# Andrea Tosin

*Curriculum Vitae*

*DISMA-Polito*
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## General Information

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

## Education

### Studies

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|---|---|
| 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

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|---|---|---|
| Italian | Native | |
| English | TOEFL (CBT) | *Score: 270/300* |
| French | DELF A1-A4 | *Score: 307.70/360* |

## Academic Positions

### Current

Oct 15–present **Associate Professor** of Mathematical Physics (MAT/07)
Department of Mathematical Sciences "G. L. Lagrange"
Politecnico di Torino

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### Previous

Oct 11–Oct 15 **Researcher**
Istituto per le Applicazioni del Calcolo "M. Picone"
Consiglio Nazionale delle Ricerche
Roma, Italy

Nov 08–Sept 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)

## Qualifications

2017 National Scientific Qualification (ASN – "Abilitazione Scientifica Nazionale") as full professor in Mathematical Physics

Validity 28th March 2017 through 28th March 2023

Report `http://calvino.polito.it/~tosin/pdf/ASN19212_I.pdf`

## Prizes and Honours

2013 SIMAI 2013 prize for young scientists in Applied Mathematics

2011 INdAM-SIMAI 2010 prize for the best Italian PhD theses in Applied Mathematics

## Scientific Activity

### Research

Research Field **Mathematical Physics** and **Applied Mathematics**

Research Topics Traffic problems (vehicular traffic, crowd dynamics), social systems, biological systems

Methods Kinetic theory, multiscale models, transport and diffusion equations, numerical simulations

### Projects and Grants

Dec 17 National Grant for Fundamental Research (FFABR)

Grant 3 k€

Jul 16-Jul 18 Politecnico di Torino and 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€

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 INdAM-GNFM Young Researchers Project

Title Multiscale methods and models for collective behaviors in living complex systems

Role Principal Investigator

Grant 2 k€

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

## Organisation of Conferences

Sep 18 "Advances in kinetic theory"
Thematic session within the UMI-SIMAI-PTM Joint Meeting – Wrocław, Poland

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

Oct 17 "Problems in discrete dynamics: from biochemical systems to rare events, networks, clustering and related topics - II Edition" – Arcidosso GR, Italy

Jul 14 "Complex Systems (vehicular traffic, crowd dynamics, biological systems, social systems)" Mini-Symposium within the SIMAI 2014 Congress – Taormina ME, Italy

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

## Editorial Activity

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 Activity

Referee for Applied Mathematical Modelling • Communications in Mathematical Sciences • Comptes Rendus – Mecanique • Discrete and Continuous Dynamical Systems – Series B • Journal of Computational and Applied Mathematics • Journal of Differential Equations • 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 • Networks and Heterogeneous Media • New Journal of Physics • Physica A • SIAM Journal on Applied Mathematics • SIAM Journal on Control and Optimization • Transportation Research Part C: Emerging Technologies

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

## Students

Under way Marilina Barulli
**BSc Mathematics for Engineering**, Politecnico di Torino, Italy
Thesis topic: Binary control strategies in kinetic traffic modelling

Under way Sara Cavaglion
**BSc Mathematics for Engineering**, Politecnico di Torino, Italy
Thesis topic: Population dynamics models

Under way Davide Cividino
**BSc Mathematics for Engineering**, Politecnico di Torino, Italy
Thesis topic: Boltzmann-type kinetic models of Alzheimer's disease

Under way — Simona Cucchiara
**BSc Mathematics for Engineering**, Politecnico di Torino, Italy
Thesis topic: Boltzmann-type kinetic models of vehicular traffic

Under way — Giulia Formica
**BSc Mathematics for Engineering**, Politecnico di Torino, Italy
Thesis topic: Fokker-Planck models of social phenomena

Under way — Luca Lanzilao
**MSc Mathematical Engineering** (co-supervised with Fiammetta Venuti), Politecnico di Torino, Italy
Thesis topic: Crowd-structure interaction at various scales

Under way — Nicolò Perello
**BSc Mathematics for Engineering**, Politecnico di Torino, Italy
Thesis topic: Stability, bifurcations and limit cycles with applications

