secondary studies.**
Institut de Batxillerat Joan Salvat Papasseit,
Barcelona, Spain.

5 Areas of Interest

Stability and Wave Propagation in Particulate/Multiphase Flows.

Ferrohydrodynamics.

Granular Materials.

Fluid Dynamics in general.

Applied Mathematics in general.

6 Publications

6.1 Full Papers in Indexed Journals

1. G. C. Yang, C. Y. Kwok, Y. D. Sobral, The effects of bed form roughness on total suspended load via the Lattice Boltzmann Method. *Applied Mathematics Modelling* v. 63, p. 591–610, 2018.
2. Sobral, Y. D., Hinch, E. J. Finite Amplitude Steady-State One-Dimensional Waves in Fluidized Beds. *SIAM Journal on Applied Mathematics*, v. 77, p. 247-266, 2017.
3. Jing, Lu, Kwok, Fiona C. Y., Leung, Andy Y. F., Sobral, Yuri D. Basal Effect in Mono- and Bi-disperse Chute Flows. *Springer Proceedings in Physics*, vol. 188, p. 671-678, 2017.
4. Gontijo, R. G., Malvar, S., Sobral, Y. D., Cunha, F. R. The influence of a magnetic field on the mechanical behavior of a fluid interface. *Meccanica*, v. 52, p. 1309-1327, 2017.
5. Jing, L., Kwok, F. C. Y., Leung, A. Y. F., Sobral, Y. D. Characterization of base roughness for granular chute flows. *Physical Review E*, v. 94, p. 052901, 2016.
6. Jing, L., Kwok, C. Y., Leung, A. Y., Sobral, Y. D. Extended CFD-DEM for free-surface flow with multi-size granules. *International Journal for Numerical and Analytical Methods in Geomechanics*, v. 40, p. 62-79, 2016.
7. Cunha, F. R., Sobral, Y. D., Gontijo, R. G. Stabilization of concentration waves in fluidized beds of magnetic particles. *Powder Technology*, v. 24, p. 219-229, 2013.
8. Gontijo, R. G., Sobral, Y. D., Cunha, F. R. Symmetry breaking of particle trajectories due to magnetic interactions in a dilute suspension. *Journal of Magnetism and Magnetic Materials*, v. 326, p. 240-250, 2013.



9. Sobral, Y. D., Hinch, E. J. Gravitational overturning in stratified particulate flows. *SIAM Journal on Applied Mathematics*, Vol. 71, No. 6, pp. 2151–2167, 2011.
10. Sobral, Y. D., Oliveira, T. F., Cunha, F. R. On the Unsteady Forces During the Motion of a Sedimenting Particle. *Powder Technology*, v. 178, p. 129-141, 2007.
11. Oliveira, T. F., Sobral, Y. D., Bobenrieth-Miserda, R. F., Cunha, F. R. Una metodología de análisis estocástico de flujos turbulentos. *Revista Iberoamericana de Ingeniería Mecánica*, v. 11, n. 3, p. 53-61, 2007.
12. Cunha, F. R., Sobral, Y. D. Asymptotic solution for pressure driven flows of magnetic fluids in pipes. *Journal of Magnetism and Magnetic Materials*, v. 289, p. 314-317, 2005.
13. Sobral, Y. D., Cunha, F. R. Drift velocity and stretching of polarized drops in magnetic fields. *Journal of Magnetism and Magnetic Materials*, v. 289, p. 318-320, 2005.
14. Sobral, Y. D., Cunha, F. R. Efeitos hidrodinâmicos e magnéticos na estabilização de ondas de concentração em leitos fluidizados. *Revista Iberoamericana de Ingeniería Mecánica*, v. 9, n. 1, p. 23-36, 2005.
15. Ramos, D. M., Cunha, F. R., Sobral, Y. D., Rodrigues, J. L. A. F. Numerical Simulation of Magnetic Fluids in Laminar Pipe Flows. *Journal of Magnetism and Magnetic Materials*, v. 289, p. 238-241, 2005.
16. Sobral, Y. D., Cunha, F. R. Wave hierarchy of concentration waves in magnetic fluidized beds. *Journal of Magnetism and Magnetic Materials*, v. 289, p. 111-114, 2005.
17. Cunha, F. R., Sobral, Y. D. Characterization of the Physical Parameters in a Process of Magnetic Separation and Pressure Driven Flows of a Magnetic Fluid in a Cylindrical Tube. *Physica A*, v. 343C, p. 36-64, 2004.
18. Sobral, Y. D., Cunha, F. R. A Stability Analysis of a Magnetic Fluidized Bed. *Journal of Magnetism and Magnetic Materials*, v. 258, p. 464-467, 2003.
19. Sobral, Y. D., Cunha, F. R. A Linear Stability Analysis of a Homogeneous Fluidized Bed. *Tendencies in Computational and Applied Mathematics*, v. 3, n. 2, p. 197-206, 2002.

