LUIGI VERGORI

Personal Details:
Age 45, Italian.

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Dipartimento di Ingegneria,
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Research Topics

Stability of harmonic maps;
Linear and nonlinear stability in implicit theories of fluid dynamics;
Piezo-viscous fluids;
Mechanics of nematic shells;
Nonlinear elasticity;
Nonlinear waves.

Academic Qualifications

2014-2016: Postgraduate Certificate, University of Glasgow, Learning & Teaching Centre, Glasgow, United Kingdom.

2005-08: PhD in Mathematics, Università del Salento, Lecce, Italy.
Thesis: *Linear and Nonlinear Stability in non-standard Theories of Fluid Dynamics*;
Advisor: Professor Giuseppe Saccomandi.

1996-2003: BSc & MSc in Mathematics, Università degli Studi di Lecce, Italy (awarded cum laude).

Teaching and Research Experience

November 7^{th} 2016– to date: Associate Professor in Mathematics at the Università di Perugia.

September 9^{th} 2013– to November 6^{th} 2016: Lecturer B (grade 8) in Mathematics at the University of Glasgow.

March 2012–September 8^{th} 2013: Marie Curie Fellow of the Istituto Nazionale di Alta Matematica (INdAM) based at the National University of Ireland Galway.

September 2012–December 2012: Teaching Assistant for the course 'Nonlinear Elasticity', NUIGalway.

November 2008–October 2011: Postdoctoral Fellow, Department of Mathematics, Università del Salento, Lecce, Italy.

September 2008–March 2011: Adjunct Professor of Rational Mechanics, Department of Industrial Engineering, Università del Salento, Lecce, Italy.

Distinctions

- 2018 annual prize for the best publication of the young researchers of the University of Perugia.
- 2013 AIMETA (Italian Association of Theoretical and Applied Mechanics) Junior prize for the innovative contributions in the mathematical modelling of nematic liquid crystals coating curved surfaces.

Publications

1. L. FUSI, L. VERGORI: The Rayleigh-Bénard problem for a fluid with pressure- and temperature-dependent material properties. To appear in Zeitschrift für angewandte Mathematik und Physik.
2. G. SACCOMANDI, L. VERGORI, E.M. ZANETTI: Linear, weakly nonlinear and fully nonlinear models for soft tissues: Which ones provide the most reliable estimations of the stiffness? Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences **380** (2022), 20210321.
3. L. FUSI, A. FARINA, K.R. RAJAGOPAL, L. VERGORI: Channel flows of shear-thinning fluids that mimic the mechanical response of a Bingham fluid. International Journal of Non-Linear Mechanics **138** (2022), 103847.
4. L. FUSI, K.R. RAJAGOPAL, G. SACCOMANDI, L. VERGORI: Flow past a porous plate of non-Newtonian fluids with implicit shear stress shear rate relationships. European Journal of Mechanics, B/Fluids **92** (2022), 166–173.
5. G. NAPOLI, O. PYLYPOVSKYI, D.D SHEKA, L. VERGORI: Nematic shells: New insights in topology- and curvature-induced effects. Soft Matter **17** (2021), 10322-10333.
6. G. NAPOLI, L. VERGORI: Cooling a spherical nematic shell. Physical Review E **104** (2021), L022701.

7. G. SACCOMANDI, L. VERGORI: Some Remarks on the Weakly Nonlinear Theory of Isotropic Elasticity. Journal of Elasticity **147** (2021), 33–58.

8. G. SACCOMANDI, E. SPERANZINI, L. VERGORI: Shear Deformations for Weakly-Nonlinear Elastic Materials. Lecture Notes of TICMI **21** (2020), 107–119.

9. G. SACCOMANDI, L. VERGORI: On universal relations in continuum mechanics: A discussion centred on shearing motions. Applications in Engineering Science **4** (2020), 100020.

10. C. ROGERS, G. SACCOMANDI, L. VERGORI: Helmholtz-type solitary wave solutions in nonlinear elastodynamics. Ricerche di Matematica **69** (2020), pp. 327–341.

11. E. PUCCI, G.SACCOMANDI, L. VERGORI: Linearly polarized waves of finite amplitude in pre-strained elastic materials. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences **475** (2019), 20180891.

12. G. SACCOMANDI, L. VERGORI: Generalised Mooney-Rivlin models for brain tissue: A theoretical perspective. To appear in International Journal of Non-Linear Mechanics **109** (2019), 9–14.

