Stefano Turzi | Curriculum vitae

Professional address

Department of Mathematics – Politecnico di Milano
Piazza Leonardo da Vinci 32, 20133 Milano - Italy
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Current position

Tenure-Track Researcher in Mathematical Physics
Politecnico di Milano *from 13/11/2017*
RTD-B, art. 24 comma 3-b L. 240/2010 - SC 01/A4, SSD MAT/07

Italian academic qualification as Associate Professor
in Mathematical Physics *28/03/2017*

Visiting positions

Visiting Fellow **University of Cambridge**
Isaac Newton Institute for Mathematical Sciences *07/01/2013 – 19/04/2013*

Visiting Academic **Southampton University (UK)**
School of Mathematics, Invited by: Dr. D. Chillingworth *25/03/2012 – 21/04/2012*

Former academic positions

Researcher in Mathematical Physics
Politecnico di Milano *01/06/2013 – 12/11/2017*
RTD-A, art. 24 comma 3-a L. 240/2010 - SC 01/A4, SSD MAT/07

Researcher in Mathematical Physics
Università degli Studi e-Campus (Italy) *25/03/2010 – 31/05/2013*

Post-doc Research Fellow
Politecnico di Milano *16/01/2010 – 31/03/2010*
Title: *Transport phenomena in active barriers*
Coordinators: Prof. P. Biscari & Prof. A. Frezzotti

Research contract
Politecnico di Milano, funded by Saes Getters S.p.A. *01/07/2009 – 30/09/2009*
Title: *Permeability in active barriers*
Coordinator: Prof. A. Frezzotti

Research Fellow in Soft Matter Theory
Southampton University (UK) *01/03/2008 – 28/02/2009*
Supervisor: Prof. G. R. Luckhurst

Research contract
Politecnico di Milano *01/09/2008 – 31/12/2008*

Title: *Stability of lipid membranes with nematic interaction*
Coordinator: Prof. P. Biscari

Work history

Optical Design Engineer
Cisco Systems, Optical R&D Dept. *01/03/2000 – 29/02/2004*
I was mainly concerned with the design of optical amplifiers (EDFA), the theoretical study and simulation of distributed Raman amplification, and the design of algorithms for automatic network planning

S/390 System Engineer
IBM Italy *01/06/1999 – 29/02/2000*

Education

European PhD in Mathematical Engineering (cum laude)
Politecnico di Milano *18/05/2007*
Thesis title: *Distortion-induced effects in nematic liquid crystals*
Supervisor: Prof. P. Biscari

Degree in Electronic Engineering (MSc Equivalent)
Politecnico di Milano *08/04/1998*
Thesis title: *Design, characterization and intensity noise analysis of a diode pumped Tm-Ho:YAG laser for LIDAR applications at 2.1 μm*
Supervisor: Prof. P. Laporta

Research grants and contracts

PI for 4 projects funded by the GNFM (Italian National Group for Mathematical Physics): 2016 (3300 €); 2014 (4000 €); 2008 (3000 €); 2007 (1500 €)

Contract with ACS S.r.l (Advanced Customized Solutions): 2016 (9500 €)

The contract concerns the modelling of a bistable cholesteric liquid crystal device for applications in wearable electronics and the simulation of its optical response.

Invited talks and seminars

Mathematical Physics of Living Systems
Cortona (Italy) *27/08-02/09/2017*

Liquid Crystal Modelling and Simulation: A Comprehensive Introduction
Erice (Italy) *14-18/07/2017*

Scientific Meeting GNFM 2017
Montecatini (Italy) *04-06/05/2017*

Molecular Simulation and Engineering (MolSimEng 2016)
Politecnico di Milano *30/09/2016*

26th International Liquid Crystal Conference
Kent (OH), USA *31/07-05/08/2016*

Mechanics and Mathematics of (soft) Materials and Structures
Roma, La Sapienza *08/04/2016*

XXII Congresso - AIMETA
Genova (Italy) *14-17/09/2015*

The powerful continuum mechanics
Brescia (Italy) *13-14/11/2014*

7^{th} Italian-Japanese Workshop on Liquid Crystals and 11^{th} National SICL Meeting
Ravenna (Italy) *07-10/07/2014*

Two-day workshop on LC-flows
IMATI, Pavia (Italy) *25/03/2014*

The mathematics of cells and tissues (INDAM Meeting)
Cortona (Italy) *01-06/09/2013*

