

# Silvia Lorenzani

## Curriculum vitae

Date and place of birth: 23.06.1971, Terni (Italy)  
Nationality: Italian  
Languages: Italian (mother tongue), English, German  
Address: Dipartimento di Matematica, Politecnico di Milano,  
Piazza Leonardo da Vinci 32, 20133 Milano (Italy)  
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### CURRENT POSITION

December 2017- Associate Professor, Dipartimento di Matematica,  
Politecnico di Milano (Italy).

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### RESEARCH INTERESTS

- Non-equilibrium statistical mechanics, kinetic theory of rarefied gas:
    - \* Analytical solutions of the Boltzmann equation (variational methods);
    - \* Analytical and numerical investigation of microchannel flows.
  - Microfluidics: Gas rarefaction effects in Micro-Electro-Mechanical Systems (MEMS) devices.
  - Deterministic and stochastic homogenization of Smoluchowski equation.
  - Fluid instabilities.
  - Turbulent transition in rapidly rotating flows.
  - Turbulent transport of passive tracers.
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### EDUCATION

July 1990 Classical high school certificate at "Liceo G.C. Tacito" in Terni.

- October 1997    Master's degree ('Laurea') in Theoretical Physics, Bologna University, Italy.  
                     Final mark: 110/110. Advisor: Prof. G. Turchetti.
- Thesis title: "A mathematical model for the diffusion  
                             in atmosphere of a dense gas" (in Italian).
- November 1997    Grant at the Italian National Research Council (CNR)  
 -August 1998    in Bologna. Advisor: Dr. F. Tampieri.
- Turbulent transport of passive tracers in atmosphere  
                             \* Investigations of Lagrangian Time-Scales  
                             \* Closure schemes for Lagrangian Stochastic modelling  
                             \* Dispersion properties in non-Gaussian turbulence
- September 1998    Graduate student researcher at the Department of Physics,  
 -March 2001    University of Bayreuth (Germany). Advisor: Prof. F. Busse.
- Hydrodynamical instabilities  
                     –Turbulent transition in rapidly rotating flows  
                     –Magnetic field generation (dynamo action)  
                     –Numerical solutions to the three-dimensional  
                             Navier-Stokes equations  
                     –Parallel programming
- April 2001        Graduate student researcher at the Institute of Geophysics,  
 -November 2001    University of Göttingen (Germany). Advisor: Prof. A. Tilgner.
- November 2001    Ph.D. degree, University of Göttingen (Germany).  
                     Final mark: magna cum laude. Supervisor:  
                     Prof. A. Tilgner. Co-supervisor: Dr. M. Rein.
- Thesis title: "Fluid instabilities in precessing ellipsoidal shells",  
                             concerning the study of precession-driven flows in ellipsoidal  
                             containers in connection with the origin of the Earth's magnetic field.
- For the achievement of the Ph.D. degree, the following  
                             examinations have been passed:
- Fluid Dynamics ('Angewandte Mechanik und Strömungsphysik')  
                     –Numerical methods ('Numerische Methoden')  
                     –Relativistic quantum field theory ('Relativistische  
                             Quantenfeldtheorie').
- December 2001    Postdoctoral researcher, Dipartimento di Matematica,  
 -March 2008    Politecnico di Milano (Italy).  
                     Supervisor: Prof. Carlo Cercignani.

May 2008 -December 2017	Assistant Professor ('ricercatore di ruolo'), Dipartimento di Matematica, Politecnico di Milano (Italy).
July 2013	Master's degree ('Laurea Specialistica') in Mathematics, Bologna University, Italy. Final mark: 110/110 cum laude. Advisor: Prof. B. Franchi. -Thesis title: "Homogenization of the Smoluchowski equation in perforated domains".
December 2013 -December 2019	Achievement of the National Scientific Qualification ( 'Abilitazione Scientifica Nazionale' ) as Associate Professor in the sector 01/A4-Mathematical Physics.
March 2018 -March 2024	Achievement of the National Scientific Qualification ( 'Abilitazione Scientifica Nazionale' ) as Full Professor in the sector 01/A4-Mathematical Physics.

