# Lamberto Rondoni - Professor of Mathematical Physics – Politecnico di Torino

**ACADEMIC BACKGROUND**
- Master: Nuclear Engineering, University of Bologna, 1986
- Master: Mathematics, Virginia Polytechnic Institute and State University, 1990
- Master: Physics, Virginia Polytechnic Institute and State University, 1990
- PhD: Mathematical Physics, VPI and State University, 1991
- Postdoc: Virginia Polytechnic Institute and State University,1991-1992
- Research Associate: University of New South Wales, 1992-1995
- Researcher: Politecnico di Torino, 1995-1999
- Associate Professor: Politecnico di Torino, 1999-2010
- Full Professor: Politecnico di Torino, 2011- present

**TASKS and RELATED AFFILIATIONS**

*Politecnico di Torino:*
- Library Director
- Faculty of Architecture Sciences
- Faculty of Engineering Mathematics
- Treasurer CECAM-IT-SIMUL node

*Italian Institute for Nuclear Physics:*
- Head theory group RareNoise project (on detectors of gravitational waves)

*University of Turin:*
- Faculty of Physics of Complex Systems

*University Putra Malaysia:*
- Founder of Malaysia-Italy Centre of Excellence for Mathematical Sciences (http://www.upm.edu.my/berita/ upm_politecnico_di_torino_launches_micems_to_spearhead_internation al_research-25250?L=en)

*Tashkent Turin Polytechnic University:* - Faculty of Civil Engineering

**PROFESSIONAL ACTIVITIES**
- About 160 publications (including invited reviews) in professional journals, 5 edited books, 3 books.
- Numerous invited lectures in meetings and institutes in Europe, America, Asia and Oceania.
- Organizer of international meetings, including workshops funded by the Chinese Academy of Sciences, by the Australian Research Council and by local administrations in various countries.
- Referee for journals including: Nature, Journal of Statistical Physics, Nonlinearity, Physical Review Letters, Physical Review E, Journal of Physics A, Physica A, Physica D., Journal of Statistical Mechanics, Chaos, Journal of Chemical Physics.

**STUDENTS and ASSOCIATES**
- Supervised more than thirty Ph.D. and MS students, now employed in academia, industry, school, etc. Hired twelve research associates.

**TEACHING ACTIVITY**
- Taught about 25 different kinds of courses of physics and mathematics subjects, at undergraduate and graduate level, in America, Europe, Asia, Oceania. Member or chair of examining committees for international MS and PhD programs.

**SELECTION OF PAST RESPONSIBILITIES**
- Deputy Director at Department of Mathematical Sciences
- Member of Government Committee for admission to Architecture schools
- Mathematics Department Governing Board
- Vice-coordinator program in Architecture Sciences
- Chair Theory Group for Consortium of INFN Padova, CNR Trento, Politecncico di Torino (IDEAS-ERC project on noise in gravitational waves detectors)

- Coordinator Ph.D. in Mathematics for Engineering Sciences (Politecnico di Torino)
- Coordinator Ph.D. in Applied Mathematics (Politecnico di Torino)
- Coordinator Ph.D. in Pure and Applied Mathematics (Politecnico di Torino and University di Torino)

**FUNDING** - Funded by Asian, Australian, European (including ERC-IDEAS scheme), and US agencies.
- Funded by public and private institutions and companies.

## LEADERSHIP AND ENGAGEMENT:
1. Numerous extended academic visits in prestigious international institutions, such as Princeton University, Duke University, Rockefeller University, Rutgers University, King's College,London Mathematical Society, Niels Bohr Institute, Université Libre de Bruxelles, Eotvos University, Ecole Normale Superieure, Australian National University, Max  Planck Institutes, Chinese Academy of Sciences, Lanzhou University, Xiamen Univeristy, University Putra Malaysia;
2. Scientific Board of [Graphene@Polito](#) Laboratory;
3. Organizer of numerous meetings and conferences, nationally and internationally on statistical physics and dynamical systems;
3. More than 40 invited lectures given, nationally and internationally;
4. Referee for more than 25 professional journals;
5. Member of academic and government committees, including the national committee for editing of Mathematics and Physics admission tests for Architecture and for Engineering programs;
6. Former Coordinator of PhD in Mathematics for Engineering Sciences (Politecnico di Torino); co-founder and former Coordinator of PhD in Pure and Applied Mathematics (Politecnico di Torino and Università di Torino);
7. former Deputy Chair of Department of Mathematical Sciences, Politecnico di Torino;
8. former member of Management Board of Mathematics Department, and of Department of Mathematical Sciences, Politecnico di Torino;
9. Vice-coordinator Architecture Sciences programmes, Politecnico di Torino.

