CURRICULUM VITAE OF SIMONA TONINI

Current position

Associate Professor of Thermal Physics at the Department of Engineering and Applied Sciences of the University of Bergamo.

Habilitation as Full Professor of Thermal Physics from 14 March 2025.

Education and training

2000: "Laurea cum laude" in Management Engineering at the University of Bergamo. La tesi è stata svolta presso ABB Corporate Research Ltd (CH) sul tema di ricerca'*Uncertainty analysis for the global heat transfer coefficient and application to heat exchange models'.*

2006: PhD in Mechanical Engineering at City University London (UK); Title of thesis: *'Fuel spray modelling in direct injection Diesel and Gasoline engines'.*

Professional experience

Apr. 1999 – Sep. 1999, ABB Corporate Research Ltd, CH-5405 Baden-Dättwil: tirocinio pressi il dipartimento di Ingegneria Meccanica nel progetto 'Uncertainty Analysis for the Global Heat Transfer Coefficient and Application to Heat Exchange Models'.

Sep. 2000 - Dec. 2000, Servitec s.r.l., Via Pasubio 5, 24044 Dalmine, BG: collaboration with the department for research and energy development.

Jan. 2006 - Jan. 2007, University of Bergamo: research fellow at the Department of Industrial Engineering. Research project: 'Numerical study of fuel spray for internal combustion engines'.

Feb. 2007 - Dec. 2007, University of Bergamo: research grant provided by the European Social Fund, the Ministry of Labour and Social Security and the Lombardy Region in the INGENIO Global Grant program. Responsible for the numerical simulation activity within the project 'Spray and aerosol: innovative design methods' at the Department of Industrial Engineering.

Mag. 2008 - Apr. 2009, University of Bergamo: research fellow at the Department of Industrial Engineering. Research project title: 'Numerical survey of liquid jet fragmentation phenomena from injectors for internal combustion engines'.

Jun. 2010 - Oct. 2013, University of Bergamo: research fellow at the Department of Industrial Engineering. Title of research project: 'Modelling spray transport phenomena'.

Nov. 2013 - Sep. 2015, University of Bergamo: research fellow at the Department of Engineering and Applied Sciences. Title of research project: 'Modelling of processes of fragmentation and evaporation of liquid particles in a gas'.

Oct. 2015 - Sept. 2018: University of Bergamo: Researcher (type B) at the Department of Engineering and Applied Sciences.

Ott. 2018 - present: University of Bergamo: Associate Professor of Thermal Physics at the Department of Engineering and Applied Sciences.

Research interests

Thermal fluid dynamics, heat exchange, theoretical and numerical modelling of transport phenomena in multiphase flows, interface dynamics.

Participation in research projects

2001-2002, City University of London (UK): participation in the project funded by Yamaha Motor Company Japan, 'Modelling of flow development and spray formation in direct injection gasoline engines'.

2002, City University of London (UK): participation in the project funded by BMW Germany, 'Investigation of internal flow in gasoline multi-hole nozzles'.

2002-2003, City University of London (UK): participation in the project funded by Siemens Automotive VDO, 'Investigation of internal flow in Piezo pintle nozzles for gasoline direct injection engines'.

2005-2008, City University of London (UK): participation in the project funded by Toyota Motor Company Europe, 'CFD Feasibility studies of relevance to the Automotive Industry'.

2006 -2008, University of Bergamo, Department of Industrial Engineering: scientific collaborator of the Project of Relevant National Interest - YEAR 2005, "Technologies for localized thermal control by spray" coordinated by the University of Bergamo, Code: 2005092135. PI: Prof. Gianpietro Cossali.

2008-2010, University of Bergamo, Department of Industrial Engineering: scientific collaborator of the Project of National Interest - YEAR 2007, "Liquid spray technologies for fire fighting applications" coordinated by the University of Bergamo, Code: 2007M3XJAW. PI: Prof. Gianpietro Cossali.

2010-2014, University of Bergamo, Department of Industrial Engineering: scientific collaborator of the European Project: FIRST (Fuel Injector Research for Sustainable Transport)- FP7. Grant agreement ID: 265848. Coordinator ROLLS-ROYCE PLC.

2013-2018, University of Bergamo, Department of Industrial Engineering: participation as Visiting Scientist to the project "Investigation of non-spherical droplets in high-pressure fuel sprays", funded by Engineering and Physical Sciences Research Council (EPSRC), at the University of Brighton (Sir Harry Ricardo Laboratory). Principal Investigator: Prof. C. Crua; Chttps://gow.epsrc.ukri.org/NGBOViewGrant.aspx? GrantRef=EP/K020528/1.