6.2 Full Papers in Refereed Conference Proceedings

1. Yang, G. C., Kwok, F. C. Y., Sobral, Y. D. The role of fluid viscosity in an immersed granular collapse. In: *Powders and Grains 2017*, 2017, Montpellier.
2. Jing, L., Kwok, F. C. Y., Leung, A. Y. F., Sobral, Y. D. Effect of geometric base roughness on size segregation. In: *Powders and Grains 2017*, 2017, Montpellier.
3. Jing, L., Kwok, F. C. Y., Leung, A. Y. F., Sobral, Y. D. Basal Effect in Mono- and Bi-Disperse Chute Flows. In: *The 7th International Conference on Discrete Element Methods*, 2016, Dalian.
4. Das, S. S., Sobral, Y. D., Cunha, F. R. Numerical Investigations of Instabilities in Gas-Solid Fluidized Beds. In: *XXXVII Ibero-Latin American Congress on Computational Methods in Engineering*, 2016, Brasília.



5. Vieira, C. O., A. P. Reis, Sobral, Y. D., Cunha, F. R. Flow of a ferrofluid in a rectangular driven cavity in the presence of uniform magnetic fields. In: XXXVII Ibero-Latin American Congress on Computational Methods in Engineering, 2016, Brasília.
6. Sobral, Y. D., Gontijo, R. G., Cunha, F. R. Symmetry breaking of particle trajectories due to magnetic interactions in a dilute suspension. In: 4th International Conference on Mathematical and Computational Applications, 2013, Manisa.
7. Sobral, Y. D., Hinch, E. J. Two-dimensional instabilities in fluidised beds. In: 11th Pan-American Congress of Applied Mechanics, 2010, Foz do Iguaçu.
8. Sobral, Y. D., Hinch, E. J. Concentration instabilities and the formation of bubbles in fluidised beds. In: 6th International Conference on Multiphase Flow, 2007, Leipzig.
9. Sobral, Y. D., Hinch, E. J. Fluctuations de concentration et instabilité secondaire en lits fluidisés. Partie I: Stabilité linéaire et saturation des ondes de concentration. In: 18ème Congrès Français de Mécanique, 2007, Grenoble.
10. Sobral, Y. D., Hinch, E. J. Instabilities and bubble formation in fluidised beds. In: 19th International Congress of Mechanical Engineering, 2007, Brasília.
11. Sobral, Y. D., Cunha, F. R. On the unsteady motion of an isolated sedimenting particle. In: 18th International Congress of Mechanical Engineering, 2005, Ouro Preto.
12. Ramos, D. M., Sobral, Y. D., Cunha, F. R., Rodrigues, J. L. A. F. Computer Simulation of Magnetic Fluids in Laminar Pipe Flows. In: 10th Brazilian Congress of Thermal Sciences and Engineering, Rio de Janeiro, 2004.
13. Torres, W. P., Sobral, Y. D., Cunha, F. R. Uma Investigação Experimental de Ondas de Concentração em Leitos Fluidizados Líquido-Sólido. Parte I: Caracterização do Sistema de Fluidização e Visualização das Instabilidades. In: 10th Brazilian Congress of Thermal Sciences and Engineering, Rio de Janeiro, 2004.
14. Sobral, Y. D., Cunha, F. R. Characterization of the Physical Parameters in a Process of Magnetic Separation. In: 17th International Congress of Mechanical Engineering, São Paulo, 2003.
15. Sobral, Y. D., Cunha, F. R. Estabilização de Ondas de Concentração em Leitos Fluidizados com Fase Particulada Magnética. In: VI Congresso Iberoamericano de Engenharia Mecânica, Coimbra, 2003.
16. Sobral, Y. D., Cunha, F. R. Mechanisms of Void Fraction Instabilities in Fluidized Beds. In: 9th Brazilian Congress of Thermal Sciences and Engineering, Caxambu, 2002.
17. Sobral, Y. D., Cunha, F. R. A Note on the Governing Equations of Fluidized Bed Suspensions. In: XVI Congresso Brasileiro de Engenharia Mecânica, Uberlândia, 2001.