## SUPERVISED PhD THESES:
1. *Complexity, sustainability and models: possible avenues for the dispersed city design?* by Claudio Bonicco, Dipartimento di Casa Città (thesis on urban development), Politecnico di Torino (2003)
2. *Statistical properties of relativistic particle systems*, by Antonio Aliano, Dipartimento di Fisica, Politecnico di Torino (2006)
3. *Boltzmann maps generalization to open systems and biological applications: how to fix key parameters in protein reactions*, by Andrea Picco, Istituto per la Ricerca e la Cura del Cancro di Candiolo (research center for on cancer research), Università di Torino (2006)
4. *Chaotic and Polygonal Billiards as Models of Mass Transport in Microporous Media*, by Carlo Bianca, Dipartimento di Matematica, Politecnico di Torino (2008)
5. *Anomalous transport: from new theories of osmotic pressure to a new approach in the framework of dynamical systems*, by Lucia Salari, Dipartimento di Matematica, Politecnico di Torino (2012)
6. *Applied models in non-equilibrium statistical mechanics*, by Paolo Alberto Adamo, Dipartimento di Scienze Matematiche, Politecnico di Torino (2013)
7. *A Study of quantum isotopic sieving through carbon nanotubes*, by Devagnik Dasgupta, Dipartimento di Scienze Matematiche, Politecnico di Torino e IIT Torino (2013)
8. *Persistent homology for emerging features detection in networks*, by Irene Donato, Dipartimento di Scienze Matematiche, Politecnico di Torino and ISI (2014)
9. *Energy and Density Distorsion in an Oscillator Chain*, by Antonella Verderosa, Dipartimento di Scienze Matematiche, Politecnico di Torino (2017)
10. Human exploration of complex knowledge spaces, by Giovanna Chiara Rodi, Dipartimento di Scienze Matematiche, Politecnico di Torino (2017)
11. Tensor decomposition techniques for analysing time-varying networks, by Anna Sapienza, Dipartimento di Scienze Matematiche, Politecnico di Torino (2017)
12. The slicer map: moments, correlations and universality, by Muhammad Tayyab, Dipartimento di Matematica, Università di Torino (2018)
13. Currently supervising four PhD students on: a) exactly solvable models and universality classes in

anomalous transport, b) response theory and fluctuations theorems; c) statistical mechanics and symmetries under magnetic fields; d) models of pollutants transport in atmosphere


