



# Andrea Tosin

## General Information

Name, Surname Andrea Tosin  
Nationality Italian  
Date of birth 22nd September 1980  
Place of birth Torino, Italy  
Gender Male

## Education

### Studies

PhD (2008) Mathematics for Engineering Sciences (Politecnico di Torino, Italy)  
MSc (2004) Mathematical Engineering (Politecnico di Torino, Italy)  
BSc (2002) Mathematics for Engineering Sciences (Politecnico di Torino, Italy)

### Languages

Italian Native  
English TOEFL (CBT)  
French DELF A1-A4

Score: 270/300  
Score: 307.70/360

## Academic Positions

### Current

Apr 20–present Full professor of Mathematical Physics (MAT/07)  
Department of Mathematical Sciences “G. L. Lagrange”  
Politecnico di Torino  
Address Corso Duca degli Abruzzi 24, 10129 Torino, Italy  
Email [andrea.tosin@polito.it](mailto:andrea.tosin@polito.it)  
Phone +39 011.090.7562  
Home page <http://staff.polito.it/andrea.tosin>

### Previous

Oct 15–Apr 20 Associate professor of Mathematical Physics (MAT/07)  
Department of Mathematical Sciences “G. L. Lagrange”  
Politecnico di Torino  
Torino, Italy  
Oct 11–Oct 15 Researcher  
Istituto per le Applicazioni del Calcolo “M. Picone”  
Consiglio Nazionale delle Ricerche  
Roma, Italy

Nov 08–Sep 11 INdAM Postdoctoral Fellow  
Department of Mathematics  
Politecnico di Torino, Italy  
Funding Agency: Compagnia di San Paolo

Oct 07–Oct 08 Research Fellow  
Istituto per le Applicazioni del Calcolo “M. Picone”  
Consiglio Nazionale delle Ricerche (Roma, Italy)  
Funding Agency: University of Salerno ( Fisciano SA, Italy)

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## Prizes and Honours

2017 National Grant for Fundamental Research (FFABR) – Grant: 3 k€  
2013 SIMAI 2013 prize for young scientists in Applied Mathematics  
2011 INdAM-SIMAI 2010 prize for the best Italian PhD theses in Applied Mathematics

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## Scientific Activity

### Research

Research Field Mathematical Physics

Research statement My research consists mainly in revisiting the classical mathematical methods of the kinetic theory (Boltzmann-type collisional equations, Fokker-Planck mean field asymptotics) and of the transport of measures to investigate multiscale problems in the realm of interacting multi-agent systems

Research Topics Interacting multi-agent systems, vehicular traffic, crowd dynamics, social systems

Methods Kinetic theory, multiscale conservation laws, transport and diffusion equations, numerical simulations

### Coordination of Research Groups

- Head of a local research group (at the Department of Mathematical Sciences “G. L. Lagrange” of Politecnico di Torino) devoted to the modelling, analysis and numerical treatment of multi-agent systems by means of mathematical methods of the kinetic theory
- 2012-present National coordinator of the SIMAI Activity Group on Complex Systems (SisCo-SIMAI, <http://staff.polito.it/andrea.tosin/SisCo-SIMAI>)

### Projects and Grants

2016-2020 Compagnia di San Paolo Starting Grant “Attracting Excellent Professors”  
Title Vehicular and pedestrian traffic models: from flow forecast to safety management  
Role Principal Investigator  
Grant 100 k€

2011 INdAM-GNFM Young Researchers Project  
Title Multiscale methods and models for collective behaviors in living complex systems  
Role Principal Investigator  
Grant 2 k€

### Participation in Other Research Projects

2017 PRIN  
Title Innovative numerical methods for evolutionary partial differential equations and applications  
Role Participant

2012 Google Research Award  
Title Multi-population models for vehicular traffic and pedestrians

- Role Participant
- 2010–2014 FP7 NoE HYCON2  
 Title Highly-complex and networked control systems  
 Role Participant (CNR Unit)
- 2011–2013 PRIN  
 Title Nonlinear hyperbolic problems for applications  
 Role Participant
- 2009–2011 PRIN  
 Title Mathematical models of mechanical interactions of cells and cell aggregates with the surrounding environment  
 Role Participant
- 2006–2008 PRIN  
 Title Mathematical models of growth and vascularisation of tumours and biological tissues  
 Role Participant
- 2005 INdAM Project  
 Title Traffic flows and optimization on complex networks  
 Role Participant