## MEMBERSHIPS

Since January 2003	Member of the National Group for Mathematical Physics (GNFM-INdAM) Section: Mechanics of continuous fluids.
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## ORGANIZATION OF CONFERENCES AND SEMINARS

- [1 ] Conference: "Boltzmann equation: Mathematics, modeling and simulations. In memory of Carlo Cercignani". Institut Henri Poincare', Paris. February 9-11, 2011.  
Organizers: F. Bolley, L. Desvillettes, S. Lorenzani, C. Mouhot.  
Scientific committee: A. Bobylev, R. Marra, Y. Pomeau, C. Villani.
- [2 ] Seminar: Luca Marino (Sapienza–University of Rome), "Experimental analysis of rarefied gases in micro-technologies", Dipartimento di matematica, Politecnico di Milano. October 4, 2011.
- [3 ] Seminar: Marco Lenci (University of Bologna), "Ideas from statistical mechanics for the notion of infinite mixing", Dipartimento di matematica, Politecnico di Milano. April 11, 2014.
- [4 ] Minisymposium: "Recent kinetic models and their hydrodynamic limits", at the 2016 SIMAI annual meeting (SIMAI 2016), Milan. September 13-16, 2016.  
Organizers: Marzia Bisi and Silvia Lorenzani.
- [5 ] Seminar: Martin Heida (Weierstrass Institute Berlin), "The SQRA operator: convergence behaviour and applications", Dipartimento di matematica, Politecnico di Milano. March 13, 2019.
- [6 ] Seminar: Kazuo Aoki (University of Kyoto), "Chapman-Enskog theory", Dipartimento di matematica, Politecnico di Milano. November 19, 2019.
- [7 ] Seminar: Mario Pulvirenti (Sapienza–University of Rome), "Validity of the Boltzmann equation and existence of solutions", Dipartimento di matematica, Politecnico di Milano. November 21-22, 2019.

- [8 ] Seminar: Giuseppe Toscani (University of Pavia), "Recent socio-economic developments of the kinetic theory", Dipartimento di matematica, Politecnico di Milano. November 29, December 6, 2019.
- [9 ] Conference: "The legacy of Carlo Cercignani: From kinetic theory to turbulence modeling". Politecnico di Milano, Milan. May 24-28, 2021 (scheduled).
- Organizers: S. Lorenzani, P. Barbante, F. Belgiorno, L. Valdettaro, G. Valente, M. Vianello.
- Scientific committee: P. Biscari, A. Frezzotti, G. Frosali, S. Graffi, M. Lampis, G. Magli, R. Monaco, T. Ruggeri, G. Saccomandi, G. Spiga.
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## VISITING POSITIONS

- Invited by Professor Laurent Desvillettes at the 'Ecole Normale Superieure de Cachan' (ENS Cachan, Paris) during the following periods:
- [\* ] November 2009, February 2011, October 2011, April 2014.
- Invited by Professor Laurent Desvillettes at the 'Université Paris Diderot' (Paris 7) during the following periods:
- [\* ] November 2015, March 2017.
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## RESEARCH PROJECTS (of national interest)