2016-present, University of Bergamo, Department of Industrial Engineering: scientific collaborator of the project "International Research Training Group GRK 2160 entitled: Droplet Interaction Technologies" (GRK 2160/2: DROPIT), active from 01.10.2016 and funded by Deutsche Forschungsgemeinschaft (DFG) until 30.09.2025.

2024-present, University of Bergamo, Department of Industrial Engineering: scientific collaborator of the project "Ecool Collabora- Innova" active from 01.12.2024 and funded by Regione Lombardia (Italy) until 13.12.2027. Principal Investigator: Prof. Mauro Carnevale.

Responsibility for scientific studies and research commissioned by qualified public or private institutions

2016-2017: Scientific director of the project "Development of a novel version of DRIER Kinematic Model", between University of Bergamo, Department of Engineering and Applied Sciences, and Ammann Italy srl.

2022-present: scientific manager at the University of Bergamo for the development of analytical models of heating and evaporation of droplets of traditional and alternative fuels within the project "Closed cycle multi-fuel technologies for power plants and engines", 2022-2030, funded by Tomsk Polytechnic University, Russia. Principal Investigator: Professor P.A. Strizhak, Tomsk Polytechnic University, Russia; Leading researcher: Professor S. Sazhin, University of Brighton, UK.

2023- present: scientific responsible for the activities of mathematical modeling of the phenomena of transport in oscillating drops provided by the project Outgoing Visiting Professors/Researchers, funded by the University of Bergamo.

Scientific publications

Co-author of more than 100 publications in international scientific journals, international congress proceedings and book chapters.

Organisation of international conferences

Member of the Organizational Committee of the 22nd European Conference on Liquid Atomization and Spraying Systems 8-10 September 2008, Lake Como, Italy. Organization of the scientific programme, establishment and management of the conference website:

Board member of Institute for Liquid Atomization and Spray Systems, ILASS – Europe and member of the Organizational and Scientific Committees of the following international conferences:

28th European conference on Liquid Atomization and Spray Systems, 6th-8th SEPTEMBER, 2017 VALENCIA, SPAIN.

29th European Conference Liquid Atomization & Spray Systems, University Pierre & Marie Curie, 02/09/2019 - 04/09/2019.

14th ICLASS 2018, University of Illinois at Chicago, 22/07/2018 - 26/07/2018.

15th ICLASS 2021, University of Edinburgh, 29/08/2021 - 02/09/2021.

ILASS 2022 - Technion & Tel Aviv University (Virtual), 06/09/2022 - 08/09/2022.

Member of the Organizational and Scientific Committee of the annual DIPSI Workshop on Drop Impact Phenomena and Spray Investigation, University of Bergamo, from 2006.

Prizes and awards for scientific activity

2007 PE Publishing Award for the paper “Multi-component fuel vaporization modelling and its effect on spray development in gasoline direct injection engines”, Proc. IMechE, Part D: J. Automobile Engineering, 221(10), 1321-1342, 2007.

Achievements in technology transfer

2007-2011: founding partner of the spin-off of the University of Bergamo UNIHEAT S.r.l., registered office via S. Nicolò 11, 34121 - Trieste (TS). The company operates in the following areas: (i) consultancy services engineering and technical and scientific in the field of thermal simulations of complex systems; (ii) design activities for thermal and mechanical components and for the thermal control of industrial parts; (iii) engineering software distribution activities, (iv) component prototyping activities thermal, design,

assistance, drafting of technical-scientific projects for companies in the field national and European.

Educational activities

Teacher of Thermal physics (from 2006 - present); Thermal physics and thermal plants (from 2015 to 2024); Thermal physics for advanced technology (from 2020 - present).

Annual teaching assignment within the framework of the PhD in Engineering and Applied Sciences at the University of Bergamo of the Short Course on Dimensional Analysis for Engineering Applications (from 2018 to 2024) and of Short Course on Inverse Problems in Engineering (2025).

Supervisor of master and doctoral theses

Master theses: S. Adami (2006), A. Bisighini (2007), R. De Danieli (2010), U. Ravelli (2010), F. Villa (2011), A. Pagliaroli (2010), L. Bergamini (2014), A. Belotti (2014), U. Ravasio (2017), J. Früh (2019), M. Guarnieri (2019), A. Rondi (2021), S. Pollice (2021), M. Locatelli (2022), V. Ferretti (2024), F. Cassina (2025).

Doctoral theses: G. Galbiati (2016), Ronan A.R. Bernard (2020), G. Varma Raja Kochanattu (2021), S. Schubert (2020-present), Y. Hu (2022-2025).

Doctoral thesis examiner: P. Errante (2020, Ecole Centrale de Lyon), R. Hyde (2021, University of Bergamo).

Dalmine, 03 December 2025