### Research Partnerships with Public and Private Companies

- 2020 MSc thesis in Mathematical Engineering (Politecnico di Torino) in partnership with Thales Alenia Space S.p.A. on the topic: “Virtual Shaker Testing of a large satellite with uncertainty quantification of the mechanical stiffness”
- 2019 Signing of a Memorandum of Understanding with Oasys Ltd. for joint teaching and research activities on the mathematical modelling and the numerical simulation of crowd dynamics in built environments
- 2017 Cooperation agreement within the research project “Design Experience at Juventus Stadium: a New Concept Design for the Omar Sivori Club”

### Organisation of Conferences and Conference Sessions

- Oct 20-Sep 21 “MAIn 2021 - Mathematics for Artificial Intelligence”  
 Online seminar cycle
- Sep 19 “Models and Applications”  
 Section S9 of the 21st UMI (“Italian Mathematical Union”) Congress – Pavia, Italy  
 (co-organiser: Giuseppe Saccomandi)
- Jul 19 “Mathematical descriptions of traffic flow: micro, macro and kinetic models”  
 Mini-symposium within the ICIAM 2019 Congress – Valencia, Spain  
 (co-organiser: Gabriella Puppo)
- Oct 18 “Recent trends in kinetic modelling and related fields” – Torino, Italy  
 (co-organiser: Mattia Zanella)
- Oct 18 “Problems in discrete dynamics: from biochemical systems to rare events, networks, clustering and related topics - IV Edition” – Arcidosso, Italy  
 (co-organisers: Vincenzo Barone, Armando Bazzani, Paolo Freguglia, Giordano Mancini, Monica Sanna)
- Sep 18 “Advances in kinetic theory”  
 Thematic session within the UMI-SIMAI-PTM Joint Meeting – Wrocław, Poland  
 (co-organiser: Ewelina Zatorska)

- Jul 18 “Models and numerical methods in kinetic theory”  
Special session within the 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications – Taipei, Taiwan  
(co-organisers: Giacomo Dimarco, Mattia Zanella)
- Oct 17 “Problems in discrete dynamics: from biochemical systems to rare events, networks, clustering and related topics - II Edition” – Arcidosso, Italy  
(co-organisers: Armando Bazzani, Chiara Cappelli, Paolo Freguglia, Monica Sanna)
- Jul 14 “Complex Systems (vehicular traffic, crowd dynamics, biological systems, social systems)”  
Mini-Symposium within the SIMAI 2014 Congress – Taormina ME, Italy  
(co-organiser: Marina Dolfin)
- Nov 12 “From individual to collective behaviour: crowds and swarms” – Roma, Italy
- Jun 10 “Crowd and swarm dynamics: interactions, self-organization, mathematics, applications”  
Young Researcher Mini-Symposium within the SIMAI 2010 Congress – Cagliari, Italy  
(co-organiser: Paolo Frasca)

### Editorial Activity

- 2018-present Associate Editor of *Mathematics and Computers in Simulation* (Elsevier)
- 2012-present Member of the Editorial Board of *SEMA SIMAI Springer Series*
- 2013-2015 Member of the Editorial Board of the Springer-Birkhäuser Series (Boston, USA) *Modeling and Simulation in Science, Engineering and Technology*

### Referee of Scientific Papers

- Referee for • Acta Applicandae Mathematicae • Applied Mathematical Modelling • Applied Mathematics and Computation • Communications in Mathematical Sciences • Comptes Rendus – Mécanique • Computers & Mathematics with Applications • Discrete and Continuous Dynamical Systems – Series B • Journal of Computational and Applied Mathematics • Journal of Computational Physics • Journal of Differential Equations • Journal of Mathematical Analysis and Applications • Journal of Mathematical Biology • Journal of Physics A: Mathematical and Theoretical • Journal of Theoretical Biology • Kinetic and Related Models • Mathematical Models and Methods in Applied Sciences • Multiscale Modeling & Simulation • Networks and Heterogeneous Media • New Journal of Physics • Physica A • SIAM Journal on Applied Mathematics • SIAM Journal on Control and Optimization • The IMA Journal of Applied Mathematics • Transportation Research Part C: Emerging Technologies • Vietnam Journal of Mathematics

Publons Certified referee activity: <https://publons.com/a/591032>

### Referee of Research Projects

- 2017 Referee of a proposal presented at the PALM (“*Physics: Atoms, Light, Matter*”) Laboratory, University of Paris-Saclay, on the topic: “Complex Systems: from systems out of equilibrium to the biological matter”