13. G. SACCOMANDI, L. VERGORI: Old Problems Revisited from New Perspectives in Implicit Theories of Fluids. In: Angiolo Farina, Andro Mikelić, Giuseppe Saccomandi, Adélia Sequeira, Eleuterio F. Toro. Non-Newtonian Fluid Mechanics and Complex Flows. Lecture Notes in Mathematics 2212 (2018), Springer, Cham, 45–90.

14. C. ROGERS, G. SACCOMANDI, L. VERGORI: Cnoidal and gausson phenomena in nonlinear elastodynamics. Acta Mechanica (2018), 1-12.

15. G. NAPOLI, L. VERGORI: Influence of the extrinsic curvature on two-dimensional nematic films. Physical Review E, **97** (2018), 052705.

16. T. SIGAEVA, R. MANGAN, L. VERGORI, M. DESTRADE, L. SUDAK: Wrinkles and creases in the bending, unbending and eversion of soft sectors. Proceedings of the Royal Society of London Series A: Mathematical, Physical and Engineering Sciences, **474** (2018), 20170827.

17. D. MACTAGGART, L. VERGORI, J. QUINN: Braginskii magnetohydrodynamics for arbitrary magnetic topologies: Coronal applications. Journal of Fluid Mechanics, **826** (2017), 615–635.

18. G. SACCOMANDI, L. VERGORI: Large time approximation for shearing motions. SIAM Journal on Applied Mathematics, 76(5) (2016), 1964–1983.

19. G. NAPOLI, L. VERGORI: Hydrodynamic theory for nematic shells: The interplay among curvature, flow and alignment. Physical Review E, 94 (2016), 020701(R).

20. A.A. HILL, K.R. RAJAGOPAL, L. VERGORI: On the stability and uniqueness of the flow of a fluid through a porous medium. Zeitschrift für Angewandte Mathematik und Physik **67**(3) (2016), 1–12.

21. C. ROGERS, G. SACCOMANDI, L. VERGORI Ermakov-modulated nonlinear Schrödinger models. integrable reduction. Journal of Nonlinear Mathematical Physics, 23(1) (2016), pp. 108–126.

22. K.R. RAJAGOPAL, G. SACCOMANDI, L. VERGORI: *On the approximation of isochoric motions of fluids under different flow conditions.* Proceedings of the Royal Society of London Series A: Mathematical, Physical and Engineering Sciences, 471(2180) (2015), 20150159.

23. C. ROGERS, G. SACCOMANDI, L. VERGORI: *Nonlinear elastodynamics of materials with strong ellipticity condition: Carroll-type solutions.* Wave Motion **56** (2015), 147–164.

24. C. ROGERS, G. SACCOMANDI, L. VERGORI: *Carroll-type deformations in nonlinear elastodynamics.* Journal of Physics A: Mathematical and Theoretical, **47** (2014), 205204.

25. M. DESTRADE, R.W. OGDEN, I. SGURA, L. VERGORI. *Straightening: existence, uniqueness and stability.* Proceedings of the Royal Society of London Series A: Mathematical, Physical and Engineering Sciences, **470** (2014), 20130709.

26. M. DESTRADE, R.W. OGDEN, I. SGURA, L. VERGORI. Straightening wrinkles. Journal of the Mechanics and Physics of Solids **65** (2014), 1–11.

27. G. NAPOLI, L. VERGORI: *Effective free energies for cholesteric shells.* Soft Matter **9** (2013), 8378–8387.

28. L. VERGORI, M. DESTRADE, P. McGARRY, R.W. OGDEN: *On anisotropic elasticity and questions concerning its Finite Element implementation.* Computational Mechanics **52** (2013), 1185–1197.

29. K.R. RAJAGOPAL, G. SACCOMANDI, L. VERGORI: *Unsteady flows of fluids with pressure dependent viscosity.* Journal of Mathematical Analysis and Applications **404** (2013), 362–372.

30. G. NAPOLI, L. VERGORI: *Curvature-induced ordering in cylindrical nematic shells.* International Journal of Nonlinear Mechanics **49** (2013), 66–71.

31. G. NAPOLI, L. VERGORI: *Extrinsic Curvature Effects on Nematic Shells.* Physical Review Letters **108** (2012), 207803.

32. G. NAPOLI, L. VERGORI: *Surface free energies for nematic shells.* Physical Review E **85** (2012), 061701.

33. K.R. RAJAGOPAL, G. SACCOMANDI, L. VERGORI: *Flow of fluids with pressure and shear dependent viscosity down an inclined plane.* Journal of Fluid Mechanics **706** (2012), 173–189.