SIAM Annual Meeting 2012 (AN12)
Minneapolis (MN), USA *10/07/2012*

Seminario di Modellazione & Simulazione DIS
Università di Roma Tre *10/11/2011*

SIAM Conference on Mathematical Aspects of Materials Science
Philadelphia, USA *11/05/2008*

Ferroelectric phenomena in liquid crystals
Liquid Crystal Institute, Kent (OH), USA *23/06/2007*

Applied Mathematics Seminar
Mathematical Institute, Oxford University (UK) *15/01/2007*

Seminar
School of Mathematics, Southampton University (UK) *17/10/2006*

Teaching

o Thesis supervisor

Bachelor degree (Mathematical Eng.)
Politecnico di Milano
7 students: M. Galvani, C. Bardelli, L. Mancini, F. Palma, M. Toschi, S. Ubbiali, S. Castelnuovo

o Teacher

Elements of Mathematics (Calculus)
Politecnico di Milano *2017*
Bachelor degree in Civil Architecture

Mathematics and Mechanics of Solids (Mathematics)
Politecnico di Milano *2013–2017*
Master degree in Civil Architecture

Theoretical Mechanics
Università e-Campus *2010–2013*
Civil and Environmental Engineering

o Assistant

Models and Methods for Statistical Mechanics (Lab. of Monte Carlo methods)
Politecnico di Milano *2013–2017*
Master degree in Mathematical Engineering

Mathematical and Physical Modelling for Engineering [2]
Politecnico di Milano *2010–2013*
Master degree in Mathematical Engineering

Theoretical and Continuum Mechanics
Politecnico di Milano, Mathematical Engineering *2009–2012*

Mathematical Models and Methods
Politecnico di Milano *2009*
Business Engineering

Theoretical Mechanics
Politecnico di Milano *2005,2007,2009*
Chimical Engineering, Materials Engineering, Civil Engineering, Aerospace Engineering

Analytical Mechanics
Politecnico di Milano *2007*
Aerospace Engineering

Calculus II
Politecnico di Milano *2005–2007*
Electrical Engineering, Mechanical Engineering

Probability and Statistics
Politecnico di Milano *2005*
Electrical Engineering

Scientific interests

My main scientific interests are related to the mathematical and physical aspects of soft matter theory, liquid crystals in particular. Specifically, I have dealt with:

- *Active and bio-inspired soft matter*.
- *Anisotropic non-linear viscoelasticity and nematoacustics*. Anisotropic sound propagation and inelastic response in nematic liquid crystals.
- *Phase transitions*. Fundamental aspects of Landau theory of phase transitions with applications to biaxial nematic liquid crystals.
- *Group theory and order parameters*. Group-theoretical methods for the determination of the orientational ordering tensors and the algebra of invariants.
- *Singularity theory*. Catastrophe theory application to the study of phase transitions in liquid crystals.
- *Applied mathematics*. Applications of singular perturbation theory.

Selected publications

[1] Abramo Agosti, Davide Ambrosi and Stefano Turzi. *Strain energy storage and dissipation rate in active cell mechanics*. **Physical Review E**, 97(5):052410, 2018. doi:10.1103/PhysRevE.97.052410.

[2] Stefano S. Turzi. *Active nematic gels as active relaxing solids*. **Physical Review E**, 96(5):052603, 2017. doi:10.1103/PhysRevE.96.052603.

[3] Stefano S. Turzi and Fulvio Bisi. *Determination of the symmetry classes of orientational ordering tensors*. **Nonlinearity**, 30(12):4277, 2017. doi:10.1088/1361-6544/aa8713.

[4] Gaetano Napoli and Stefano Turzi. *The delamination of a growing elastic sheet with adhesion*. **Meccanica**, 52(14):3481–3487, Nov 2017. doi:10.1007/s11012-017-0618-0.

[5] Stefano S. Turzi. *Viscoelastic nematodynamics*. **Physical Review E - Statistical, Nonlinear, and Soft Matter Physics**, 94(6):062705, 2016. doi:10.1103/PhysRevE.94.062705.

[6] Paolo Biscari, Antonio Dicarlo, and Stefano S. Turzi. *Liquid relaxation: A new Parodi-like relation for nematic liquid crystals*. **Physical Review E - Statistical, Nonlinear, and Soft Matter Physics**, 93(5):052704, 2016. doi:10.1103/PhysRevE.93.052704.