### Referee of PhD Theses

- 2020 PhD candidate: Martina Conte  
Thesis: “Mathematical models for glioma growth and migration inside the brain”  
PhD programme in Mathematics, Basque Center for Applied Mathematics, Spain
- 2019 PhD candidate: Marta Marulli  
Thesis: “Mathematical model for ionic exchanges in renal tubules: the role of epithelium”  
PhD programme in Mathematics, *Alma Mater Studiorum* University of Bologna, Italy
- 2019 PhD candidate: Elisa Iacomini  
Thesis: “Mathematical models and methods for traffic flow and stop & go waves”  
PhD programme in Mathematical Models for Engineering, Electromagnetism and Nanoscience, “Sapienza” University of Rome, Italy

- 2018 PhD candidate: Veronica Tora  
Thesis: “Mathematical models for brain diseases: formation of senile plaques and neurofibrillary tangles in Alzheimer’s disease”  
PhD programme in Mathematics, *Alma Mater Studiorum* University of Bologna, Italy
- 2018 PhD candidate: Marco Torregrossa  
Thesis: “Modeling of socio-economic phenomena by Fokker-Planck equations”  
Joint PhD programme in Mathematics, University of Pavia, University of Milano Bicocca and INdAM, Italy
- 2017 PhD candidate: Domenico Brunetto  
Thesis: “MOOCs and active learning in mathematics: educational and mathematical modelling for classroom practices”  
PhD programme in Mathematical Models and Methods in Engineering, Politecnico di Milano, Italy

### Postdoctoral Students and Research Fellows

- Jan 20–present Felisia Angela Chiarello  
Postdoc, Politecnico di Torino, Italy  
Research topic: Kinetic equations and conservation laws for modelling and simulating multi-agent systems
- Nov 19–present Nadia Loy  
Postdoc, Politecnico di Torino, Italy  
Research topic: Kinetic equations and conservation laws for modelling and simulating multi-agent systems
- Jun 17–Aug 17 Sebastiano Roncoroni  
Research fellow, Politecnico di Torino, Italy  
Research topic: Boltzmann-type kinetic equations for the study of non-homogeneous vehicular traffic
- Jan 17–Jul 18 Mattia Zanella  
Postdoc, Politecnico di Torino, Italy  
Research topic: Kinetic models of multi-agent systems, Fokker-Planck asymptotics and related numerical approximations
- Jan 13–May 15 Fabio S. Priuli  
Postdoc, University of Rome “Tor Vergata” and IAC-CNR, Italy  
Research topic: Optimisation of pedestrian flows in complex environments  
Co-supervised with Emiliano Cristiani
- Jan 12–Dec 15 Marco Scianna  
Postdoc, Politecnico di Torino, Italy  
Research topic: Multiscale models of environment sensing in cell aggregates and human crowds

### PhD Students

- Oct 16–Sep 19 Nadia Loy  
Politecnico di Torino, Italy  
Thesis: “Kinetic models for cell migration and their hydrodynamic limits”  
Co-supervised with Prof. Luigi Preziosi
- Nov 15–Oct 18 Raul De Maio  
“Sapienza” University of Rome, Italy  
Thesis: “Multiscale methods for traffic flow on networks”  
Co-supervised with Prof. Fabio Camilli
- Jan 14–Dec 16 Giuseppe Visconti  
University of Insubria, Como, Italy  
Thesis: “Single- and multi-population kinetic models for vehicular traffic reproducing fundamental diagrams and with low computational complexity”  
Co-supervised with Prof. Gabriella Puppo and Dr. Matteo Semplice

Jan 12–Dec 15 Alessandro Corbetta  
Politecnico di Torino, Italy & TU/e Eindhoven, the Netherlands  
Thesis: “Multiscale crowd dynamics: physical analysis, modeling and applications”  
Co-supervised with Prof. Luca Bruno, Prof. Adrian Muntean, Prof. Federico Toschi