- [1 ] PRIN 2002-2004 "Mathematical problems of the kinetic theory": Participant.
- [2 ] PRIN 2004-2006 "Mathematical problems of the kinetic theory": Participant.
- [3 ] PRIN 2006-2008 "Mathematical problems of classical kinetic theory, complex and turbulent fluids and liquid crystals": Participant.
- [4 ] CARIPO 2007-2009 "Innovative models for the study of the behavior of solids and fluids in micro/nano-electromechanical systems": Participant.
- [5 ] SAES GETTERS S.p.A 2009 "Analysis of the effect of gas composition on the parameters of quality of MEMS": Principal Investigator.
- [6 ] CARIPO 2009-2011 "Interactions between surfaces in micro-and nano-devices": Participant.
- [7 ] PRIN 2009-2011 "Kinetic theory for fluid dynamics and micro-systems": Participant.
- [8 ] GNFM 2013 "Damping forces exerted by gas mixtures in MEMS devices vibrating at high frequencies according to the kinetic theory of gases": Principal Investigator.
- [9 ] Annual individual funding of basic research activities (FFABR), MIUR Italy (2017).
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## REVIEWING ACTIVITIES

Mathematical Reviews, Physics of Fluids, Journal of Fluid Mechanics, Journal of Statistical Physics, Physical Review Fluids, Physical Review E, Journal of Physics A: Mathematical and Theoretical, Physica A: Statistical Mechanics and its Applications, Zeitschrift fuer Angewandte Mathematik und Physik (ZAMP), European Journal of Mechanics-B/Fluids, Microfluidics and Nanofluidics, Vacuum, International Journal for Numerical Methods in Fluids, International Communications in Heat and Mass Transfer, Meccanica, Journal of Fluids Engineering, Journal of Sound and Vibration.

- Referee for research projects within the call "Consolidate the Foundations", for basic research activities (Universita' di Roma Tor Vergata), 2016.
- Referee for research projects within a call to provide financial support to non-permanent researchers (RTD) (Universita' di Firenze), 2017.
- Referee for research projects submitted to the SNSF-Swiss National Science Foundation, 2017.
- Referee for the evaluation of PRIN (MIUR, Italy) research projects, 2019.

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## EDITORIAL ACTIVITIES

2020-                      Guest Editor: *Fluids*.  
                               Special Issue: "Rarefied Gas Dynamics".  
                               [https://www.mdpi.com/journal/fluids/special\\_issues/rarefied\\_gas\\_dynamics](https://www.mdpi.com/journal/fluids/special_issues/rarefied_gas_dynamics)

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## TEACHING ACTIVITIES

1999-2001                Assistant Professor ('esercitatore') of the undergraduated courses  
                               "Quantenmechanik I" (Quantum Mechanics I) and  
                               "Methoden der theoretischen Physik I" (Mathematical Methods  
                               for Physics), Dept. of Physics, University of Bayreuth (Germany).

2002-2012                Assistant Professor ('esercitatore') of the undergraduated courses  
                               "Meccanica razionale" (Theoretical Mechanics), "Meccanica  
                               Aerospaziale" (Analytical Mechanics) and "Metodi e  
                               Modelli per la Meccanica Statistica" (Statistical Mechanics),  
                               Faculty of Engineering, Politecnico di Milano (Italy).

2008-                      Professor of the undergraduated course "Meccanica razionale"  
                               (Theoretical Mechanics), Building Engineering/ Architecture  
                               (Master of Science degree), Politecnico di Milano (Italy).  
                               CFU 6 (33 hours of lectures and 27 hours tutoring).

2012-                      Professor of the undergraduated course "Meccanica razionale"  
                               (Theoretical Mechanics), Building and Construction Engineering  
                               (Bachelor of Science degree), Politecnico di Milano (Italy).  
                               CFU 6 (33 hours of lectures and 27 hours tutoring).

2019-                      Professor of the undergraduated course "Methods and Models for  
                               Statistical Mechanics", Mathematical Engineering  
                               (Master of Science degree), Politecnico di Milano (Italy).  
                               CFU 8 (80 hours of lectures).

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2002-2003                Co-supervisor of the master thesis ('Laurea') in  
                               Aerospace Engineering of Mauro Porta. Thesis title:"  
                               Numerical simulation of three-dimensional hypersonic flows

of a rarefied gas past complex-geometry bodies”  
(in Italian). Faculty of Engineering, Politecnico di Milano (Italy).

