Curriculum Vitae of Daniele Marchisio

Work address	Dipartimento di Scienza Applicata e Tecnologia, Istituto di Ingegneria Chimica, Politecnico di Torino, C.so Duca degli Abruzzi 24, 10129 Torino (TO) Italy
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Current position	*Full Professor*

Education

BS & MS (*cum laude*) in Chemical Engineering	1992 - 1997	**Politecnico di Torino** (Italy)
PhD in Chemical Engineering	1998 – 2001	**Politecnico di Torino** (Italy)
	1999 - 2000	Visiting Scholar at **Iowa State University** (USA)
Post-doc in Chemical Engineering	2001 – 2003	**Iowa State University** (USA)
Post-doc / academic guest in Chemical Engineering	2003 (Dec.) - 2004 (Apr.)	**Eidgenössische Technische Hochschule** (ETH) of Zurich (Switzerland)

Work & research experience

2004 – 2010	*Assistant Professor* at the Department of Material Science and Chemical Engineering of the **Politecnico di Torino** (Italy)
Summers of 2007 & 2008	*Visiting Professor* at the Department of Chemical Engineering of **University College London** (UK)
2010 – 2016	*Associate Professor* at the Department of Material Science and Chemical Engineering (now Applied Science and Technology) of the **Politecnico di Torino** (Italy)
2012 (Dec.) – 2013 (Feb.)	*Visiting Scientist* at **CSIRO** (CMIS – Clayton, Melbourne, VIC, Australia)
2016 – 2019	*Adjunct Visiting Professor* at the **Beijing University of Chemical Technology** (China)
2016 – present	*Full Professor* at the Department of Applied Science and Technology of the **Politecnico di Torino** (Italy)

International Awards & Recognition

1997	Laurea Prize "Vittorio de Bernochi" from the Association of Architects and Engineers of the Politecnico di Torino as the best graduate in Chemical Engineering in the year 1997
1998	Prize "Optime" from the Industrial Union of Turin as one of the best 100 students of the year
2001	United Engineering Foundation Conference Fellowship, for attending the Chemical Reaction Engineering Conference (24-29 June 2001, Barga, Italy)
2007	Most cited paper for Chemical Engineering Science: D.L. Marchisio, R.D. Vigil, R.O. Fox (2003) Implementation of the Quadrature Method of Moments in CFD codes for aggregation-breakage problems, Chemical Engineering Science, 58, 3337-3351
2007	Recipient of the International Incoming Short Visits fellowship funded by the Royal Society of the United Kingdom
2010	Sciencedirect top 25 most downloaded article for: M. Hussain, R. Ceccarelli, D.L. Marchisio, D. Fino, N. Russo, F. Geobaldo (2010) Synthesis, characterization and photocatalytic application of novel TiO2 nanoparticles, Chemical Engineering Journal. 157, 45-51

Membership in Professional Organizations and Scientific Committees

- Member of the American Institute of Chemical Engineering (AIChE)
- Member of the Italian Association of Chemical Engineering (AIDIC)
- Member of the European Federation of Chemical Engineering (EFCE)
- Member of the Working Parties on Industrial Crystallization and Multiphase Flows of the EFCE
- *Consigliere* (from 2017 to 2019) of the GRICU (Gruppo Ingegneria Chimica dell'Università)

Institutional roles:

- Coordinator of the Doctorate Program in Chemical Engineering at Politecnico di Torino (2017 – 2019)
- Member of the Academic Senate of Politecnico di Torino (2019 - 2022)

Membership in editorial boards of international journals, scientific committees of international conferences and reviewing activity

- Associate Editor for the Canadian Journal of Chemical Engineering http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1939-019X/homepage/EditorialBoard.html
- Member of the Advisory Board of Chemical Engineering & Technology http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1521-4125/homepage/2044_edbd.html
- Member of scientific/organizing committees of the International Symposium on Industrial Crystallization (ISIC), International Conference on Multiphase flows, European Conference on Mixing, Population Balance Modelling Conference
- Reviewer for the most important journals in his field (*Journal of Computational Physics, International Journal of Multiphase Flows, A.I.Ch.E. Journal, Chemical Engineering Science, Journal of Colloid and Interface Science, Chemical Engineering Journal, Industrial and Engineering Chemistry Research, Chemical Engineering Research and Design, Computers & Chemical Engineering, Physical Review E, Journal of Pharmaceutical Sciences, etc.*) as well as for the Cambridge University Press for book proposal reviewing
- Reviewer for grant proposals for Swiss National Science Foundation, German Science Foundation (DFG), Austrian Science Foundation, Beijing University of Chemical Technology, Fundação para a Ciência e a Tecnologia (Portugal), Research Council of Norway
- Member of the Advisory Board of the CORAL EPSRC project http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/N024915/1