**SUPERVISED MASTER THESES:**
1. *Microscopic models of equilibrium and nonequilibrium mechanical vibrations*, by Laura Stricker, Dipartimento di Matematica e Dipartimento di Meccanica, Politecnico di Torino (2008)
2. *Quantum cascade terahertz emitters: process optimization, optics and chaotic resonator design*, by Marco Cerrato, Dipartimento di Matematica e Dipartimento di Elettronica, Politecnico di Torino (2009)
3. *Concorso internazionale, evolo-progettazione generativa in un grattacielo*, by Matteo Petracca, Dipartimento di Matematica, Politecnico di Torino (2010)
4. *Model order reduction method applied to chemical kinetics equations*, by Chiara Frola, Dipartimento di Elettronica, Politecnico di Torino (2011)
5. *Nonlinear analysis of EEG temporal series at rest and under anaesthesia*, by Alessandro Barardi, Dipartimento di Matematica, Politecnico di Torino and Brain & Pyschological Sciences Research Centre, Swinburne University of Technology (2012)
6. *Moderne teorie della complessità e la probabilità emergente di Benard Lonergan*, by Santo Lepore, Facoltà Teologica dell'Italia Settentrionale (2013)
7. *Localizzazione e delocalizzazione nella chemiotassi dei neutrofili*, by Anna Sapienza, Dipartimento di Scienze Matematiche, Politecnico di Torino (2013)
8. *Scienza E Fede: Comunicazione È Dialogo?* by Lara Reale, Facoltà Teologica dell'Italia Settentrionale (2013)
9. *Studio della plasticità sinaptica in una popolazione di neuroni Hodgkin-Huxley*, by Andrea Valenti, Dipartimento di Scienze Matematiche, Politecnico di Torino (2014)
10. *Ergodicità e nozioni di temperatura nei sistemi hamiltoniani*, by Francesca Giordani, Fisica dei Sistemi Complessi, Università di Torino (2014)
11. *4-Wave Interactions in Kinetic Wave Turbulence*, by Giovanni Dematteis, Fisica dei Sisemi Complessi, Università di Torino (2015)
12. *BBGKY hierarchy for thermostatted systems*, by Sirio Belga Fedeli, Dipartimento di Scienze Matematiche, Politecnico di Torino (2016)
13. *Quantum thermostatted disordered systems under compression*, by Tommaso Vanzan, Dipartimento di Scienze Matematiche, Politecnico di Torino (2016)
14. *Fluctuations in nonequilibrium systems and time symmetry breaking*, by Sara Dal Cengio, Fisica dei Sistemi Complessi, Università di Torino (2016)
15. *Mathematical modelization and experimental validation of a simple pendulum for the measurement of the Newtonian constant G*, by Luca Maffioli, Dipartimento di Scienze Matematiche, Politecnico di Torino (2016)
    [cotutored with Prof. A. De Marchi, Dipartimento di Elettronica e Telecomunicazioni]
16. *Fano Resonances applied to mechanical oscillators*, by Giulia De Laurentis, Ingegneria Elettronica, delle Telecomunicazioni e Fisica, Politecnico di Torino (2016) [cotutored with Prof. C. Ricciardi, Dipartimento Scienza Applicata e Tecnologia]
17. Stochastic clustering regime for a billiard model of wet granular matter, by Danilo Forastiere, Fisica dei Sistemi Complessi, Università di Torino (2018) [cotutored with Prof. Juergen Vollmer, Leipzig University]
18. Quantum transport in a finite Kronig-Penney model and random walks on a lattice, by Teodor Roci, Fisica dei Sistemi Complessi, Università di Torino (2018)
19. A study of heat flow through a qubit system, by Federica Montana, Fisica dei Sisemi Complessi, Università di Torino (2018) [cotutored with Prof. Erik Aurell, KTH, Stockholm]
20. Bias- and bath-meadited clustering of driven particles through a quiescent bath, by Giulia Janzen, Fisica dei Sistemi Complessi, Università di Torino (2018) [cotutored with Prof. Carlos Mejia Monasterio, Technical University of Madrid]
21. Statistical properties of a biased out-of-equilibrium Brownian gyrator, by Sara Cerasoli, Fisica dei Sistemi Complessi, Università di Torino (2018) [cotutored with Prof. Gleb Oshanin, Sorbonne, Paris]
22. The role of the overhang in weakly coupled cantilevers driven by an external force, by Tarcisio Boffi, Fisica, Università Sapienza Roma, (2019) [cotutored with with Prof. Paolo de Gregorio, Politecnico di Torino]

**SUPERVISED BACHELOR THESES:**

**1.** *Approccio Bayesiano per la predizione dei complessi proteici in cellule mammifero*, by Chiara Peyron, Dipartimento di Matematica e Istituto per la Ricerca e la Cura del Cancro di Candiolo, Università di Torino (2003)

**2.** *Chaotic Dynamical Systems and Biological Applications*, by Stefano Sarao, Dipartimento di Scienze Matematiche, Politecnico di Torino (2014)

**3.** *Mathematical models for chemical kinetics*, by Tommaso Vanzan, Dipartimento di Scienze Matematiche, Politecnico di Torino (2014)

**4.** *Mathematical models for anomalous diffusion: Polygonal Billiards and Slicer Map*, by Silvia Massi, Dipartimento di Scienze Matematiche, Politecnico di Torino (2014)

**5.** *Sistemi dinamici in ingegneria civile: il caso del Tacoma Narrows Bridge*, by Alessandro Cetani, Ingengeria Civile, Politecnico di Torino (2014)

**6.** *Teoria delle grandi deviazioni e applicazioni*, by Maria Assunta Palmieri, Dipartimento di Scienze Matematiche, Politecnico di Torino (2014)