6.3 Abstracts in Conference Proceedings

1. Das, S. S., Sobral, Y. D., Cunha, F. R. CFD-DEM simulations in a gas-solid fluidized bed. In: XXXVI Congresso Nacional de Matemática Aplicada e Computacional, 2016, Gramado.



2. Vieira, C. O., A. P. Reis, Sobral, Y. D., Cunha, F. R. Escoamento de fluidos magnéticos em cavidades. In: XXXVI Congresso Nacional de Matemática Aplicada e Computacional, 2016, Gramado.
3. Sobral, Y. D., A. P. Reis, C. V. Oliveira, Cunha, F. R. Numerical simulation of the flow of an asymmetric magnetic fluid in a driven cavity. In: 87th Annual Meeting of The Society of Rheology, 2015, Baltimore.
4. Cunha, F. R., Gontijo R. G., Sobral, Y. D. An Analysis of Two Particle Relative Trajectories Interacting Hydrodynamically and Magnetically in Creeping Flow. 13th International Conference on Magnetic Fluids, 2013, New Delhi.
5. Cunha, F. R., Gontijo R. G., Sobral, Y. D. On the Balance and Constitutive Equations Governing the Motion of Non-symmetrical Fluids. 13th International Conference on Magnetic Fluids, 2013, New Delhi.
6. Cunha, F. R., Gontijo R. G., Sobral, Y. D. Shape of a Magnetic Fluid Free Surface Undergoing an External Field. 13th International Conference on Magnetic Fluids, 2013, New Delhi.
7. Cunha, F. R., Gontijo R. G., Sobral, Y. D. An Investigation of a Ferrofluid Stability Used in Electrical Transformers from its Rheological Properties. 13th International Conference on Magnetic Fluids, 2013, New Delhi.
8. Sobral Y.D., Taberlet N., Grenard V., Cunha F.R. A Study of Fluidisation Via a Hybrid Method. 6th International Conference on Multiscale Materials Modeling, 2012, Singapore.
9. Sobral Y.D., Taberlet N., Grenard V., Cunha F.R. Simulations of Suspensions Using Molecular Dynamics Coupled with Averaged Continuum Equations. In: International Congress on Industrial and Applied Mathematics, 2011, Vancouver.
10. Sobral, Y.D., Bubble Formation in Fluidised Beds. In: International Congress on Industrial and Applied Mathematics, 2011, Vancouver.
11. Sobral, Y. D., Hinch, E. J. Two-dimensional Instabilities in Fluidised Beds. In: International Congress of Mathematicians, 2010, Hyderabad.
12. Taberlet, N., Tokieda, T., Sobral, Y. D. Energy dissipation in a rotating drum. In: Southern Workshop on Granular Materials, 2009, Viña del Mar,. p. 41.
13. Sobral, Y. D., Hinch, E. J. Two-dimensional instabilities in fluidised beds. In: Southern Workshop in Granular Materials, 2009, Viña del Mar, p. 38.
14. Ramos, D. M., Sobral, Y. D., Cunha, F. R. A Study of Drag Reduction in a Pipe Flow of a Magnetic Fluid. In: Third Annual European Rheology Conference, 2006, Hersonissos.
15. Sobral, Y. D., Hinch, E. J. Instabilities in fluidised beds: growth and saturation of 1D disturbances. In: British Applied Mathematics Colloquium, 2006, Stoke-on-Trent.
16. Sobral, Y. D., Cunha, F. R. Asymptotic Solutions for Pressure Driven Flows of Magnetic Fluids in Pipes. In: 10th International Conference on Magnetic Fluids, 2004, Guarujá, p. 290.
17. Sobral, Y. D., Cunha, F. R. Drift Velocity and Stretching of Polarized Drops in Magnetic Fields. In: 10th International Conference on Magnetic Fluids, 2004, Guarujá, p. 256.