July 2013 Supervisor of the reading course ('Laurea triennale') in Mathematical Engineering of Gabriele Rovi. Presentation title:” The Boltzmann equation” (in Italian). School of Industrial and Information Engineering, Politecnico di Milano (Italy).

July 2017 Co-supervisor of the master thesis ('Laurea Magistrale') in Mathematical Engineering of Annagiulia Tiozzo. Thesis title:” Computational models for nanoparticle transport in the vascular system”. School of Industrial and Information Engineering, Politecnico di Milano (Italy).

November 2017- Ph.D. advisor of Nhu Ngoc Nguyen (INdAM-Marie Curie fellowship). Doctoral program on Mathematical Models and Methods in Engineering, Politecnico di Milano (Italy).

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February 2010 Lecturer within the PhD course:”Micro Electro Mechanical Systems (MEMS)”. Titles of the lectures:  
(\* ) ”Damping in MEMS”  
(\* ) ”Rarefied lubrication”.  
Department of Structural Engineering, Politecnico di Milano (Italy).

March 2012 Lecturer within the PhD course:”Micro Electro Mechanical Systems (MEMS)”. Title of the lecture:  
(\* ) ”Microfluidics and rarefied gas dynamics”.  
Department of Structural Engineering, Politecnico di Milano (Italy).

(\* ) Supervisor of the final course project of Alessandro Caspani.

February 2014 Lecturer within the PhD course:”Micro Electro Mechanical Systems (MEMS)”. Title of the lecture:  
(\* ) ”Microfluidics and rarefied gas dynamics”.  
Department of Structural Engineering, Politecnico di Milano (Italy).

(\* ) Supervisor of the final course projects of Lorenzo Baldrati and Georgios Bellas-Chatzigeorgis.

February 2016

Lecturer within the PhD course: "MEMS & 3D".

Title of the lecture:

(\*) "Microfluidics and rarefied gas dynamics in MEMS".

Department of Structural Engineering, Politecnico di  
Milano (Italy).

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Since 2013

Member of the evaluation committee for the selection of teaching assistants for the MAT/07 (Mathematical Physics) courses at the Mathematics Department, Politecnico di Milano.

Since 2013

Member of the Thesis evaluation committee ('Commissione di Laurea') for Building Engineering. Politecnico di Milano.

Since 2016

Member of the committee for the self-assessment (AVA-MIUR) of the Bachelor's degree in Building Engineering. Politecnico di Milano.

Since 2019

Member of the Thesis evaluation committee ('Commissione di Laurea') for Mathematical Engineering. Politecnico di Milano.

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16 December 2019

Member of the final examination board of the PhD of Ricardo Brancher. Université D'Aix-Marseille (France).

13 March 2020

Member of the final examination board of the PhD of Alexandros Tsimpanoukis. University of Thessaly (Greece).

27 March 2020

Member of the final examination board of the PhD of Marta Marulli. University of Bologna (Italy).

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## INVITED TALKS (WORKSHOPS AND CONFERENCES)