[7] Gaetano Napoli and Stefano S. Turzi. *Snap buckling of a confined thin elastic sheet*. **Proceedings of the Royal Society of London A: Mathematical, Physical and Engineering Sciences**, 471(2183), 2015. doi:10.1098/rspa.2015.0444.

[8] Stefano S. Turzi. *Elastic director vibrations in nematic liquid crystals*. **European Journal of Applied Mathematics**, 26:93–107, 2015. doi:10.1017/S0956792514000345.

[9] David R. J. Chillingworth, Reiner Lauterbach, and Stefano S. Turzi. *Molien series and low-degree invariants for a natural action of* $SO(3) \wr Z_2$. **Journal of Physics A: Mathematical and Theoretical**, 48:015203 (1–29), 2015. doi:10.1088/1751-8113/48/1/015203.

[10] Paolo Biscari, Antonio DiCarlo, and Stefano S. Turzi. *Anisotropic wave propagation in nematic liquid crystals*. **Soft Matter**, 10:8296–8307, 2014. doi:10.1039/c4sm01067a.

[11] Riccardo D. Pascalis, Gaetano Napoli, and Stefano S. Turzi. *Growth-induced blisters in a circular tube*. **Physica D - Nonlinear Phenomena**, 283:1–9, 2014. doi:10.1016/j.physd.2014.05.008.

[12] Stefano S. Turzi and Tim J. Sluckin. *Symmetry adapted molecular-field theory for thermotropic biaxial nematic liquid crystals and its expansion at low temperature*. **SIAM Journal on Applied Mathematics**, 73:1139–1163, 2013. doi:10.1137/120897237.

[13] G. R. Luckhurst, S. Naemura, T. J. Sluckin, K. S. Thomas, and S. S. Turzi. *Molecular-field-theory approach to the Landau theory of liquid crystals: Uniaxial and biaxial nematics*. **Physical Review E: Statistical, Nonlinear, and Soft Matter Physics**, 85:031705 (1–21), 2012. doi:10.1103/PhysRevE.85.031705.

[14] Stefano S. Turzi. *On the Cartesian definition of orientational order parameters*. **Journal of Mathematical Physics**, 52:053517 (1–29), 2011. doi:10.1063/1.3589961.

[15] G. R. Luckhurst, S. Naemura, T. J. Sluckin, T. B. T. To, and S. Turzi. *Molecular field theory for biaxial nematic liquid crystals composed of molecules with* C_{2h} *point group symmetry*. **Physical Review E: Statistical, Nonlinear, and Soft Matter Physics**, 84:011704 (1–13), 2011. doi:10.1103/PhysRevE.84.011704.

[16] Livio Gibelli and Stefano Turzi. *A catastrophe-theoretic approach to tricritical points with application to liquid crystals*. **SIAM Journal on Applied Mathematics**, 70:63–76, 2009. doi:10.1137/080733759.

[17] Gaetano Napoli and Stefano Turzi. *On the determination of nontrivial equilibrium configurations close to a bifurcation point*. **Computers & Mathematics with Applications**, 55:299–306, 2008. doi:10.1016/j.camwa.2007.04.008.

[18] Paolo Biscari and Stefano Turzi. *Boundary-roughness effects in nematic liquid crystals*. **SIAM Journal on Applied Mathematics**, 67:447–463, 2007. doi:10.1137/060656711.

[19] Paolo Biscari, Gaetano Napoli, and Stefano Turzi. *Bulk and surface biaxiality in nematic liquid crystals*. **Physical Review E: Statistical, Nonlinear, and Soft Matter Physics**, 74:031708 (1–7), 2006. doi:10.1103/PhysRevE.74.031708.

Other

[20] Paolo Biscari and Stefano Turzi. *Asymptotic director fields of moving defects in nematic liquid crystals*. **Bollettino dell'Unione Matematica Italiana (UMI)**, 5:81–91, 2012. URL: http://link.springer.com/journal/40574.

[21] Paolo Biscari and Stefano Turzi. *Surface melting and effective anchoring in nematics*. **Proceedings in Applied Mathematics and Mechanics**, 7:1130403–1130404, 2007. doi:10.1002/pamm.200700997.

[22] M. Tamburello, S. Turzi, and S. Vanoli. *Subband spectrum analysis for optical multiplex section protection*, 02 2007. **US Patent**. URL: https://www.lens.org/lens/patent/US_7181137_B1.