34. K.R. RAJAGOPAL, G. SACCOMANDI, L. VERGORI: *Stability of Rayleigh-Bénard convection in a porous medium.* Zeitschrift für angewandte Mathematik und Physik **62** (2011), 149–160.

35. K.R. RAJAGOPAL, G. SACCOMANDI, L. VERGORI: *Couette flow with frictional heating in a fluid with temperature and pressure dependent viscosity.* International Journal of Heat and Mass Transfer **54** (2011), 783–789.

36. K.R. RAJAGOPAL, G. SACCOMANDI, L. VERGORI: *Linear stability of Hagen-Poiseuille flow in a chemically reacting fluid.* Computer & Mathematics with Applications **61** (2011), 460–469.

37. K.R. RAJAGOPAL, G. SACCOMANDI, L. VERGORI: *A systematic approximation for the equations governing convection-diffusion in a porous medium.* Nonlinear Analysis: Real World Applications **11** (2010), 2366–2375.

38. G. SACCOMANDI, L. VERGORI: *Piezo-viscous flows over an inclined surface.* Quarterly Journal of Applied Mathematics **68** (2010), 747–763.

39. L. VERGORI: *Flows at small Reynolds and Froude numbers.* International Journal of Engineering Science **11** (2010), 1659–1670.

40. L. VERGORI: *Couette and Poiseuille flows in bitumen.* Proceedings of the 15th Conference on Waves and Stability in Continuous Media, World Scientific, Singapore (2010) ISBN 981-4317-41-1, 359–364.

41. G. NAPOLI, L. VERGORI: *Equilibrium of nematic vesicles.* Journal of Physics A: Mathematical and Theoretical, **43** (2010), 445207.
G. NAPOLI, L. VERGORI: Corrigendum: Equilibrium of nematic vesicles (2010 J. Phys. A: Math. Theor. 43 445207). Journal of Physics A: Mathematical and Theoretical, **51** (2018), 359501.

42. S. RIONERO, L. VERGORI: *Long-time behaviour of fluid motions in porous media according to Brinkman model.* Acta Mechanica **210** (2010), 221–240.

43. K.R. RAJAGOPAL, G. SACCOMANDI, L. VERGORI: *On the Oberbeck-Boussinesq approximation for fluids with pressure-dependent viscosities.* Nonlinear Analysis: Real World Applications **10** (2009), 1139–1150.

44. K.R. RAJAGOPAL, G. SACCOMANDI, L. VERGORI: *Stability analysis of the Rayleigh-Bénard convection for a fluid with temperature and pressure dependent viscosity.* Zeitschrift für angewandte Mathematik und Physik **60** (2009), 739–755.

45. L. VERGORI: *Spectral geometry for the Jacobi operator of the identity map.* Note di Matematica, vol. **28**, n. 1 (2008), 29-42.

46. D. PERRONE, L. VERGORI: *Stability of contact metric manifolds and unit vector fields of minimum energy.* Bull. Austral. Math. Soc. Vol. **76** (2006), 269-283.

47. S. RIONERO, L. VERGORI: *A note on the nonlinear stability of laminar MHD flows in a porous medium in the presence of Brinkman law.* Rend. Acc. Sc. fis. mat. Napoli, Vol. LXXIII (2006), 387-402.

Expertise

Journal reviewer: International Journal of Engineering Science; International Journal of Non-Linear Mechanics; Chemical Engineering & Technology; The Quarterly Journal of Mechanics and Applied Mathematics; International Journal of Engineering, Science and Technology; Mathematics and Computers in Simulation; Theoretical and Computational Fluid Dynamics; Zeitschrift für Angewandte Mathematik und Physik; Acta Mechanica; Theoretical & Applied Mechanical Letters; Proceedings of the Royal Society of London Series A: Mathematical, Physical and Engineering Sciences; Physical Review E; Journal of Rheology; European Journal of Mechanics/B Fluids; Journal of the Brazilian Society of Mechanical Sciences and Engineering; Journal of Elasticity; Soft Matter.

Project proposal reviewer: Post-doc research project proposal for the Czech Science Foundation, Czech Republic.

Conference as organiser:

- Giornate Signorini 2022, November 4-5 2022, Perugia, Italy.
- WASCOM 2011, 16th International Conference on Waves and Stability in Continuous Media, June 12 - 18 2011, Brindisi, Italy.

Advanced School as co-organiser and lecturer: Advanced School on Theories and Applications of Liquid Crystals, September 3rd-7th 2018, Naples.