Invited Keynote/Plenary Lectures, Invited Seminars and Organization of Summer Schools

- Daniele Marchisio has delivered about **20+ invited/keynote/plenary lectures at important international conferences** (among which: Recent Advances in Bubble Columns, SFGP/EFCE, Paris, France, 2019; Paris – FranceBIRS-CMO Workshop: New Frontiers in Multiphase CFD for the 21st Century Energy Mix at Casa Matemática Oaxaca, Mexico, 2018; 14th International Conference on Multiphase Flow, Desenzano, Italy, 2017; 15th Multiphase Flow Conference and Short Course: Simulation, Experiment and Application, Dresden, Germany, 2017; Dynamics of Evolving Fluid Interfaces – DEFI; Lyon, France, 2016; 19th International Symposium of Industrial Crystallization, Toulouse, France, 2014; 5th International Conference on Population Balance Modelling, Bangalore, India, 2013; 9th European Congress of Chemical Engineering, The Hague, The Netherlands, 2013; North American Mixing Forum – Mixing XXIII, Cancun, Mexico, 2013; 50th European Two-Phase Flows Group Meeting, 2012 - 2nd Joint ETPFG-EFCE Multi-Phase Meeting, 2012, Udine, Italy; etc.)
- Daniele Marchisio has delivered **30+ invited seminars at public and private institutions** around the world (TU Darmstadt, TU Munich, University College London, CSIRO Melbourne, MIT, University of Warwick, CEA Marcoule, Warsaw Technical University, Eindhoven Technical University and Multiscale Institute, Aalto University, University of Alberta, Imperial College, etc.)
- Daniele Marchisio has **organized and lectured in 14 advanced doctorate summer schools** on several topics including: multiscale modelling, simulation of multiphase flows and population balance modelling (GRICU Summer School on Multiscale Modelling, Palermo, Italy, 2017; Multiscale modelling of flowing soft matter, CISM, Italy, 2016; Multiscale modelling and Multiphysics coupling in solid and fluids mechanics, TEC21, France, 2015; 3rd Summer School of the IMPRS Magdeburg, Germany, 2013; Computational Models for Polydisperse Particulate and Multiphase Systems, CSIRO – CMIS, Australia, 2013; Multiphase turbulent reacting flows, CISM, 2006; etc.)

Tutoring & Research Activity / Coordination of National and International Project

Daniele Marchisio has acted as **supervisor for 50+ master students and 20+ PhD students**.

Daniele Marchisio's research activity focuses on the development, validation and implementation of computational methods for multiscale modeling, with a particular focus on turbulent multiphase reacting systems. His early research interests focused on the treatment of very fast chemical reactions with Computational Fluid Dynamics (CFD) through the Reynolds-Averaged Navier-Stokes equation (RANS) and the Large Eddy Simulation (LES) approaches. More recently he has been interested in the description of the evolution of multiphase systems through Population Balance Models (PBM). He developed, investigated and validated an entire class of methods (Quadrature-Based Moments Methods, QBMM) that are now employed in commercial and open source CFD codes. These methods have been also applied to the atomistic description of fluids, by solving the Boltzmann equation. Lately the problem of coupling, following the multiscale approach, different scales, namely fully atomistic and coarse-grained molecular dynamics simulations (by using GROMACS and LAMMPS), mesoscale models, such as Dissipative Particle Dynamics (DPD) and continuum models (CFD), has been investigated.