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"

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–present — Mattia Zanella
**Postdoc**, Politecnico di Torino, Italy
Research topic: Kinetic models of multi-agent systems, Fokker-Planck asymptotics and related numerical approximations

Oct 16–present — Nadia Loy
**PhD student** (co-supervised with Luigi Preziosi), Politecnico di Torino, Italy
Research topic: Kinetic and continuous models of biological systems

Nov 15–present — Raul De Maio
**PhD student** (co-supervised with Fabio Camilli), "Sapienza" University of Rome, Italy
Research topic: Multiscale models of traffic flow on networks

Oct 15 — Raul De Maio
**MSc Applied Mathematics** (co-supervised with Eugenio Montefusco), "Sapienza" University of Rome, Italy
Thesis: "A multiscale approach to vehicular traffic"

Jan 14–Dec 16 — Giuseppe Visconti
**PhD student** (co-supervised with Gabriella Puppo and Matteo Semplice), Università degli Studi dell'Insubria, Como, Italy
Thesis: "Single- and multi-population kinetic models for vehicular traffic reproducing fundamental diagrams and with low computational complexity"

Jan 13–May 15 — Fabio S. Priuli
**Postdoc** (co-supervised with Emiliano Cristiani), University of Rome "Tor Vergata" and IAC-CNR, Italy
Research topic: Optimisation of pedestrian flows in complex environments

Jan 12–Dec 15 — Marco Scianna
**Postdoc**, Politecnico di Torino, Italy
Research topic: Multiscale models of environment sensing in cell aggregates and human crowds

Jan 12–Dec 15 — Alessandro Corbetta
**PhD student** (co-supervised with Luca Bruno, Adrian Muntean, Federico Toschi), Politecnico di Torino, Italy & TU/e Eindhoven, the Netherlands
Thesis: "Multiscale crowd dynamics: physical analysis, modeling and applications"

Mar 11 Riccardo Ferrero
**BSc Mathematics for Engineering Sciences** (co-supervised with Enrico Serra), Politecnico di Torino, Italy
Thesis: "Maximum principles and overdetermined elliptic problems"

Mar 11 Lorenzo Pavese
**BSc Mathematics for Engineering Sciences** (co-supervised with Marco Codegone), Politecnico di Torino, Italy
Thesis: "Elements of distributional Fourier transform with application to a linear elasticity problem"

Dec 10 Anna Scotti
**MSc Mathematical Engineering** (co-supervised with Luca Bruno, Fiammetta Venuti), Politecnico di Torino, Italy
Thesis: "The role of hanger slackening in footbridge dynamics: mathematical modelling and engineering outcomes"

Mar 10 Annachiara Colombi
**BSc Mathematics for Engineering Sciences** (co-supervised with Luigi Preziosi), Politecnico di Torino, Italy
Thesis: "Modelling tumour growth by mixture theory methods"

Mar 10 Fabio Fanari
**BSc Mathematics for Engineering Sciences** (co-supervised with Luigi Preziosi), Politecnico di Torino, Italy
Thesis: "Variational methods with applications to analytical mechanics"

Dec 08 Miriam Pirra
**MSc Mathematical Engineering** (co-supervised with Luigi Preziosi), Politecnico di Torino, Italy
Thesis: "Modelling pedestrian traffic by conservation laws with non-local flux"

Dec 07 Mattia Bozzola
**MSc Mathematical Engineering** (co-supervised with Davide Fransos, Luigi Preziosi), Politecnico di Torino, Italy
Thesis: "Immersed boundary method applied to tumor cord development"

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

Dec 06 Miriam Pirra
**BSc Mathematics for Engineering Sciences** (co-supervised with Luigi Preziosi), Politecnico di Torino, Italy
Thesis: "Tumour growth models in avascular phase"

## Invited Talks

Jun 18 15th IFAC Symposium on Control in Transportation Systems (CTS 2018, University of Genova, Italy)
Talk: "Control strategies for road risk mitigation in kinetic traffic modelling"

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, Rome, 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"

Sept 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"