- [1 ] S. Lorenzani. *Rarefied gas flows in MEMS applications*. Invited speaker at the Kyoto-Birmingham University International Symposium on "Recent advances in Fluid Mechanics", Birmingham, UK, September 4-5, 2006.
  - [2 ] S. Lorenzani. *Gas rarefaction effects in Micro-Electro-Mechanical Systems applications*. Invited speaker within the minisymposium "New Trends in Kinetic Theory", at the 2010 SIMAI annual meeting (SIMAI 2010), Cagliari, Italy, June 21-25, 2010.
  - [3 ] S. Lorenzani. *On the evaluation of damping in Micro-Electro-Mechanical Systems devices according to the kinetic theory of gases*. Invited speaker within the minisymposium "Modelling of vacuum gas dynamics problems", at the ECCOMAS 2012, Vienna, Austria, September 10-14, 2012.
  - [4 ] S. Lorenzani. *Analysis of damping forces exerted by single-component gases and mixtures in high-frequency MEMS devices*. Invited speaker within the minisymposium "Modelling and analysis of MEMS and NEMS", at the AIMETA 2015, Genova, Italy, September 14-17, 2015.
  - [5 ] S. Lorenzani. *High-frequency sound wave propagation in binary gas mixtures flowing through microchannels*. Invited speaker at the workshop on "Recent advances in kinetic equations and applications", Parma, Italy, October 1-2, 2015.
  - [6 ] S. Lorenzani. *Sound wave propagation in binary gas mixtures flowing through microchannels according to the method of elementary solutions*. Invited speaker at the INDAM workshop on "Innovative algorithms and analysis", Rome, Italy, May 17-20, 2016.
  - [7 ] S. Lorenzani. *From a microscopic to a macroscopic model for Alzheimer disease: Two-scale homogenization of the Smoluchowski equation in perforated domains*. Invited speaker at the workshop on "Mathematical models for quantum and classical mechanics (SEMODOY2016)", Firenze, Italy, November 17-18, 2016.
  - [8 ] S. Lorenzani. *Analysis of gas rarefaction effects in Micro-Electro-Mechanical-Systems (MEMS) devices on the basis of the Boltzmann equation*. Invited speaker at the workshop on "Advances in Mathematics for Technology (AMATH 2017)", Catania, Italy, October 9-11, 2017.
  - [9 ] S. Lorenzani. *Homogenization of the Smoluchowski equation in perforated domains: A mathematical model for aggregation and diffusion of beta-amyloid in Alzheimer's disease*. Invited speaker at the workshop on "Asymptotic homogenization in biology", Torino, Italy, June 25, 2018.
  - [10 ] S. Lorenzani. *Kinetic theory of gas mixtures*. Invited speaker within the special session "Models and numerical methods in kinetic theory", at the 12th American Institute of Mathematical Sciences (AIMS) Conference, Taipei, Taiwan, July 5-9, 2018.
  - [11 ] S. Lorenzani. *Variational solutions of the linearized Boltzmann equation for gas flows in microchannels*. Invited speaker within the session "Advances in kinetic theory", at the Joint Meeting of UMI-SIMAI-PTM, Wroclaw, Poland, September 17-20, 2018.
  - [12 ] S. Lorenzani. *Kinetic modeling of gas mixtures in MEMS applications*. Invited speaker within the minisymposium "Kinetic modelling and multiscale simulation of nonequilibrium flow dynamics", at the 9th International Congress on Industrial and Applied Mathematics (ICIAM 2019), Valencia, Spain, July 15-19, 2019.
  - [13 ] S. Lorenzani. *Microchannel flow applications of a linearized kinetic Bhatnagar-Gross-Krook-type model for inert gas mixtures with general intermolecular forces*. Invited speaker at the workshop on "Theory and Numerics in Kinetic Theory", Parma, Italy, December 13, 2019.
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## CONTRIBUTIONS TO CONFERENCES AND WORKSHOPS