Daniele Marchisio has acted as **Principal Investigator in the following projects** (selection of most relevant projects in recent years):

- Research project funded by the European Commission (H2020) titled: "BIG-MAP: Building a Low-Carbon, Climate Resilient Future: Next-Generation Batteries", 2020 – 2022, € 210.000 (PI for DISAT)
- Research project funded by the European Commission (H2020) titled: "SEA Circular Processing of Seawater Brines from Saltworks for Recovery of Valuable Raw Materials", 2020 – 2022, € 120.000 (Polito is third party)
- Research project titled "Multiscale modelling of structured fluids" granted by Rodhia/Solvay, 2020 – 2022, € 150.000
- Research project funded by the European Commission (H2020) titled: "SimDOME: Digital Ontology-based Modelling Environment for Simulation of materials", 2019 – 2022, € 575.000
- Research project funded by the European Commission (H2020) titled "VIMMP: Virtual Materials (Modelling) Marketplace", 2018-2021, € 650.000
- Consultancy Project titled "CFD simulation of precipitation processes" granted by BASF, 2017-2019, € 60.000

- Research Project titled “CFD simulation of foam formation in carbonated beverages” granted by Sidel/Tetrapack/Optimad, 2017-2020, € 30.000 + 85.000
- Research project titled “Simulation of industrial bubble columns under heterogeneous regime with CFD and PBM” funded by the IFP Energie Nouvelles, Lyon (France), 2015-2018, € 30.000
- Collaborative project funded by the European Commission (FP7) titled “MODENA: Modelling of morphology development of micro- and nano-structures”, 2014-2016, € 305.000
- Research project titled “CFD simulation of gas-liquid reactors with population balances” funded by BASF, Ludwigshafen (Germany), 2012-2014, € 120.000

Publications & Citation Report

Daniele Marchisio has published 150+ papers on international journals and 140+ papers on proceedings of international conferences. He has authored one book (Marchisio D.L., Fox R.O. (2013) Computational Models for Polydisperse Particulate and Multiphase Systems, Cambridge University Press: Cambridge; ISBN: 978-0-521-85848-9) and edited another one (Marchisio D.L., Fox R.O. (2007) Multiphase reacting flows: modelling and simulation, Springer: Wien; CISM Series, Vol. 492, ISBN: 978-3-211-72464-4).

June 2020	**Scopus**	**Web of Science**
Total number of documents	152	149
Total number of citations	4862	4451
Hirsch factor (*H-index*)	36	35

In particular **Daniele Marchisio meets the requirement to act as “Commissario all'Abilitazione Nazionale nel Settore 09/D2”.**

List of 25 most recent publications

1. Shiea, M., Buffo, A., Vanni, M., Marchisio, D. Numerical Methods for the Solution of Population Balance Equations Coupled with Computational Fluid Dynamics (2020) Annual review of chemical and biomolecular engineering, 11, pp. 339-366.
2. Shiea, M., Buffo, A., Vanni, M., Marchisio, D.L. A novel finite-volume TVD scheme to overcome non-realizability problem in quadrature-based moment methods (2020) Journal of Computational Physics, 409, art. no. 109337.
3. Li, D., Marchisio, D., Hasse, C., Lucas, D. twoWayGPBEFoam: An open-source Eulerian QBMM solver for monokinetic bubbly flows (2020) Computer Physics Communications, 250, art. no. 107036.
4. Lavino, A.D., Carbone, P., Marchisio, D. MARTINI coarse-grained model for poly-ε-caprolactone in acetone-water mixtures (2020) Canadian Journal of Chemical Engineering, in press.
5. Pollack, M., Pütz, M., Marchisio, D.L., Oevermann, M., Hasse, C. Zero-flux approximations for multivariate quadrature-based moment methods (2019) Journal of Computational Physics, 398, art. no. 108879.
6. Li, D., Marchisio, D., Hasse, C., Lucas, D. Comparison of Eulerian QBMM and classical Eulerian–Eulerian method for the simulation of polydisperse bubbly flows (2019) AIChE Journal, 65 (11), art. no. e16732.
7. Castellano, S., Carrillo, L., Sheibat-Othman, N., Marchisio, D., Buffo, A., Charton, S. Using the full turbulence spectrum for describing droplet coalescence and breakage in industrial liquid-liquid systems: Experiments and modeling (2019) Chemical Engineering Journal, 374, pp. 1420-1432.
8. Gemello, L., Plais, C., Augier, F., Marchisio, D.L. Population balance modelling of bubble columns under the heterogeneous flow regime (2019) Chemical Engineering Journal, 372, pp. 590-604.
9. Boccardo, G., Buffo, A., Marchisio, D. Simulation of Mixing in Structured Fluids with Dissipative Particle Dynamics and Validation with Experimental Data (2019) Chemical Engineering and Technology, 42 (8), pp. 1654-1662.
10. Shiea, M., Buffo, A., Baglietto, E., Lucas, D., Vanni, M., Marchisio, D. Evaluation of Hydrodynamic Closures for Bubbly Regime CFD Simulations in Developing Pipe Flow (2019) Chemical Engineering and Technology, 42 (8), pp. 1618-1626.