### MSc Students

- Under way Giacomo Cravero  
MSc Mathematical Engineering, Politecnico di Torino, Italy  
Thesis topic: Models of multi-modal transportation systems  
Co-supervised with Dr. Marco Scianna  
External Company: Hitachi Rail (representative: eng. Maurizio Pichierri)
- Under way Giacomo Masali  
MSc Mathematical Engineering, Politecnico di Torino, Italy  
Thesis topic: Kinetic equations on graphs for the spreading of infectious diseases  
Co-supervised with Dr. Nadia Loy
- Under way Serena Russo  
MSc Mathematical Engineering, Politecnico di Torino, Italy  
Thesis topic: Kinetic models of socio-epidemiological dynamics  
Co-supervised with Dr. Nadia Loy
- Oct 20 Adele Ravagnani  
MSc Physics of Complex Systems, Politecnico di Torino, Italy  
Thesis: “Phase transition in vehicular traffic: a Boltzmann-type kinetic approach”  
Co-supervised with Dr. Mattia Zanella
- Apr 20 Andrea Medaglia  
MSc Physics, University of Milan, Italy  
Thesis: “Kinetic-controlled non-Maxwellian traffic models with driver-assist vehicles”  
Co-supervised with Dr. Mattia Zanella
- Mar 20 Matteo Defilippi  
MSc Mathematical Engineering, Politecnico di Torino, Italy  
Thesis: “Uncertainty quantification of mechanical stiffnesses in a base-shake sine test of a spacecraft”  
Co-supervised with Dr. Mattia Zanella  
External Company: Thales Alenia Space (representative: eng. Pietro Nali)
- Oct 18 Luca Lanzilao  
MSc Mathematical Engineering, Politecnico di Torino, Italy  
Thesis: “Mathematical models of crowd-to-structure action in footbridges at different scales”  
Co-supervised with Dr. Fiammetta Venuti
- Oct 15 Raul De Maio  
MSc Applied Mathematics, “Sapienza” University of Rome, Italy  
Thesis: “A multiscale approach to vehicular traffic”  
Co-supervised with Prof. Eugenio Montefusco
- Dec 10 Anna Scotti  
MSc Mathematical Engineering, Politecnico di Torino, Italy  
Thesis: “The role of hanger slackening in footbridge dynamics: mathematical modelling and engineering outcomes”  
Co-supervised with Prof. Luca Bruno, Dr. Fiammetta Venuti
- Dec 08 Miriam Pirra  
MSc Mathematical Engineering, Politecnico di Torino, Italy  
Thesis: “Modelling pedestrian traffic by conservation laws with non-local flux”  
Co-supervised with Prof. Luigi Preziosi
- Dec 07 Mattia Bozzola  
MSc Mathematical Engineering, Politecnico di Torino, Italy  
Thesis: “Immersed boundary method applied to tumor cord development”  
Co-supervised with Dr. Davide Fransos, Prof. Luigi Preziosi

Jul 07 Paola Latorraca  
MSc Mathematical Engineering, Politecnico di Torino, Italy  
Thesis: "Qualitative analysis of a multiphase model for the growth of tumor cords"  
Co-supervised with Prof. Luigi Preziosi

### BSc Students

- Under way Davide Grande  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis topic: Monte Carlo numerical simulation of multi-agent systems
- Under way Alessia Loncini  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis topic: Kinetic models of opinion dynamics
- Under way Erika Rongoni  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis topic: Models of aerial traffic control
- Dec 20 Carmen Frasca  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: "Boltzmann-type analysis and simulation of simple market economies"
- Oct 20 Alessandro Baldi  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: "Kinetic models of opinion formation and numerical simulations"
- Oct 20 Maria Anna Consoli  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: "Markov models for consensus in multi-agent systems"
- Sep 20 Matteo Rufolo  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: "Kinetic equations for the analysis of the wealth distribution"
- Jul 20 Matteo Raviola  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: "A kinetic approach to the Sznajd model of opinion formation on social networks"
- Mar 20 Valentina Crivello  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: "Boltzmann and Fokker-Planck models for wealth distribution"
- Mar 20 Martina Fraia  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: "A kinetic reinterpretation of the Sznajd model of opinion formation"
- Dec 19 Stefano Peirone  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis "Direct methods of the Calculus of Variations"
- Oct 19 Elena Pitino  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: "Kinetic equations for opinion dynamics in multi-agent systems"
- Sep 19 Giulia Della Croce Di Dojola  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: "Emergence of fat-tailed distributions in multi-agent systems"
- Jul 19 Marilina Barulli  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: "Boltzmann-type models for vehicular traffic with application to driver-assist vehicles"
- Jul 19 Simone Martone  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: "Opinion dynamics: kinetic modelling and Monte Carlo simulations"
- Oct 18 Davide Cividino  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: "A Boltzmann-type kinetic model of Alzheimer's disease"