**7.** *Nonlinear dynamics in structural mechanics*, by Iqboljon Adahamjonov, Mechanical Engineering Department, Turin Politechnic University in Tashkent (2015)


**POST-DOCTORAL POSITIONS AND OTHER POST-GRADUATE SCHOLARSHIPS:**

**1.** S. Stoecker (Germany), 1997

**2.** O. G. Jepps (Australia), 2004-2006

**3.** C. R. Mejia Monasterio (Mexico), 2005-2007

**4.** M. Cerrato (Italy), 2008-2009

**5.** A. Botrugno (Italy), 2008-2010

**6.** P. M. De Gregorio (Italy), 2008-2012

**7.** A. Igarashi (Japan), 2009-2011

**8.** S. Banerjee (India), 2009-2011

**9.** M. Colangeli (Italy), 2010-2012

**10.** R. Belousov (Russia), 2012-2013

**11.** P. Adamo (Italy), 2013

**12.** D. Dasgupta (India), 2013

**13.** Giuseppa Algano (Italy), 2019


**PUBLICATIONS:**

About 160 publications including scientific articles in specialized journals, edited books and journal special issues, scholarly books, textbooks, popular articles. The following is a selection of recent publications:

**1.** *Time reversal and symmetries of time correlation functions*
by: A. Coretti, S. Bonella, L. Rondoni, G. Ciccotti
Molecular Physics, Volume 116, 2018, Pages 3097-3103 Published online: 17 May 2018

**2.** *4-wave dynamics in kinetic wave turbulence*
By: Chibbaro, Sergio; Dematteis, Giovanni; Rondoni, Lamberto
PHYSICA D-NONLINEAR PHENOMENA   Volume: 362   Pages: 24-59   Published: JAN 1 2018

**3.** *Asymmetry relations and effective temperatures for biased Brownian gyrators.*
By: Cerasoli, Sara, Dotsenko, Victor, Oshanin, Gleb, Rondoni, Lamberto (2018). PHYSICAL REVIEW. E, vol. 98, p. 0421491

**4.** *Wave-turbulence theory of four-wave nonlinear interactions*
By: Chibbaro, Sergio; Dematteis, Giovanni; Josserand, Christophe; et al.
PHYSICAL REVIEW E   Volume: 96   Issue: 2   Article Number: 021101   Published: AUG 30 2017

**5.** *Nonequilibrium Langevin dynamics: A demonstration study of shear flow fluctuations in a simple fluid*
By: Belousov, Roman; Cohen, E. G. D.; Rondoni, Lamberto
PHYSICAL REVIEW E   Volume: 96   Issue: 2   Article Number: 022125   Published: AUG 14 2017

**6.** *Time-reversal symmetry for systems in a constant external magnetic field*
By: Bonella, Sara; Coretti, Alessandro; Rondoni, Lamberto; et al.
PHYSICAL REVIEW E   Volume: 96   Issue: 1   Article Number: 012160   Published: JUL 31 2017

**7.** *Quantum Correlations under Time Reversal and Incomplete Parity Transformations in the Presence of a Constant Magnetic Field*
By: De Gregorio, Paolo; Bonella, Sara; Rondoni, Lamberto
SYMMETRY   Volume: 9   Issue: 7   Article Number: 120   Published: JUL 2017

**8.** *On the relevance of the maximum entropy principle in non-equilibrium statistical mechanics*
By: Auletta, Gennaro; Rondoni, Lamberto; Vulpiani, Angelo
EUROPEAN PHYSICAL JOURNAL-SPECIAL TOPICS   Volume: 226   Issue: 10
Pages: 2327-2343   Published: JUL 2017

**9.** *Broken versus Non-Broken Time Reversal Symmetry: Irreversibility and Response*
By: Dal Cengio, Sara; Rondoni, Lamberto
SYMMETRY-BASEL Volume: 8   Issue: 8   Article Number: 73   Published: AUG 2016

**10.** *On Typicality in Nonequilibrium Steady States*
By: Evans, Denis J.; Williams, Stephen R.; Searles, Debra J.; et al.
JOURNAL OF STATISTICAL PHYSICS   Volume: 164   Issue: 4   Pages: 842-857   Published: AUG 2016


**Full list of publications** available at: https://iris.polito.it/cris/rp/rp04367#.XEoyri2ZOL8