18. Ramos, D. M., Sobral, Y. D., Rodrigues, J. L. A. F., Cunha, F. R. Numerical Simulation of Magnetic Fluids in Pipes. In: 10th International Conference on Magnetic Fluids, 2004, Guarujá, p. 140.
19. Sobral, Y. D., Cunha, F. R. Wave Hierarchy of Concentration Waves in Magnetic Fluidized Beds. In: 10th International Conference on Magnetic Fluids, 2004, p. 86.
20. Sobral, Y. D., Cunha, F. R. A Note on the Problem of a Wave Hierarchy Approach to Describe Concentration Waves Interactions in Fluidized Beds. In: VIII Workshop on Partial Differential Equations, 2003, Rio de Janeiro, p. 79.
21. Sobral, Y. D., Cunha, F. R. On the Transition Between Aggregative and Particulate Flows in Fluidized Beds. In: XXV Congresso Nacional de Matemática Aplicada e Computacional, Nova Friburgo, 2002. p. 439.
22. Sobral, Y. D., Cunha, F. R. The Influence of Magnetic Parameters on the Stability of Magnetic Fluidized Beds. In: XXV Congresso Nacional de Matemática Aplicada e Computacional, Nova Friburgo. 2002. p. 440.
23. Sobral, Y. D., Cunha, F. R. The Stability of a Polarized Fluidized Bed of Magnetic Particles. In: Moscow International Symposium on Magnetism, 2002, Moscow, p. 276.
24. Sobral, Y. D., Cunha, F. R. A Linear Stability Analysis of a Homogeneous Fluidized Bed. In: XXIV Congresso Nacional de Matemática Aplicada e Computacional, 2001, Belo Horizonte, p. 60.
25. Sobral, Y. D., Cunha, F. R. Um Estudo das Equações Governantes Para Leitos Fluidizados. In: 7º Congresso de Iniciação Científica da Universidade de Brasília, 2001. p. 499.
26. Sobral, Y. D., Rassi Jr, W., Matos, H. C. Introdução à Teoria de Galois. In: 4º Congresso de Iniciação Científica da Universidade de Brasília. 1997. p. 208.

6.4 Other Publications

1. Sobral, Y. D. Instabilities in fluidised beds. University of Cambridge, 2008. (PhD Thesis)
2. Sobral, Y. D. Estabilidade Hidrodinâmica e Magnética de Leitos Fluidizados. Universidade de Brasília, 2004. (MSc Dissertation)
3. Sobral, Y. D. Investigação da Estabilidade de Leitos Fluidizados para Diferentes Modelos Constitutivos. Universidade de Brasília, 2002. (Final Undergraduate Report)
4. Sobral, Y. D. Validation des Modèles de Turbulence dans le Code N3S-Renault Version Engine. Guyancourt - Paris: Renault - Technocentre, 1999. (Internship Final Report)
5. Sobral, Y. D., Rassi Jr, Wagih. Introdução à Teoria de Galois. Universidade de Brasília, 1998. (Initiation to Research Report)

7 Supervision of Students

1. Carlos Henrique Santos (Msc in Mathematics, expected defense December 2018). Nonlinear dynamics of interacting magnetic dipoles.



2. Vanderlino Barreto Neto (MSc in Mechanical Sciences, expected defense August 2018, co-supervisor). Continuum modelling of suspensions in channel flows via the Lattice-Boltzmann method.
3. Pavel Zenon Sejas Paz (PhD in Mathematics, expected defense December 2019). Stability of flows of ferrofluids.
4. Álvaro Moreira Neto (PhD in Mechanical Sciences, 2018, co-supervisor). Nonlinear behaviour of elastic suspensions in different flows: mathematical modelling and simulation.
5. Camila de Oliveira Vieira (PhD in Mathematics, 2018). Numerical simulation of flows of magnetic fluids in cavities.
6. Larissa Kawano Mori (BSc Monography in Economics, 2017, co-supervisor). Considerations on the architecture of multilayer neural networks.
7. André von Borries Lopes (MSc in Fluid Dynamics, 2012, co-supervisor). Nonlinear waves in gas-dynamics.

8 Technical visits and seminars

1. Technical visit and seminar: University of Hong Kong, Hong Kong, March 2017. Host: Prof. Fiona Kwok, Department of Civil Engineering.
2. Seminar: Loyola University Maryland, USA, March 2014. Host: Prof. Michael Knapp, Department of Mathematics.
3. Seminar: United States Naval Academy, USA, March 2014. Host: Prof. Eyo Eyo Ita III, Department of Physics.
4. Technical visit (as part of a sabbatical year) and seminar: University of California Santa Barbara, USA, November 2013 - July 2014. Host: Prof. Hector D. Ceniceros, Department of Mathematics.
5. Technical visit (as part of a sabbatical year) and seminar: École Normale Supérieure de Lyon, France, August - October 2013. Host: Prof. Nicolas Taberlet, Laboratory of Physics.
6. Technical visit and seminar: University of Hong Kong, Hong Kong, October 2012. Host: Prof. Fiona Kwok, Department of Civil Engineering.
7. Technical visit: University of California Santa Barbara, USA, January - March 2012. Host: Prof. Hector D. Ceniceros, Department of Mathematics.
8. Technical visit: École Normale Supérieure de Lyon, France, January - March 2011. Host: Prof. Nicolas Taberlet, Laboratory of Physics.
9. Technical visit: Indian Institut of Science, Bangalore, India, August 2010. Host: Prof. Kartik Venkatraman, Department of Aeronautical Engineering.
10. Seminar: Jawarhalal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore, India, August 2011. Host: Prof. Santosh Ansumali, Unity of Mechanics.
11. Technical visit: École Normale Supérieure de Lyon, France, September 2010. Host: Prof. Nicolas Taberlet, Laboratory of Physics.