- Oct 18 Simona Cucchiara  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: “Kinetic models for multi-agent systems with application to vehicular traffic”
- Oct 18 Nicolò Perello  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: “Stability and bifurcations in models of population dynamics”
- Sep 18 Sara Cavaglion  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: “SIS and SIR epidemiological models”
- Sep 18 Giulia Formica  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: “Fokker-Planck models for social phenomena”
- Mar 18 Matteo Marino  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: “The Cucker-Smale model and its mean-field limit”
- Sep 17 Julien Genovese  
BSc Mathematics for Engineering, Politecnico di Torino, Italy  
Thesis: “Conservation laws for vehicular traffic”
- Mar 11 Riccardo Ferrero  
BSc Mathematics for Engineering Sciences, Politecnico di Torino, Italy  
Thesis: “Maximum principles and overdetermined elliptic problems”  
Co-supervised with Prof. Enrico Serra
- Mar 11 Lorenzo Pavese  
BSc Mathematics for Engineering Sciences, Politecnico di Torino, Italy  
Thesis: “Elements of distributional Fourier transform with application to a linear elasticity problem”  
Co-supervised with Prof. Marco Codegone
- Mar 10 Annachiara Colombi  
BSc Mathematics for Engineering Sciences, Politecnico di Torino, Italy  
Thesis: “Modelling tumour growth by mixture theory methods”  
Co-supervised with Prof. Luigi Preziosi
- Mar 10 Fabio Fanari  
BSc Mathematics for Engineering Sciences, Politecnico di Torino, Italy  
Thesis: “Variational methods with applications to analytical mechanics”  
Co-supervised with Prof. Luigi Preziosi
- Dec 06 Miriam Pirra  
BSc Mathematics for Engineering Sciences, Politecnico di Torino, Italy  
Thesis: “Tumour growth models in avascular phase”  
Co-supervised with Prof. Luigi Preziosi

### Invited Talks

- Apr 20 e-Workshop “Collective Models, Control and Uncertainty Quantification for Infectious Diseases and Related Problems”  
Talk: “Some (very) preliminary ideas for models of epidemic spreading in an urban mobility context”
- Feb 20 Workshop on “Kinetic Traffic Models and Numerical Methods” (“Sapienza” University of Rome, Italy)  
Talk: “Emerging topics in the kinetic theory of traffic flow”
- Jul 19 ICIAM 2019 - “International Congress on Industrial and Applied Mathematics” (Valencia, Spain)  
Talk: “A kinetic approach to uncertainty damping in traffic flow via driver-assist vehicles”
- Jun 19 “The 28th Biennial Numerical Analysis Conference” (University of Strathclyde, Glasgow, Scotland)  
Talk: “Kinetic models of traffic flow control via driver-assist vehicles”



- May 19 Summer school “Trails in kinetic theory: foundational aspects and numerical methods” (Hausdorff Research Institute for Mathematics, Bonn, Germany)  
Talk: “Kinetic modelling of traffic flow control”
- May 19 Spring Workshop on “Computational Mathematics, Statistics and Machine Learning” (University of Pavia, Italy)  
Talk: “Kinetic insights into the rise and fall of popularity on social media”
- Apr 18 Workshop “Numerical Aspects of Hyperbolic Balance Laws and Related Problems” (University of Ferrara, Italy)  
Talk: “Boltzmann-type models with uncertain binary interactions”
- Nov 17 Meeting “The finite volumes schemes and traffic modeling” (Laboratoire de Mathématiques de Besançon, Besançon, France)  
Talk: “Control strategies for road risk mitigation in kinetic traffic modelling”
- Oct 17 Mathematics and Applications Sussex seminars (University of Sussex, Brighton, UK)  
Talk: “Kinetic and multiscale models of traffic flows”
- Sep 17 IperPV2017 – XVII Italian Meeting on Hyperbolic Equations (University of Pavia, Italy)  
Plenary talk: “Kinetic and multiscale models of traffic flows”
- May 17 Warwick EPSRC Symposium on Partial Differential Equations and their Applications – “Emerging PDE models in Socio-Economic Sciences” (Mathematics Institute, University of Warwick, UK)  
Talk: “Reducing complexity of multi-agent systems with symmetry breaking: an application to opinion dynamics with polls”
- Mar 17 CrossFields PDEs – “Current Topics in Kinetic Theory” (Institute of Mathematics of the Polish Academy of Sciences, Warsaw, Poland)  
Talk: “Kinetic description of collision avoidance in pedestrian crowds by sidestepping”
- Feb 17 Problems in discrete dynamics - From biochemical systems to rare events, networks, clustering and related topics (Arcidosso, Italy)  
Talk: “Proposal of a risk model for vehicular traffic: A Boltzmann-type kinetic approach”
- Jun 16 X Forum of Partial Differential Equations (Institute of Mathematics of the Polish Academy of Sciences, Będlewo, Poland)  
Talk: “A Boltzmann-type kinetic approach to the modelling of vehicular traffic”
- Mar 16 ANCONET “Analysis and Control on Networks: trends and perspectives” (University of Padua, Italy)  
Talk: “A Boltzmann-type kinetic approach to traffic flow on road networks”
- Nov 15 Applied PDEs Seminar (Imperial College London, UK)  
Talk: “Multiscale models of crowd dynamics”
- Oct 15 Radon Group Seminars (RICAM, Linz, Austria)  
Talk: “Multiscale models of crowd dynamics”
- Sep 15 Workshop “Mathematical Foundations of Traffic” (IPAM-UCLA, Los Angeles CA, USA)  
Talk: “A Boltzmann-type kinetic approach to the modeling of vehicular traffic”
- Jun 15 MASCOT 2015 “14th Meeting on Applied Scientific Computing and Tools” (IAC-CNR, Roma, Italy)  
Talk: “Individuality vs. Collectivity in Crowd Dynamics Modeling”
- Jan 15 Meiji Seminar on Nonlinear Mathematical Sciences (Meiji University, Tokyo, Japan)  
Talk: “Microscopic, Macroscopic: Comparison and Multiscale Coupling”
- Jan 15 ICMMA 14 Conference “Crowd Dynamics” (Meiji University, Tokyo, Japan)  
Talk: “Multiscale Modeling of Pedestrian Dynamics: Individuality vs. Collectivity”
- Oct 14 KI-Net Conference “Modeling and Control in Social Dynamics” (Rutgers University, Camden NJ, USA)  
Talk: “Generalized Kinetic Equations and Stochastic Game Theory for Social Systems”
- Jul 14 SIMAI 2014 Congress (Taormina, Italy)  
Plenary talk: “From individuals to collectivity: Multiscale methods for living complex systems”