Sept 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" (Rome, Italy)
Talk: "On the dynamics of social conflicts: looking for the Black Swan"

Sept 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"

### 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

### Boards

Jul 17 — President of the PhD thesis committee of Antonella Verderosa (Politecnico di Torino, Italy)
Thesis: "Energy and density distortion in an oscillator chain" (supervisor: Lamberto Rondoni)

Jul 17 — President of the PhD thesis committee of Annachiara Colombi (Politecnico di Torino, Italy)
Thesis: "Non-local hybrid models for collective dynamics" (supervisors: Marco Scianna, Luigi Preziosi)

Feb 16 — Member of the PhD thesis committee of Alessandro Corbetta (TU/e Eindhoven, the Netherlands)
Thesis: "Multiscale crowd dynamics: physical analysis, modeling and applications" (supervisors: Luca Bruno, Federico Toschi, Adrian Muntean, Andrea Tosin)

Dec 15 — Member of the PhD thesis committee of Matthias Mimault (INRIA Sophia Antipolis - Méditerranée, France)
Thesis: "Crowd motion modeling by conservation laws" (supervisor: Paola Goatin)

2012-present — National coordinator of the SIMAI Activity Group on Complex Systems (SisCo-SIMAI, `http://calvino.polito.it/~tosin/SisCo-SIMAI`)

## Teaching

### 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

2018 Rational Mechanics (Politecnico di Torino, Italy)
Mathematical Methods for Engineering (Politecnico di Torino, Italy)

2017 Rational Mechanics (Politecnico di Torino, Italy)
Mathematical Methods for Engineering (Politecnico di Torino, Italy)

2016 Mathematical Methods for Engineering (Politecnico di Torino, Italy)

### Teaching Assistant at BSc and MSc Courses

2018 Transport Models and Kinetic Theory (MSc, Politecnico di Torino, Italy)

2017 Transport Models and Kinetic Theory (MSc, Politecnico di Torino, Italy)

2016 Rational Mechanics (BSc, Politecnico di Torino, Italy)

2009 Mathematical Methods for Engineering (MSc, Politecnico di Torino, Italy)
Partial Differential Equations (BSc, Politecnico di Torino, Italy)

2007 Functional Analysis (MSc, Politecnico di Torino, Italy)
Partial Differential Equations (BSc, 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)

### Self-Contained Mini-Courses

2011 Mechanics of Multiphase Systems (MSc, Politecnico di Torino, Italy)

2010 Mechanics of Multiphase Systems (MSc, Politecnico di Torino, Italy)

2008 Continuum Mechanics (MSc, Politecnico di Torino, Italy)

2007 Continuum Mechanics (MSc, Politecnico di Torino, Italy)

2006 Mechanics of multiphase systems (MSc, Politecnico di Torino, Italy)

### Membership of Boards of Teachers

2017 Boards of Teachers of Electronics, Telecommunications and Physical Engineering (Politecnico di Torino, Italy)
Boards of Teachers of Mathematical Engineering (Politecnico di Torino, Italy)

2016 Boards of Teachers of Mathematical Engineering (Politecnico di Torino, Italy)

## Publications

### Books

[2] E. Cristiani, B. Piccoli, A. Tosin. *Multiscale Modeling of Pedestrian Dynamics*, volume 12 of *MS&A: Modeling, Simulation and Applications*. Springer International Publishing, 2014. doi:

10.1007/978-3-319-06620-2.

[1] G. Ajmone Marsan, N. Bellomo, A. Tosin. *Complex Systems and Society – Modeling and Simulation*. SpringerBriefs in Mathematics. Springer, New York, 2013. doi:10.1007/978-1-4614-7242-1.

## Papers

[40] M. Bertsch, B. Franchi, M. C. Tesi, A. Tosin. Well-posedness of a mathematical model for Alzheimer's disease. *SIAM J. Math. Anal.*, 50(3):2362–2388, 2018. doi:10.1137/17M1148517.

[39] F. Camilli, R. De Maio, A. Tosin. Measure-valued solutions to nonlocal transport equations on networks. *J. Differential Equations*, 264(12):7213–7241, 2018. doi:10.1016/j.jde.2018.02.015.