- [1 ] R. Cesari, S. Lorenzani, A. Maurizi and F. Tampieri. *Passive tracer fluxes in complex turbulent flows*. In Annales Geophysicae. Nice, France, April 20-24, 1998. XXIII General Assembly of the European Geophysical Society.
- [2 ] S. Lorenzani and A. Tilgner. *Instability of fluid flows in precessing ellipsoidal shells*. The 7th Symposium: Study of the Earth's deep interior. Exeter, England, July 30th-August 4th, 2000.
- [3 ] S. Lorenzani, A. Maurizi and F. Tampieri. *Caratteristiche lagrangiane della turbolenza non gaussiana*. In LXXXVI Congresso Nazionale della Società Italiana di Fisica, Palermo, Italy, October 6-11, 2000.
- [4 ] A. Maurizi and S. Lorenzani. *Lagrangian time scales in homogeneous non-Gaussian turbulence*. Nice, France, March 25-30, 2001. XXVI General Assembly of the European Geophysical Society.
- [5 ] S. Lorenzani and A. Tilgner. *Fluid flows in precessing ellipsoidal shells*. Nice, France, March 25-30, 2001. XXVI General Assembly of the European Geophysical Society.
- [6 ] S. Lorenzani and A. Tilgner. *Instabilities in precessing flows*. Schwerpunktstreffen: Geomagnetic Variations. Braunschweig, Germany, April 3-4, 2001.
- [7 ] S. Lorenzani and A. Tilgner. *Numerical simulations of precession driven flow*. Nice, France, April 21-26, 2002. XXVII General Assembly of the European Geophysical Society.
- [8 ] C. Cercignani, M. Lampis and S. Lorenzani. *Sul flusso di Poiseuille in dinamica dei gas rarefatti*. Chia Laguna, Italy, May 27-31, 2002. VI Congresso SIMAI.
- [9 ] C. Cercignani, M. Lampis and S. Lorenzani. *Variational approach to plane Poiseuille flow with general boundary conditions*. Whistler, Canada, July 20-25, 2002. 23rd International Symposium on Rarefied Gas Dynamics.
- [10 ] C. Cercignani, M. Lampis and S. Lorenzani. *Variational approach to plane Poiseuille flow with general boundary conditions*. Sestri Levante, Italy, October 24-26, 2002. Conference on Perspectives in Kinetic Theory.
- [11 ] C. Cercignani, M. Lampis and S. Lorenzani. *Plane Poiseuille flow with general boundary conditions: a variational and a numerical approach*. Rio de Janeiro, Brasil, July 20-25, 2003. 18th International Conference on Transport Theory.
- [12 ] C. Cercignani, M. Lampis and S. Lorenzani. *Sui flussi nei microcanali piani in dinamica dei gas rarefatti*. Ferrara, Italy, September 9-12, 2003. XVI Congresso AIMETA di Meccanica Teorica ed Applicata.
- [13 ] C. Cercignani, M. Lampis and S. Lorenzani. *Flow of a rarefied gas between parallel and almost parallel plates*. Bari, Italy, July 10-16, 2004. 24rd International Symposium on Rarefied Gas Dynamics.
- [14 ] A. Frezzotti, L. Gibelli and S. Lorenzani. *A kinetic model for vapor-liquid flows*. Bari, Italy, July 10-16, 2004. 24rd International Symposium on Rarefied Gas Dynamics.
- [15 ] C. Cercignani, M. Lampis and S. Lorenzani. *Mathematical models and methods in micro-nano-technologies*. Baia Samuele (Ragusa), Italy, May 22-26, 2006. VIII Congresso Simai.
- [16 ] S. Lorenzani, L. Gibelli, A. Frezzotti, A. Frangi and C. Cercignani. *Kinetic approach to gas flows in microchannels*. Barga, Italy, June 11-15, 2006. Second International Conference on Transport Phenomena in Micro and Nanodevices.
- [17 ] C. Cercignani, M. Lampis and S. Lorenzani. *Generalized Reynolds equation based on the ellipsoidal statistical model*. St. Petersburg, July 21-28, 2006. 25rd International Symposium on Rarefied Gas Dynamics.