- Jun 14 Biomat 2014 “Complexity and Emergence in Social and Biological Systems” (University of Granada, Spain)  
Talk: “Traffic flow on networks: A fully-discrete kinetic theory approach”
- Sep 13 NumHyp2013 “Numerical Approximations of Hyperbolic Systems with Source Terms and Applications” (RWTH Aachen University, Germany)  
Talk: “Multiscale methods for cell migration and organization – Modeling, analysis, and (some) numerics”
- Sep 13 INdAM Meeting “The Mathematics of Cells and Tissues” (Cortona, Italy)  
Talk: “Multiscale modeling of *in vitro* cell organization and migration”
- May 13 INdAM Workshop “Mathematical Models and Methods for Planet Earth” (Roma, Italy)  
Talk: “On the dynamics of social conflicts: looking for the Black Swan”
- Sep 10 Workshop “Partial Differential Equations in Mathematical Biology” (Institute of Mathematics of the Polish Academy of Sciences, Będlewo, Poland)  
Talk: “Initial/boundary-value problems of tumor growth in mixture theory”
- Jul 09 BIRS Workshop “Multiscale Analysis of Self-Organization in Biology” (Banff, Alberta, Canada)  
Talk: “Tumor growth by a mixture theory approach: modeling and analytical issues”

### Contributed Talks

- Sep 19 21st Congress of the Italian Mathematical Union (UMI) (Pavia, Italy)  
Talk: “Kinetic models in the mathematical theory of vehicular traffic”
- Oct 18 Conference “Kinetic and transport equations: mathematical advances and applications” (Parma, Italy)  
Talk: “Kinetic insights into the rise and fall of popularity on social media”
- Jun 18 15th IFAC Symposium on Control in Transportation Systems (CTS 2018, Savona, Italy)  
Talk: “Control strategies for road risk mitigation in kinetic traffic modelling”

### Visits

- Oct 17 University of Sussex  
Brighton, UK  
Dr. Bertram Düring
- Nov 15 Imperial College London  
London, UK  
Prof. José Antonio Carrillo de la Plata, Prof. Pierre Degond
- Oct 15 Johann Radon Institute for Computational and Applied Mathematics (RICAM)  
Linz, Austria  
Dr. Marie-Therese Wolfram
- Jul 15 University of Ferrara  
Ferrara, Italy  
Prof. Lorenzo Pareschi
- Dec 11 Eindhoven University of Technology (TU/e)  
Eindhoven, the Netherlands  
Dr. Adrian Muntean, Prof. Federico Toschi
- Nov 10 Institute of Applied Mathematics and Mechanics  
Warsaw, Poland  
Prof. Mirosław Lachowicz
- Apr-May 10 Rutgers University  
Camden NJ, USA  
Prof. Benedetto Piccoli
- Jun 07 University of Minnesota  
Minneapolis MN, USA  
Prof. Hans Othmer

