

CURRICULUM VITAE

Last name : Gavriilyuk (Gavriliouk)

First name : Sergey (Serguei)

Born : 20 october 1960, Russie

Nationality : russian et french

Family status : married, two sons

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Position :

- Professor at the Aix-Marseille University, member of the team SMASH – Simulation, Modélisation et Analyse des Systèmes Hétérogènes – Simulation, Modelling and Analysis of Heterogeneous Systems (UMR CNRS 6595, l’IUSTI, Marseille, France)

Education :

- 1982, Master of Science, Dpt of Applied Mathematics and Mechanics, Novosibirsk State University, Novosibirsk, Russia (diploma with "high honours").
- 1987, PhD in Fluid Mechanics, Structure of non-linear waves in gas-liquid mixtures, Lavrentyev Institute of Hydrodynamics, Novosibirsk, Russia. PhD Advisers : Academician L.V. Ovsyannikov et Professeur V.Yu. Lyapidevskiy.

Career :

- 2005 - present, Professor at the University Aix-Marseille, member of the laboratory SMASH – Simulation, Modélisation et Analyse des Systèmes Hétérogènes – Simulation, Modelling and Analysis of Heterogeneous Systems (UMR CNRS 6595, l’IUSTI, Marseille, France)

- 1996-2004, Professor at the University Aix-Marseille, member of the laboratory "Modelling in Mechanics and Thermodynamics", Marseille, France
- 1986-1996 Junior researcher, Senior researcher in the Lavrentyev Institute of Hydrodynamics, and Associate Professor at the Novosibirsk State University, Dpt of Applied Mathematics and Mechanics

Responsabilities

- Director of the Master Program "Two-phase flows, energetics and combustion", Aix-Marseille University/newline
- Editor of "Continuum Mechanics and Thermodynamics", Springer (depuis 2005) <http://link.springer.de/link/service/journals/00161/>
- 1991-1993, Vice-director of Dpt of Applied Mathematics and Mechanics, Novosibirsk State University, Novosibirsk, Russia

RESEARCH FIELDS

- Mathematical Physics, Fluid Mechanics, Nonlinear Waves, Waves in Multi-Phase Flows.
- Current research interests : Variational principles in continuum mechanics, non-conservative hyperbolic systems of equations.

PUBLICATIONS

- [1] 2010 S. Gavriluk and H. Gouin, Geometric evolution of the Reynolds stress tensor in three-dimensional turbulence, European J. Mechanics B/Fluids (submitted).
- [2] 2010 R. Saurel, N. Favrie, F. Petitpas, M. Lallemand and S. Gavriluk, Modeling dynamic and irreversible powder compaction, Journal of Fluid Mechanics (accepted).
- [3] 2010 A. Madeo, S. Gavriluk, Propagation of Acoustic Waves in Porous Media and their Reflection and Transmission at a Pure Fluid/Porous Medium Permeable Interface, European J. Mechanics A/Solids, Volume 29, Issue 5, September-October 2010, Pages 897-910.

- [4] 2010 O. Le Métayer, S. Gavriluk and S. Hank, A numerical scheme for the Green-Naghdi model, *Journal of Computational Physics*, 229 , 2034-2045.
- [5] 2010 N. V. Chemetov, F. Cipriano and S. Gavriluk, Shallow water model for lakes with friction and penetration, *Mathematical Methods in the Applied Sciences*, Volume 33, Issue 6, pages 687703.
- [6] 2009 N. Favrie, S. Gavriluk and R. Saurel, Diffuse solid-fluid interface model in cases of extreme deformations, *Journal of Computational Physics*, 228, 6037-6077 (41 pages).
- [7] 2008 H. Gouin and S. Gavriluk, Dynamics of liquid nanofilms, *Int. J. Eng. Sciences*, 46, 1195-1202.
- [8] 2008 S. Gavriluk, N. Favrie and R. Saurel, Modelling Wave Dynamics of Compressible Elastic Materials, *J. Computational Physics*, v. 227, 2941-2969.
- [9] 2007 R. Barros, S. Gavriluk and V. Teshukov, Dispersive Nonlinear Waves in Two-Layer Flows with Free Surface. Part I. Model derivation and general properties, *Studies in Applied Mathematics*, v. 119, N 3, pp. 191-211.
- [10] 2007 R. Barros , S. Gavriluk, Dispersive Nonlinear Waves in Two-Layer Flows with Free Surface. Part II. Large amplitude solitary waves embedded into the continuous spectrum, *Studies in Applied Mathematics*, v. 119, N 3, pp. 213-251.
- [11] 2007 A. Hematulin, S. V. Meleshko & S. L. Gavriluk, Group classification of one-dimensional equations of fluids with internal inertia, *Mathematical Methods in the Applied Sciences*, **30**, 2101-2120.
- [12] 2007 N. Chikhi & S. L. Gavriluk, Statistical description of a cloud of compressible bubbles, *Continuum Mechanics and Thermodynamics*, **18**, 469-479.
- [13] 2007 S.L. Gavriluk & R. Saurel, Rankine-Hugoniot relations for shocks in heterogeneous mixtures, *Journal of Fluid Mechanics*, **575**, 495-507.
- [14] 2007 R. Saurel, O. Le Metayer, J. Massoni & S.L. Gavriluk, Shock jump relations for multiphase mixtures with stiff mechanical relaxation, *Shock Waves*, **16**, N 3, 209-232.