- [18 ] A. Frezzotti, L. Gibelli and S. Lorenzani. *A kinetic approach for the evaluation of damping in MEMS*. Glasgow, Scotland, December 7-8, 2006. Micro and Nanoscale Flows. Advancing the Engineering Science and Design.
- [19 ] C. Cercignani and S. Lorenzani. *Gas rarefaction effects in MEMS*. Dresden, September 6-8, 2007. IUTAM Symposium on advances in micro- and nanofluidics.
- [20 ] C. Cercignani and S. Lorenzani. *A variational solution of the linearized Boltzmann equation for plane Poiseuille flow*. Kyoto, Japan, July 21-25, 2008. 26rd International Symposium on Rarefied Gas Dynamics.
- [21 ] C. Cercignani and S. Lorenzani. *A variational solution of the linearized Boltzmann equation for gas flows in microchannels*. Bologna, Italy, December 10-12, 2008. Microfluidics 2008.
- [22 ] C. Cercignani and S. Lorenzani. *A variational solution of plane Poiseuille flow on the basis of the Boltzmann equation for hard-sphere molecules*. Torino, Italy, July 12-17, 2009. 21th International Conference on Transport Theory (ICTT-21).
- [23 ] C. Cercignani and S. Lorenzani. *Variational approach to gas flows in microchannels on the basis of the Boltzmann equation for hard-sphere molecules*. Brunel University, West London, UK, September 1-2, 2009. Micro and Nano Flows 2009 (MNF09).
- [24 ] S. Lorenzani. *Second-order slip coefficients as defined by the linearized Boltzmann equation with general boundary conditions*. Roma, Italy, July 5-9, 2010. 19th International Conference on the Discrete Simulation of Fluid Dynamics, DSFD 2010.
- [25 ] S. Lorenzani and L. Desvillettes. *A kinetic approach for the evaluation of damping in Micro-Electro-Mechanical Systems devices vibrating at high frequencies*. Zaragoza, Spain, July 9-13, 2012. 28th International Symposium on Rarefied Gas Dynamics.
- [26 ] M. Bisi and S. Lorenzani. *Damping forces exerted by rarefied gas mixtures in MEMS devices vibrating at high frequencies*. Marseille, France, April 22-25, 2014. 5th International Conference on Heat Transfer and Fluid Flow in Microscale (HTFFM-V).
- [27 ] S. Lorenzani. *Multiple forced-sound modes excited in disparate-mass gas mixtures flowing through microchannels*. Taormina, Italy, September 7-11, 2015. 24th International Conference on Transport Theory (ICTT2015).
- [28 ] S. Lorenzani. *Influence of the boundary conditions on the damping forces exerted by gas mixtures in high-frequency MEMS devices*. Politecnico di Milano, Milan, Italy, September 11-14, 2016. 5nd Micro and Nano Flows Conference (MNF2016).
- [29 ] L. Desvillettes and S. Lorenzani. *Homogenization of the discrete diffusive coagulation-fragmentation equations in perforated domains*. Berlin, Germany, October 4-6, 2017. Workshop on Homogenization Theory and Applications.
- [30 ] S. Lorenzani. *Which kinetic model should be used to describe time-dependent flows of binary gas mixtures?*. Glasgow, UK, July 23-27, 2018. 31st International Symposium on Rarefied Gas Dynamics.
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## PUBLICATIONS