### Memberships

- 2008-present Member of INdAM-GNFM, Section 4: “Transport and diffusion problems”

- 2007-2009 and 2015-present Member of UMI (Italian Mathematical Union)
- 2008-present Member of SIMAI (Italian Society for Applied and Industrial Mathematics)

## Teaching Activity

### Holder of PhD and Advanced Courses

- 2018 “Optimal Transport: Numerical Methods and Applications” (Lake Como School of Advanced Studies, Como, Italy)  
Series of 4 lectures on: “Conservation laws with nonlocal flux”
- 2015 “Modeling and Simulation of Emerging Collective Behavior” (“Sapienza” University of Rome, Italy)  
Series of 4 lectures on: “Macroscopic and kinetic models of vehicular traffic flows”
- 2012 CISM Course “Analysis, Modeling and Simulation of Collective Dynamics from Bacteria to Crowds” (Udine, Italy)  
Series of 8 lectures on: “Multiscale modeling of pedestrian motions by time-evolving measures”
- 2008 Intensive Program in “Mathematical Models in Life and Social Sciences” – MathMods IP 2008 (L’Aquila, Italy)  
Series of 2 lectures on: “Traffic flow: modeling and networks”

### Holder of BSc Courses

- 2020-21 Equations of Mathematical Physics (Politecnico di Torino, Italy)  
Mathematical Methods for Engineering (Politecnico di Torino, Italy)
- 2019-20 Rational Mechanics (Politecnico di Torino, Italy)  
Mathematical Methods for Engineering (Politecnico di Torino, Italy)
- 2018-19 Rational Mechanics (Politecnico di Torino, Italy)  
Mathematical Methods for Engineering (Politecnico di Torino, Italy)
- 2017-18 Rational Mechanics (Politecnico di Torino, Italy)  
Mathematical Methods for Engineering (Politecnico di Torino, Italy)
- 2016-17 Rational Mechanics (Politecnico di Torino, Italy)  
Mathematical Methods for Engineering (Politecnico di Torino, Italy)
- 2015-16 Mathematical Methods for Engineering (Politecnico di Torino, Italy)

### Teaching Assistant at BSc and MSc Courses

- 2020-21 Transport Models and Kinetic Theory (MSc, Politecnico di Torino, Italy)  
Mathematics for Artificial Intelligence (MSc, Politecnico di Torino, Italy)
- 2019-20 Transport Models and Kinetic Theory (MSc, Politecnico di Torino, Italy)
- 2018-19 Transport Models and Kinetic Theory (MSc, Politecnico di Torino, Italy)
- 2017-18 Transport Models and Kinetic Theory (MSc, Politecnico di Torino, Italy)
- 2016-17 Transport Models and Kinetic Theory (MSc, Politecnico di Torino, Italy)
- 2015-16 Rational Mechanics (BSc, Politecnico di Torino, Italy)
- 2011 Mechanics of Multiphase Systems (MSc, Politecnico di Torino, Italy)
- 2010 Mechanics of Multiphase Systems (MSc, Politecnico di Torino, Italy)
- 2009 Mathematical Methods for Engineering (MSc, Politecnico di Torino, Italy)  
Partial Differential Equations (BSc, Politecnico di Torino, Italy)
- 2008 Continuum Mechanics (MSc, Politecnico di Torino, Italy)
- 2007 Continuum Mechanics (MSc, Politecnico di Torino, Italy)
- 2007 Functional Analysis (MSc, Politecnico di Torino, Italy)  
Partial Differential Equations (BSc, Politecnico di Torino, Italy)
- 2006 Mechanics of multiphase systems (MSc, Politecnico di Torino, Italy)

- 2006 Functional Analysis (MSc, Politecnico di Torino, Italy)  
Partial Differential Equations (BSc, Politecnico di Torino, Italy)
- 2005 Calculus II (BSc, Politecnico di Torino, Italy)
- 2004 Calculus II (BSc, Politecnico di Torino, Italy)

### Thematic Seminar Cycles

- 2011 Complex Systems in Engineering Sciences (Politecnico di Torino, Italy)
- 2010 Mathematical Methods and Models for Complex Systems (Politecnico di Torino, Italy)