- [15] 2006 V. S. Nikolaev, S. L. Gavriluk & H. Gouin, Modeling of the moving deformed triple contact line : influence of the fluid inertia, *Journal of Colloid and Interface Science*, **302**, 605-612.
- [16] 2006 S.L. Gavriluk & I. Akhatov, Model of a liquid nanofilm on a solid substrate based on the van der Waals concept of capillarity, *Physical Review E*, **73**, 021604.
- [17] 2006 H. Gouin & S. L. Gavriluk, Dissipative Two-Fluid Models, *Rendiconti del Circolo Matematico di Palermo, Série II, N 78*, 133-145.
- [18] 2006 V. M. Teshukov & S.L. Gavriluk, Three-dimensional nonlinear dispersive waves on shear flows, *Studies in Applied Mathematics*, **116**, 241-255.
- [19] 2006 S.L. Gavriluk & R. Saurel, Estimation of the turbulent energy production across a shock wave, *Journal of Fluid Mechanics*, **549**, 131-139.
- [20] 2005 S.L. Gavriluk, Acoustic properties of a multiphase model with micro-inertia, *European J. of Mechanics B/Fluids*, **24**, 397-406
- [21] 2005 S.L. Gavriluk & V. M. Teshukov, Drag force acting on a bubble in a cloud of compressible spherical bubbles at large Reynolds numbers, *European J. of Mechanics B/Fluids*, **24**, 468-477.
- [22] 2004 S.L. Gavriluk, H. Gouin & V.M. Teshukov, Bubble effect on Kelvin-Helmholtz' instability, *Continuum Mechanics and Thermodynamics*, **16**, 31 - 42.
- [23] 2004 S.L. Gavriluk & V.M. Teshukov, Linear stability of parallel inviscid flows of shallow water and bubbly fluid, *Studies in Applied Mathematics*, **113**, 1 - 29.
- [24] 2003 R. Saurel, S.L. Gavriluk & F. Renaud, A multiphase model with internal degrees of freedom: application to shock-bubble interaction, *Journal of Fluid Mechanics*, **495**, 283-321.
- [25] 2002 S.L. Gavriluk & R. Saurel, Mathematical and Numerical Modeling of Two-Phase Compressible Flows with Microinertia, *Journal of Computational Physics*, **175**, 326-360.

- [26] 2002, V.M. Teshukov & S.L. Gavriluk, Kinetic model for a motion of compressible bubbles in a perfect fluid, *European J. of Mechanics, B/Fluids*, **21**, 469-491.
- [27] 2001 S.L. Gavriluk & V.M. Teshukov, Generalized Vorticity and Flow Properties for Bubbly Liquid and Dispersive Shallow Water Equations, *Continuum Mechanics and Thermodynamics*, **13**, 365-382.
- [28] 1999 O. Chevalier, H. Gouin & S. Gavriluk, Non-dissipative phase transitions in a two-component fluid mixture in the vicinity of a critical point, *J. Chimie Physique*, **96**, 1052-1058.
- [29] 1999 H. Gouin & S. Gavriluk, Hamilton's principle and Rankine-Hugoniot conditions for general motions of fluid mixtures, "Meccanica", **34**, N 1, 39-47.
- [30] 1999 S. Gavriluk & H. Gouin, A new form of governing equations of fluids arising from Hamilton's principle, "Int. J. Engineering Science" **37**, 1495-1520.
- [31] 1999 H. Gouin and S. Gavriluk, Wetting problem for multi-component fluid mixtures, *Physica A* **268**, 291-308
- [32] 1998 S. Gavriluk, H. Gouin & Yu. Perepechko, Hyperbolic models of homogeneous two-fluid mixtures, *Meccanica*, **33**, 161-175.
- [33] 1998 S. Gavriluk & Yu. Perepechko, Variational approach to constructing hyperbolic models of two-velocity media, *J. Applied Mechanics and Technical Physics*, **39**, N 5, 684-698
- [34] 1997 S. Gavriluk, H. Gouin & Yu. Perepechko, " A variational principle for two-fluid models", *C.R. Acad. Sci. Paris*, **324**, Série IIb, 1-8.
- [35] 1996 S. Gavriluk & J. Fabre, Lagrangian coordinates for a drift-flux model of a gaz-liquid mixture, *Int. J. Mult. Flows*, **22**, N 3, 453-460.
- [36] 1996 S. Gavriluk & S.M. Shugrin, Media with equations of state that depend on derivatives, *J. Applied Mechanics and Technical Physics*, **37**, N 2, 177-189