### Papers in Journals

- [1 ] A. Maurizi and S. Lorenzani. On the influence of the eulerian velocity pdf closure on the eddy diffusion coefficient. *Boundary-Layer Meteorology*, **95**:427-436, 2000. ISSN: 0006-8314.
- [2 ] S. Lorenzani and A. Tilgner. Fluid instabilities in precessing spheroidal cavities. *J. Fluid Mech.*, **447**:111-128, 2001. ISSN: 0022-1120.
- [3 ] A. Maurizi and S. Lorenzani. Lagrangian Time-Scales in Homogeneous Non-Gaussian Turbulence. *Flow, Turbulence and Combustion*, **67**:205-216, 2001. ISSN: 1386-6184.
- [4 ] S. Lorenzani and A. Tilgner. Inertial instabilities of fluid flow in precessing spheroidal shells. *J. Fluid Mech.*, **492**:363-379, 2003. ISSN: 0022-1120.
- [5 ] C. Cercignani, M. Lampis and S. Lorenzani. Variational approach to gas flows in microchannels. *Physics of Fluids*, **16**:3426-3437, 2004. ISSN: 1070-6631.
- [6 ] C. Cercignani, M. Lampis and S. Lorenzani. Plane Poiseuille flow with symmetric and nonsymmetric gas-wall interactions. *Transport Theory and Statistical Physics*, **33**:545-561, 2004. ISSN: 0041-1450.
- [7 ] A. Frezzotti, L. Gibelli and S. Lorenzani. Mean field kinetic theory description of evaporation of a fluid into vacuum. *Physics of Fluids*, **17**:012102-012102-12, 2005. ISSN: 1070-6631.
- [8 ] C. Cercignani, M. Lampis and S. Lorenzani. Plane Poiseuille-Couette problem in Micro-Electro-Mechanical Systems applications with gas-rarefaction effects. *Physics of Fluids*, **18**:087102-087102-14, 2006. ISSN: 1070-6631.
- [9 ] C. Cercignani, A. Frangi, S. Lorenzani and B. Vigna. BEM approaches and simplified kinetic models for the analysis of damping in deformable MEMS. *Engineering Analysis with Boundary Elements*, **31**:451-457, 2007. ISSN: 0955-7997.
- [10 ] S. Lorenzani, L. Gibelli, A. Frezzotti, A. Frangi and C. Cercignani. Kinetic approach to gas flows in microchannels. *Nanoscale and Microscale Thermophysical Engineering*, **11**:211-226, 2007. ISSN: 1556-7265.
- [11 ] A. Frangi, A. Frezzotti and S. Lorenzani. On the application of the BGK kinetic model to the analysis of gas-structure interactions in MEMS. *Computers & Structures*, **85**:810-817, 2007. ISSN: 0045-7949.
- [12 ] C. Cercignani, M. Lampis and S. Lorenzani. On the Reynolds equation for linearized models of the Boltzmann operator. *Transport Theory and Statistical Physics*, **36**:257-280, 2007. ISSN: 0041-1450.
- [13 ] C. Cercignani, A. Frangi, A. Frezzotti, G. P. Ghioldi, L. Gibelli, S. Lorenzani. On the application of the Boltzmann equation to the simulation of fluid structure interaction in Micro-Electro-Mechanical-Systems. *Sensor Letters*, Vol. 6, 121-129, 2008. ISSN: 1546-198X.
- [14 ] C. Cercignani and S. Lorenzani. Variational derivation of second-order slip coefficients on the basis of the Boltzmann equation for hard-sphere molecules. *Physics of Fluids*, **22**:062004-062004-8, 2010. ISSN: 1070-6631.
- [15 ] S. Lorenzani. Higher order slip according to the linearized Boltzmann equation with general boundary conditions. *Phil. Trans. R. Soc. A*, **369**:2228-2236, 2011. ISSN: 1364-503X.
- [16 ] S. Lorenzani. Comment on "Velocity slip coefficients based on the hard-sphere Boltzmann equation" [Phys. Fluids 24, 022001 (2012)]. *Physics of Fluids*, **24**:079101-079101-3, 2012. ISSN: 1070-6631.
- [17 ] L. Desvillettes and S. Lorenzani. Sound wave resonances in micro-electro-mechanical systems devices vibrating at high frequencies according to the kinetic theory of gases. *Physics of Fluids*, **24**:092001-092001-24, 2012. ISSN: 1070-6631.

- [18 ] A. Bonucci and S. Lorenzani. Scaling laws for damping forces exerted by different gases in the near-free molecular flow regimes. *Micro and Nanosystems*, **5**:303-316, 2013. ISSN: 1876-4029.
- [19 ] M. Bisi and S. Lorenzani. Damping forces exerted by rarefied gas mixtures in micro-electro-mechanical system devices vibrating at high frequencies. *Interfacial Phenomena and Heat Transfer*, **2**(3):253-263, 2014. ISSN: 2169-2785.
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