[38] E. Cristiani, A. Tosin. Reducing complexity of multiagent systems with symmetry breaking: an application to opinion dynamics with polls. *Multiscale Model. Simul.*, 16(1):528–549, 2018. doi:10.1137/17M113397X.

[37] A. Festa, A. Tosin, M.-T. Wolfram. Kinetic description of collision avoidance in pedestrian crowds by sidestepping. *Kinet. Relat. Models*, 11(3):491–520, 2018. doi:10.3934/krm.2018022.

[36] A. Tosin, M. Zanella. Boltzmann-type models with uncertain binary interactions. *Commun. Math. Sci.*, 2018. To appear (preprint: arXiv:1709.02353).

[35] M. Bertsch, B. Franchi, N. Marcello, M. C. Tesi, A. Tosin. Alzheimer's disease: a mathematical model for onset and progression. *Math. Med. Biol.*, 34(2):193–214, 2017. doi:10.1093/imammb/dqw003.

[34] M. Bertsch, B. Franchi, M. C. Tesi, A. Tosin. Microscopic and macroscopic models for the onset and progression of Alzheimer's disease. *J. Phys. A: Math. Theor.*, 50(41):414003/1–22, 2017. doi:10.1088/1751-8121/aa83bd.

[33] F. Camilli, R. De Maio, A. Tosin. Transport of measures on networks. *Netw. Heterog. Media*, 12(2):191–215, 2017. doi:10.3934/nhm.2017008.

[32] P. Freguglia, A. Tosin. Proposal of a risk model for vehicular traffic: A Boltzmann-type kinetic approach. *Commun. Math. Sci.*, 15(1):213–236, 2017. doi:10.4310/CMS.2017.v15.n1.a10.

[31] G. Puppo, M. Semplice, A. Tosin, G. Visconti. Analysis of a multi-population kinetic model for traffic flow. *Commun. Math. Sci.*, 15(2):379–412, 2017. doi:10.4310/CMS.2017.v15.n2.a5.

[30] G. Puppo, M. Semplice, A. Tosin, G. Visconti. Kinetic models for traffic flow resulting in a reduced space of microscopic velocities. *Kinet. Relat. Models*, 10(3):823–854, 2017. doi:10.3934/krm.2017033.

[29] G. Visconti, M. Herty, G. Puppo, A. Tosin. Multivalued fundamental diagrams of traffic flow in the kinetic Fokker-Planck limit. *Multiscale Model. Simul.*, 15(3):1267–1293, 2017. doi:10.1137/16M1087035.

[28] L. Bruno, A. Corbetta, A. Tosin. From individual behaviour to an evaluation of the collective evolution of crowds along footbridges. *J. Engrg. Math.*, 101(1):153–173, 2016. doi:10.1007/s10665-016-9852-z.

[27] A. Colombi, M. Scianna, A. Tosin. Moving in a crowd: Human perception as a multiscale process. *J. Coupled Syst. Multiscale Dyn.*, 4(1):25–29, 2016. doi:10.1166/jcsmd.2016.1093.

[26] A. Corbetta, A. Tosin. Comparing discrete and continuous crowd models for an increasing number of massive agents. *Adv. Math. Phys.*, 2016:6902086/1–17, 2016. doi:10.1155/2016/6902086.

[25] G. Puppo, M. Semplice, A. Tosin, G. Visconti. Fundamental diagrams in traffic flow: the case of heterogeneous kinetic models. *Commun. Math. Sci.*, 14(3):643–669, 2016. doi:10.4310/CMS.2016.v14.n3.a3.

[24] A. Colombi, M. Scianna, A. Tosin. Differentiated cell behavior: a multiscale approach using measure theory. *J. Math. Biol.*, 71(5):1049–1079, 2015. doi:10.1007/s00285-014-0846-z.

[23] E. Cristiani, F. S. Priuli, A. Tosin. Modeling rationality to control self-organization of crowds: an environmental approach. *SIAM J. Appl. Math.*, 75(2):605–629, 2015. doi:10.1137/140962413.