- [37] 1996 S. Gavriilyuk, Solitary waves in bubbly liquids are linearly unstable, *European J. of Mechanics, B/ Fluids*, **15**, N 1, 37-53.
- [38] 1995 S. Gavriilyuk, Large-time asymptotics of solution of the Cauchy problem for equations of linear wave propagation in bubbly liquid with continuous size distribution of bubbles, *Siberian J. Differential Equations*, **1**, N 1, 69-87.
- [39] 1995 S. Gavriilyuk, Travelling waves in bubbly liquid with continuous bubble size distribution, *European J. of Applied Mathematics*, **6**, 247-264.
- [40] 1994 S. Gavriilyuk, Large amplitude oscillations and their "thermodynamics" for continua with "memory", *European J. of Mechanics, B/Fluids*, **13**, N 6, 753-764.
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- [43] 1991 S. Gavriilyuk & S. A. Fil'ko, Shock waves in polydisperse bubbly media with dissipation, *Journal of Applied Mechanics and Technical Physics*, **32**, 669-677.
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- [47] 1989 S. Gavriilyuk, Modulation equations for a mixture of gas bubbles in an incompressible liquid, *Journal of Applied Mechanics and Technical Physics*, **30**, 247-253.
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Chapters of books:

- [52] 2010 S. Gavriilyuk & H. Gouin, Geometric evolution of the Reynolds stress tensor in three-dimensional turbulence, A. Greco, S. Rionero, T. Ruggeri (editors), *World Scientific*, 2010, p. 182-190, ISBN 978-981-43170-41-2.
- [53] 2001 H. Gouin & S. Gavriilyuk, Rankine-Hugoniot conditions for one-entropy two-fluid models. *Proceedings "WASCOM 99" 10th Conference on Waves and Stability in Continuous Media* (World Scientific, ISBN 981-02-4540-8), pp. 209-218.
- [54] 2000 S. Gavriilyuk & H. Gouin, Symmetric form of governing equations for capillary fluids. "Trends in Applications of Mathematics" (ed. by J. Iooss et al), *Chapman & Hall/CRC* (ISBN 1-58488-035-X) pp. 306-311.
- [55] 1995 S. Gavriilyuk & D. Serre, A model of plug-chain system near the thermodynamic critical point: connection with the Korteweg theory of capillarity and modulation equations. "Waves in Liquid/Gas and Liquid/Vapour Two-Phase Systems" (ed. by S. Morioka and L. van Wijngaarden), *Kluwer Academic Publishers* (ISBN 0-7923-3424-8) pp. 419-428.
- [56] 1994 S. Gavriilyuk, Linear wave propagation in bubbly liquid with continuous bubble size distribution. "Bubble Dynamics and Interface Phenomena" (ed. by J.R. Blake et al.), *Kluwer Academic Publishers*

(ISBN 0-7923-3008-0) pp. 141-149.

Conference papers

- [57] 2003 S. Gavriluk et V. Teshukov, Stabilité linéaire des écoulements cisailés parallèles d'un liquide à bulles et d'un fluide peu profond, 16 ième CFM, Nice
- [58] 1997 S. Gavriluk et H. Gouin, Méthode variationnelle pour les mélanges binaires homogènes, 13 ième CFM, Poitiers.
- [59] 1991 S. Gavriluk, Structure of traveling waves in polydisperse bubbly liquids with dissipation, Proc. of the International Conference on Multiphase Flows'91 - Tsukuba, Sept. 24-27, Japan.
- [60] 1991 S. Gavriluk, Nonlinear modulation of multi-dimensional high-frequency waves in monodisperse bubbly liquide, Proc. of the International Conference on Multiphase Flows'91 - Tsukuba, Sept. 24-27, Japan.