

Curriculum Vitae - Prof. Paolo Cermelli

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Current position:

Associate Professor in Mathematics, University of Torino.

Education:

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| 1987 | Laurea in Matematica (110/110 cum laude), University of Torino; |
| 1992 | Ph.D. in Mathematics, funded and awarded by the Italian Government, and carried out at Carnegie Mellon University (Pittsburgh, USA) under the supervision of Prof. M.E. Gurtin. |

Employment:

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|-----------------------|---|
| Sept. 1992-Sept. 1993 | Postdoctoral position at the Istituto Nazionale of Alta Matematica, Roma, Italy; |
| Sept. 1993-Mar. 1994 | Postdoctoral position at the Center for Nonlinear Analysis, Carnegie Mellon University (Pittsburgh, USA); |
| June 1994-Aug. 1994 | Research fellow at the Center for the Mathematical Sciences, University of Wisconsin (Madison, USA); |
| 1993-2000 | Researcher, University Piemonte Orientale, Italy |
| 2000-today | Associate Professor, University of Torino, Italy. |
| 2012 | Awarded the National Full Professor habilitation (Abilitazione Scientifica Nazionale per I fascia) |

Teaching:

During the past 18 years, I have delivered courses at all academic levels to cohorts of varying sizes. These included:

- Mathematical Physics (Classical Mechanics and Analytical Dynamics)
- Partial Differential Equations
- Mathematical Models in Physics (Dynamical Systems and Discrete Dynamical Systems, Chaos)
- Models of Applied Mathematics (Game Theory and Networks)
- Mathematical Models for Behavioural Sciences (Evolutionary Game Theory, Population Genetics, Theory of Decisions)
- Elements of Game Theory
- Calculus
- Linear Algebra

I also delivered the following postgraduate courses:

- Mechanics of Microstructures
- Game Theory
- Mathematical Problems in the Physics of Crystals and Quasicrystals
- Mathematical models for viral capsids

In addition to being the advisor of about 100 master and undergraduate theses, I have been supervisor of 1 PhD student in Italy, as well as of one PhD student at the University of Lexington (KY).

Teaching-related publications (Reviewed Lecture Notes Series at the University of Torino):

Cermelli P., Guana F., Modelli matematici ed equazioni alle derivate parziali. Quaderni didattici del Dipartimento di Matematica dell'Università di Torino n. 12.

Cermelli P., Castellano S., Modelli matematici per lo studio del comportamento. Published on-line on the web-site of the Department of Mathematics, University of Torino.

Research:

1. Research visits:

I have been invited to, and carried out research at, a number of international research institutions and universities, including the following:

- Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, USA;
- Center for the Mathematical Sciences, University of Wisconsin, Madison, USA;
- Max Planck Institut Leipzig, Germany;
- Institute for the Mathematics and its Applications, Minneapolis, USA;
- Department of Mechanical Engineering, Washington University, USA;
- Laboratoire de Mécanique des Solides, Ecole Polytechnique, Paris, France;
- Department of Theoretical and Applied Mechanics, University of Illinois, USA;
- School of Mathematical Sciences, University of Nottingham;
- Department of Mathematics, University of Kentucky, Lexington, USA;
- Mathematisches Forschung Institut, Oberwolfach, Germany;
- York Center for Complex Systems Analysis, University of York
- Okinawa Institute for Science and Technology, Okinawa, Japan
- Mathematical Biology Institute, University of Ohio.
- Courant Institute, New York University, NY, USA

2. Membership in scientific organizing committees of congresses:

- Congress "Geometry and Microstructures", Torino, October 26-28 2000;
- School "Selected Issues In the Mechanics of Crystalline Solids", Padova, October 2-5 2000;
- XI Euromech-Mecamat conference "Mechanics of Microstructured Solids: Cellular Materials, 3.

3. Research Grants:

In addition to taking part in various Italian research projects, I have been P.I. and Scientific Coordinator of the Torino node of the following research projects:

- Mathematical models for structural transitions in viral capsids (Italian Government PRIN 2009);
- Multiscale problems in solids: defects and wave propagation in materials with micro and nano-structure (Italian Government PRIN 2007);
- Selected problems in solids mechanics: defects, thin films and wave propagation (Italian Government PRIN 2002);
- Mathematical models for materials science and complex systems (University of Torino, 2008);
- Multi-scale problems in solids: energetics and wave propagation in materials with fine structure

(University of Torino, 2007).

I also have been a member of the European TMR Network 'Phase Transitions in Crystalline Solids' (1-9-1998/29-02-2004) with nodes in Padova, Roma, Paris, Besançon, Oxford, Berlin, Leipzig, Antwerp.

Furthermore, I have been a member of the European Marie Curie actions-Intra-European Fellowships network 'Multi-scale modelling and characterisation for phase transformations in advanced materials' (1-10-2004/30-09-2008) with nodes in Antwerp, Glasgow, Minneapolis, Paris, Leipzig, Padova, Cambridge, Bonn, Prague, Oxford, Barcelona.

4. Research topics:

My current research is in the areas of mathematical biology and applied mathematics, specifically:

- population dynamics and the evolution of communication
- characterization and prediction of conformational changes in viral capsids. Assembly.
- graph-theoretical methods to the study of brain functional networks
- large graph limits.