## Institutional Appointments

- Nov 2020-present Vice-coordinator of the PhD Programme in Pure and Applied Mathematics (Politecnico di Torino, University of Torino, INdAM)
- Sep 2020-present Member of the Scientific Committee of the Excellence Project, Department of Mathematical Sciences “G. L. Lagrange”, Politecnico di Torino
- 2018-present Delegate of the Boards of Teachers of Mathematical Engineering (Politecnico di Torino) for the study plans

## Publications

### Submitted

- [2] G. Dimarco, A. Tosin, M. Zanella. Kinetic derivation of Aw-Rascle-Zhang-type traffic models with driver-assist vehicles, 2021. doi:10.13140/RG.2.2.26670.54088/1. Preprint.
- [1] N. Loy, A. Tosin. Non-conservative Boltzmann-type kinetic models for multi-agent systems with label switching, 2020. doi:10.13140/RG.2.2.11726.08001/1. Preprint.

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- [52] G. Dimarco, A. Tosin. The Aw-Rascle traffic model: Enskog-type kinetic derivation and generalisations. *J. Stat. Phys.*, 178(1):178–210, 2020. doi:10.1007/s10955-019-02426-w.
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- [47] A. Tosin, M. Zanella. Uncertainty damping in kinetic traffic models by driver-assist controls. *Math. Control Relat. Fields*, 2020. To appear (preprint doi: 10.13140/RG.2.2.35871.41124).
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- [45] L. Pareschi, G. Toscani, A. Tosin, M. Zanella. Hydrodynamic models of preference formation in multi-agent societies. *J. Nonlinear Sci.*, 29(6):2761–2796, 2019. doi:10.1007/s00332-019-09558-z.
- [44] G. Toscani, A. Tosin, M. Zanella. Multiple-interaction kinetic modeling of a virtual-item gambling economy. *Phys. Rev. E*, 100(1):012308/1–16, 2019. doi:10.1103/PhysRevE.100.012308.

- [43] A. Tosin, M. Zanella. Kinetic-controlled hydrodynamics for traffic models with driver-assist vehicles. *Multiscale Model. Simul.*, 17(2):716–749, 2019. doi:10.1137/18M1203766.
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- [7] M. Herty, A. Tosin, G. Visconti, M. Zanella. Reconstruction of traffic speed distributions from kinetic models with uncertainties. In G. Puppo, A. Tosin, editors, *Mathematical Descriptions of Traffic Flow: Micro, Macro and Kinetic Models*, ICIAM2019 SEMAI SIMAI Springer Series. Springer International Publishing, 2020. To appear (preprint doi: 10.13140/RG.2.2.19358.28488).
- [6] A. Tosin, M. Zanella. Boltzmann-type description with cutoff of Follow-the-Leader traffic models. In G. Albi, S. Merino-Aceituno, A. Nota, M. Zanella, editors, *Trails in Kinetic Theory: Foundational Aspects and Numerical Methods*, SEMAI SIMAI Springer Series. Springer International Publishing, 2020. To appear (preprint: arXiv:1912.07417).

- [5] G. Ajmone Marsan, N. Bellomo, M. A. Herrero, A. Tosin. From five key questions to a System Sociology theory. In J. Bissell, C. C. S. Caiado, S. Curtis, M. Goldstein, B. Straughan, editors, *Tipping Points: Modelling Social Problems and Health*, chapter 7, pages 113–129. Wiley-Interscience, 2015. doi:10.1002/9781118992005.ch7.
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- [3] A. Tosin. Multiscale crowd dynamics: Modeling and theory. In A. Muntean, F. Toschi, editors, *Collective Dynamics from Bacteria to Crowds*, volume 553 of *CISM International Centre for Mechanical Sciences*, pages 157–177. Springer, Vienna, 2014. doi:10.1007/978-3-7091-1785-9\_6.
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- [2] A. Tosin, M. Zanella. Control strategies for road risk mitigation in kinetic traffic modelling. *IFAC-PapersOnLine*, 51(9):67–72, 2018. doi:10.1016/j.ifacol.2018.07.012.
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- [8] Live interview about the facts which took place in Piazza San Carlo, Turin, Italy on the 3rd of June 2017. Sky TG24, 2017.
- [7] Quando un modello matematico può salvare molte vite. IMQ Notizie, 2014.
- [6] Conclave 2013, CNR: “Un modello matematico per gestire la folla”. Il Fatto Quotidiano, 2013.
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Torino, 13th January 2021