11. Boccardo, G., Sethi, R., Marchisio, D.L. Fine and ultrafine particle deposition in packed-bed catalytic reactors (2019) Chemical Engineering Science, 198, pp. 290-304.
12. Spigarelli, L., Bertana, V., Marchisio, D., Scaltrito, L., Ferrero, S., Cocuzza, M., Marasso, S.L., Canavese, G., Pirri, C.F. A passive two-way microfluidic device for low volume blood-plasma separation (2019) Microelectronic Engineering, 209, pp. 28-34.
13. Bazzano, M., Marchisio, D., Sangermano, M., Wörner, M., Pisano, R. A molecular dynamics approach to nanostructuring of particles produced via aerosol cationic photopolymerization (2019) Chemical Engineering Science, 195, pp. 1021-1027.
14. Salenbauch, S., Hasse, C., Vanni, M., Marchisio, D.L. A numerically robust method of moments with number density function reconstruction and its application to soot formation, growth and oxidation (2019) Journal of Aerosol Science, 128, pp. 34-49.
15. Lavino, A.D., Marchisio, D., Vanni, M., Ferri, A., Barresi, A.A. Nanoparticles production in continuous flow devices Modelling and experimental insights into continuous flow-based processes (2019) Chimica Oggi/Chemistry Today, 37 (4), pp. 8-11.
16. Pasquino, R., Droghetti, H., Carbone, P., Mirzaagha, S., Grizzuti, N., Marchisio, D. An experimental rheological phase diagram of a tri-block co-polymer in water validated against dissipative particle dynamics simulations (2019) Soft Matter, 15 (6), pp. 1396-1404.
17. Castellano, S., Sheibat-Othman, N., Marchisio, D., Buffo, A., Charton, S. Description of droplet coalescence and breakup in emulsions through a homogeneous population balance model (2018) Chemical Engineering Journal, 354, pp. 1197-1207.
18. Droghetti, H., Pagonabarraga, I., Carbone, P., Asinari, P., Marchisio, D. Dissipative particle dynamics simulations of tri-block co-polymer and water: Phase diagram validation and microstructure identification (2018) Journal of Chemical Physics, 149 (18), art. no. 184903.
19. Barresi, A.A., Marchisio, D.L. Computational Fluid Dynamics data for improving freeze-dryers design (2018) Data in Brief, 19, pp. 1181-1213.
20. Marchisio, D.L., Galan, M., Barresi, A.A. Use of computational fluid dynamics for improving freeze-dryers design and process understanding. Part 2: Condenser duct and valve modelling (2018) European Journal of Pharmaceutics and Biopharmaceutics, 129, pp. 45-57.
21. Barresi, A.A., Rasetto, V., Marchisio, D.L. Use of computational fluid dynamics for improving freeze-dryers design and process understanding. Part 1: Modelling the lyophilisation chamber (2018) European Journal of Pharmaceutics and Biopharmaceutics, 129, pp. 30-44.
22. Gemello, L., Cappello, V., Augier, F., Marchisio, D., Plais, C. CFD-based scale-up of hydrodynamics and mixing in bubble columns (2018) Chemical Engineering Research and Design, 136, pp. 846-858.
23. Gemello, L., Plais, C., Augier, F., Cloupet, A., Marchisio, D.L. Hydrodynamics and bubble size in bubble columns: Effects of contaminants and spargers (2018) Chemical Engineering Science, 184, pp. 93-102.
24. Lavino, A.D., Banetta, L., Carbone, P., Marchisio, D.L. Extended Charge-On-Particle Optimized Potentials for Liquid Simulation Acetone Model: The Case of Acetone-Water Mixtures (2018) Journal of Physical Chemistry B, 122 (20), pp. 5234-5241.
25. Karimi, M., Marchisio, D., Laurini, E., Fermeglia, M., Pricl, S. Bridging the gap across scales: Coupling CFD and MD/GCMC in polyurethane foam simulation (2018) Chemical Engineering Science, 178, pp. 39-47.