5. Scientific publications:

- [66] Zangrossi A., Zanzotto G., Lorenzoni P., Indelicato G., Cannas Aghedu F., Cermelli P., Bisiacchi P.S., (2021) Resting-state functional brain connectivity predicts cognitive performance: an exploratory study on a time-based Prospective Memory task, *Behavioral Brain Research* **402**, 1-9.
- [65] Indelicato G., Cermelli P., Twarock R., (2020) Surface stresses in complex viral capsids and non-quasi-equivalent viral architectures, *Journal of the Royal Society Interface* **17**, 20200455-20200469
- [64] Braides A. Cermelli P., Dovetta S. (2020), The Gamma-limit of the cut functional on dense graph sequences, in *Emergence of Structures in Particle Systems: Mechanics, Analysis and Computation*, European Mathematical Society Publishing House
- [63] Braides A. Cermelli P., Dovetta S. (2020). Gamma convergence of the cut functional on dense graph sequences. *ESAIM-COCV* **26**, 1-24
- [62] Indelicato G., Cermelli P., Twarock R., (2019) A coarse-grained model of the expansion of the human rhinovirus 2 capsid reveals insights in genome release, *Journal of the Royal Society Interface* **16**, 1-13
- [61] Cermelli P., Indelicato G., Twarock R. (2017). Minimum energy paths for conformational changes of viral capsids. *Phys. Rev. E* **96** (1) 012407-1-012407-13.
- [60] Salthouse D.G., Indelicato G., Cermelli P., Keef T., Twarock R. (2015). Approximation of virus structure by icosahedral tilings. *Acta Cryst. A* **71**, 410-422.
- [59] Castellano S., Cermelli P. (2015). Preys' exploitation of predators' fear: when the caterpillar plays the Gruffalo. *Proc. Roy. Soc. B* **282** (1820) 20151786-20151793
- [58] Cermelli P., Indelicato G., Twarock R. (2014). The Role of Symmetry in Conformational Changes of Viral Capsids: A Mathematical Approach. In *Discrete and topological models in molecular biology* - In NATURAL COMPUTING SERIES, 217-240
- [57] Zappa E., Indelicato G., Albano A., Cermelli P. (2013). A Ginzburg–Landau model for the expansion of a dodecahedral viral capsid. *Int. J. Nonlin. Mech.* **56**, 71-78.
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- [54] Indelicato G., Keef T., Cermelli P., Salthouse D.G., Twarock R., Zanzotto G. (2012). Structural transformations in quasicrystals induced by higher-dimensional lattice transitions. *Proc. Roy. Soc. A*, **468**, 1452-1471.
- [53] Castellano S., Cadeddu G., Cermelli P. (2012). Computational mate choice: theory and empirical evidence. *Behavioural processes* **90** 261-277.
- [52] Indelicato G., Cermelli P., Salthouse D., Racca S., Zanzotto G., Twarock R. (2011). A crystallographic approach to structural transitions in icosahedral viruses. *J. Math. Biol.* **64**, 745-773.
- [51] Castellano S. & Cermelli P. (2011). Sampling and assessment accuracy in mate choice: a random-walk model of information processing in mating decision. *J. Theor. Biol.* **274**, 161-169.
- [50] Castellano S. & Cermelli P. (2010). Attractive amplifiers in sexual selection: where efficacy meets honesty. *Evol. Ecol.* **24**, 630-640.
- [49] Cermelli P. & Jabbour M.E. (2010). Step Bunching During the Epitaxial Growth of a Generic Binary-Compound Thin Film. *J. Mech. Phys. Solids* **58**, 810-827.
- [48] Camperio Ciani A., Cermelli P., Zanzotto G. (2008). Sexually Antagonistic Selection in Human Male Homosexuality. *PLoS ONE* **3**(6): e2282.
- [47] Gualla F., Cermelli P., Castellano S. (2008). Is there a role for amplifiers in sexual selection? *J. Theor. Biol.* **252**, 255-271.
- [46] Cermelli P. & Di Scala A.J. (2007). Constant-angle surfaces in liquid crystals. *Phil. Mag.* **87**, 1871-1888.
- [45] Cermelli P. & Armano T. (2007). Fine cross slip of a screw dislocation in anti-plane shear. *Rend. Sem. Mat. Univ. Politec. Torino* **65**, 249-260.
- [44] Cermelli P. & Jabbour M.E. (2007). Possible mechanism for the onset of step-bunching instabilities during the epitaxy of single-species crystalline films. *Phys. Rev. B* **75**, 165409.
- [43] Anderson D.M., Cermelli P., Fried E., Gurtin M.E., McFadden G.B. (2007). General dynamical sharp-interface conditions for phase transformations in viscous heat-conducting fluids. *J. Fluid Mech.* **581**, 323-370.
- [42] Castellano S. & Cermelli P. (2006). Reconciling Sexual Selection to Species Recognition: A Process-based Model of Mating Decision. *J. Theor. Biol.* **242**, 529-538.
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- [40] Cermelli P., Fried E., Gurtin M.E. (2005). Transport relations for surface integrals arising in the formulation of balance laws or evolving fluid interfaces. *J. Fluid Mech.* **544**, 339-351.
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- [35] Bortoloni L. & Cermelli P. (2004). Dislocation patterns and work-hardening in crystalline plasticity. *J. Elasticity* **76**, 113-138.
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curves in \mathbb{R}^3 and on surfaces in \mathbb{R}^3 . *Meccanica* **33**, 587-599.

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