[22] L. Fermo, A. Tosin. A fully-discrete-state kinetic theory approach to traffic flow on road networks. *Math. Models Methods Appl. Sci.*, 25(3):423–461, 2015. doi:10.1142/S0218202515400023.

[21] L. Fermo, A. Tosin. Fundamental diagrams for kinetic equations of traffic flow. *Discrete Contin. Dyn. Syst. Ser. S*, 7(3):449–462, 2014. doi:10.3934/dcdss.2014.7.449.

[20] N. Bellomo, M. A. Herrero, A. Tosin. On the dynamics of social conflicts: Looking for the Black Swan. *Kinet. Relat. Models*, 6(3):459–479, 2013. doi:10.3934/krm.2013.6.459.

[19] L. Fermo, A. Tosin. A fully-discrete-state kinetic theory approach to modeling vehicular traffic. *SIAM J. Appl. Math.*, 73(4):1533–1556, 2013. doi:10.1137/120897110.

[18] A. Tosin. Initial/boundary-value problems of tumor growth within a host tissue. *J. Math. Biol.*, 66(1):163–202, 2013. doi:10.1007/s00285-012-0505-1.

[17] A. Tosin. Un approccio multiscala alla dinamica delle folle mediante misure che evolvono nel tempo. *Boll. Unione Mat. Ital.*, 6(9):531–548, 2013.

[16] N. Bellomo, B. Piccoli, A. Tosin. Modeling crowd dynamics from a complex system viewpoint. *Math. Models Methods Appl. Sci.*, 22(supp02):1230004 (29 pages), 2012. doi:10.1142/S0218202512300049.

[15] L. Bruno, A. Tosin, P. Tricerri, F. Venuti. Non-local first-order modelling of crowd dynamics: A multidimensional framework with applications. *Appl. Math. Model.*, 35(1):426–445, 2011. doi:10.1016/j.apm.2010.07.007.

[14] E. Cristiani, B. Piccoli, A. Tosin. Multiscale modeling of granular flows with application to crowd dynamics. *Multiscale Model. Simul.*, 9(1):155–182, 2011. doi:10.1137/100797515.

[13] B. Piccoli, A. Tosin. Time-evolving measures and macroscopic modeling of pedestrian flow. *Arch. Ration. Mech. Anal.*, 199(3):707–738, 2011. doi:10.1007/s00205-010-0366-y.

[12] A. Tosin, P. Frasca. Existence and approximation of probability measure solutions to models of collective behaviors. *Netw. Heterog. Media*, 6(3):561–596, 2011. doi:10.3934/nhm.2011.6.561.

[11] A. Tosin, L. Preziosi. Multiphase modeling of tumor growth with matrix remodeling and fibrosis. *Math. Comput. Modelling*, 52(7–8):969–976, 2010. doi:10.1016/j.mcm.2010.01.015.

[10] J. Galle, L. Preziosi, A. Tosin. Contact inhibition of growth described using a multiphase model and an individual cell-based model. *Appl. Math. Lett.*, 22(10):1483–1490, 2009. doi:10.1016/j.aml.2008.06.051.

[9] B. Piccoli, A. Tosin. Pedestrian flows in bounded domains with obstacles. *Contin. Mech. Thermodyn.*, 21(2):85–107, 2009. doi:10.1007/s00161-009-0100-x.

[8] L. Preziosi, A. Tosin. Multiphase and multiscale trends in cancer modelling. *Math. Model. Nat. Phenom.*, 4(3):1–11, 2009. doi:10.1051/mmnp/20094301.

[7] L. Preziosi, A. Tosin. Multiphase modelling of tumour growth and extracellular matrix interaction: mathematical tools and applications. *J. Math. Biol.*, 58(4–5):625–656, 2009. doi:10.1007/s00285-008-0218-7.

[6] A. Tosin. From generalized kinetic theory to discrete velocity modeling of vehicular traffic. A stochastic game approach. *Appl. Math. Lett.*, 22(7):1122–1125, 2009. doi:10.1016/j.aml.2008.11.006.

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