12. Seminar: Frederick University of Nicosia, Cyprus, September 2010. Host: Prof. Stamatis Rossides and Prof. Marios Fyrillas, Department of Mechanical Engineering.
13. Technical visit: University of Belgrade, Serbia, September 2009. Host: Prof. Miloš Pavlović, Faculty of Mechanical Engineering.

9 Conferences attended

1. XXI International Symposium on Mathematical Methods Applied to the Sciences, San José - Costa Rica, 2018.
2. XXXVII Ibero-Latin American Congress on Computational Methods in Engineering, Brasília - Brazil, 2016.
3. The Society of Rheology 87th Annual Meeting, Baltimore - USA, 2015.
4. 13th International Conference on Magnetic Fluids, New Delhi - India, 2013.
5. 4th International Conference on Mathematical and Computational Applications. Manisa - Turkey, 2013.
6. 6th International Conference on Multiscale Materials Modeling. Singapore, 2012.
7. International Congress on Industrial and Applied Mathematics, Vancouver - Canada, 2011.
8. International Congress of Mathematicians, Hyderabad - India, 2010.
9. 11th Pan-American Congress of Applied Mechanics, Foz do Iguaçu - Brazil, 2010.
10. Southern Workshop in Granular Materials, Viña del Mar - Chile, 2009.
11. 6th International Conference on Multiphase Flow, Leipzig - Germany, 2007.
12. 18ème Congrès Français de Mécanique, Grenoble - France, 2007.
13. 19th International Congress of Mechanical Engineering, Brasília - Brazil, 2007.
14. Third Annual European Rheology Conference, Hersonissos - Greece, 2006.
15. British Applied Mathematics Colloquium, Stoke-on-Trent - United Kingdom, 2006.
16. 10th International Conference on Magnetic Fluids, Guarujá - Brazil, 2004.
17. VI Congresso Ibero-Americano de Engenharia Mecânica, Coimbra - Portugal, 2003.
18. XVII International Congress of Mechanical Engineering, São Paulo - Brazil, 2003.
19. VIII Workshop on Partial Differential Equations, Rio de Janeiro - Brazil, 2003.
20. II Moscow International Symposium on Magnetism, Moscow - Russia, 2002.
21. XXV Congresso Nacional de Matemática Aplicada e Computacional, Nova Friburgo - Brazil, 2002.
22. 7º Congresso de Iniciação Científica da Universidade de Brasília, Brasília - Brazil, 2001.
23. XIV Congresso Brasileiro de Engenharia Mecânica, Uberlândia - Brazil, 2001.



24. XXIV Congresso Nacional de Matemática Aplicada e Computacional, Belo Horizonte - Brazil, 2001.
25. II Escola Brasileira de Primavera de Transição e Turbulência, Uberlândia - Brazil, 2000.

10 Organisation of technical events

1. XLV Summer School of Mathematics of the Department of Mathematics of the Universidade de Brasília, 2016. Organisation of a technical event with around 100 participants in several areas of mathematics.
2. I Jornada de Matemática Aplicada 2010, Brasília, Brazil. Organisation of a one-day symposium on applied mathematics during the summer school of the Department of Mathematics of the Universidade de Brasília.
3. Semana Nacional de Ciência e Tecnologia 2009, Brasília, Brazil. Participant (organisation/presentation) of a workshop for kids on the mathematics of spinning toys.
4. Techfest IIT-Mumbai 2008, Mumbai, India. Participant (organisation/presentation) of the exhibition “The dynamics of spin”.
5. Royal Society Summer Festival 2007, London, UK. Participant (organisation/presentation) of the exhibition “The dynamics of spin”.
6. Cambridge Science Festival 2007, Cambridge UK. Participant of the DAMTP Open Day, Participant (organisation/presentation) of the Mechanics and Complex Fluids demonstrations.