

Alessandro Bigi

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Professional experiences

- Apr 2025 – now
- **Head of MS Programme Civil-Environmental Engineering** at Dept of Engineering, University of Modena and Reggio Emilia.
Duties: Coordination of the teacher board. Student advisor and tutoring. Responsibility for the QA/QC procedures of the MS Programme.
- Jan 2019 – now
- **Associate professor** at Dept of Engineering, University of Modena and Reggio Emilia.
Duties: Lecturing for the Environmental Engineering MS degree, for the Vehicle Engineering MS degree. Supervision of MS, BS and PhD students. Maintenance, deployment and renovation of atmospheric monitors, lab-work, field-work, data analysis, publishing, fundraising. Participation in the management of the Department.
- Jun 2024 – Aug 2024
- **Swiss National Science Foundation short-visit Fellow** at EMPA.
Project: CO₂ urban emission verification by combined atmospheric monitoring and modelling. *Tutor:* Christoph Hüglin *Duties:* Study of the uncertainty in the CO₂ flux estimates by VPRM for the green areas in the city of Zurich.
- Jan 2016 – Dec 2018
- **Assistant professor** at Dept of Engineering, University of Modena and Reggio Emilia.
Duties: Lecturing for the Environmental Engineering MS degree. Supervision of MS, BS and PhD students. Maintenance, deployment and renovation of atmospheric monitors, lab-work, field-work, data analysis, publishing, fundraising
- Jun 2017 – Aug 2017
- **Swiss National Science Foundation short-visit Fellow** at EMPA.
Project: “Assessment of small sensors for urban air quality measurements”.
Tutor: Christoph Hüglin *Duties:* Calibration and performance analysis of NO, NO₂ low cost sensors within a real world application testing, applying machine learning algorithms
- Sep 2015
- **Visiting scientist** at EUPHORE group of CEAM Foundation within the Pioneers Into Practice programme of CLIMATE-KIC.
Duties: analysis of an intercomparison campaign of HONO continuous analysers at the EUPHORE
- Jan 2011 – Dec 2015
- **Fixed-term Researcher** at Dept of Engineering, University of Modena and Reggio Emilia.
Duties: Lecturing for the MS degree in Environmental Engineering. Supervision of MS and BS students, instrument maintenance, deployment and upgrading, lab-work, field-work, data analysis, publishing
- Jun 2012 – Aug 2012
- **Swiss National Science Foundation short-visit Fellow** at Paul Scherrer Institute.
Project: “Characterization, calibration and validation of an Ice Selective Inlet”.
Tutor: Ernest Weingartner *Duties:* Lab calibration of the Ice Selective Inlet and its testing at the AIDA cloud chamber during the IN19 campaign
- Jun 2009 – Aug 2009
- **Honorary Research Fellow** at School of Geography, Earth and Environmental Sciences, University of Birmingham, U.K.
Host: Prof. Roy M. Harrison *Duties:* climatological analysis of air quality at a long term monitoring site
- Feb 2007 – Dec 2010
- **INTERMECH project grantee** at Dept of Engineering, University of Modena and Reggio Emilia.
Supervisor: Prof. Grazia Ghermandi. *Duties:* measurement of particle size number distribution by D/SMPS and mass concentration of PM by TEOM-FDMS, instrument maintenance and calibration, data analysis
- Oct 2003 – Jan 2007
- **Project grantee** at Dept of Agricultural Economics and Engineering, University of Bologna.
Supervisor: Dr. Donatella Pavanelli. *Duties:* surface erosion assessment, catchment basins characterisation, statistical analysis of hydrological variables, instrument maintenance

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Main projects

- MIRAI
- PI of the University project MIRAI aiming to investigate the SARS-CoV-2 risk in classrooms by indoor air quality monitoring based on compact sensors. Budget: euro 70k. (Dec 2021 – Jun 2023)
- BlackAir
- PI of the University project BlackAir aiming to investigate the sanitary impact of Black Carbon and Brown Carbon in Modena, based on urban scale dispersion modelling, compact BC-BrC samplers and hospitalization data. Budget: euro 80k. (Aug 2019 – Jan 2022)
- TRAF AIR
- Activity and task leader in actions related to air pollution for the EU project TRAF AIR ‘Understanding traffic flows to improve air quality’ (CEF-TELECOM): the project aims to study the impact of traffic on air quality in 6 European cities (Modena, Firenze, Livorno, Pisa, Saragozza e Santiago de Compostela) using low cost sensor units, traffic sensors and urban scale dispersion modelling. Budget: ca. euro 2.2 millions (Nov 2018 – Apr 2021)
- Climate-KIC
- Pioneers into Practice Programme (CLIMATE-KIC funds by European Institute of Technology) (May 2015 – Nov 2015)
- Others
- Participation to the national projects: ECOSISTER (PNRR Ecosistemi Inn. Spoke 4), INAIL-BRIC-ID21/2023, INAIL-BRIC-ID21/2022, INAIL-BRIC-ID57/2016, PRIN 2010/2011, PRIN 2006. Participation to the regional projects: ERDF 2014 – 2020, PRRITT – INTERMECH, PRRITT – SIMECH.

Education

Graduate

- Oct 2008
Short courses
- Environmental acoustic consultant degree
 - FLEXPART 10 course, ZAMG, Wien, Austria (2019)
 - Innovative Wastewater Treatment and Mathematical Modelling - Advanced Course. Palermo, Italy (2017)
 - EUSAAR - Advanced Aerosol Training Course, Hyytiälä Forest Station, Finland. (2009)
 - Global Atmosphere Watch Training & Education Centre (GAWTEC XVI). Environmental Research Station Schneefernerhaus, Germany. (2009)
 - Aerosol school: Atmospheric aerosol monitoring problems and interpretation tools. University of Bari. (2008)
 - Estimate of uncertainty in hydrological modelling. University of Bologna, Bertinoro. (2008)
 - Stochastic processes and time series analysis. Tuscia University, Viterbo. (2007)
 - International school on hydrogeological risk prevention and management. Session one - rainfall estimation and forecast - ARPA-SIMC (Regional Meteo Service) Bologna. (2004)
 - Introduction to Fortran90, CINECA (North-East Interregional Centre for Advanced Computing). (2004)
- Courses
- Soil hydrology - Faculty of Agriculture, Federico II University, Naples. (2004)
 - Bayesian statistical inference - Prof. Daniela Cocchi, University of Bologna. (2006)
 - Advanced statistics and probability - Prof. Paola Monari, Prof. Patrizia Agati, University of Bologna. (2005)
 - Time series and multidimensional series analysis - Prof. Marilena Pillati, University of Bologna. (2004)
 - Statistics and probability - Prof. Angela Montanari, University of Bologna. (2004)
- Jul 2007
- **PhD in Physical Modelling for Environmental Protection.** Advisor: Prof. Alberto Montanari, Faculty of Engineering, University of Bologna. Project: A spatially-distributed physically-based erosion model at a basin scale.
- Oct 2002
- **Environmental Engineer Master Degree** at the University of Bologna. MS Thesis: Study of the dynamics of the erosive processes in catchment basins through a physical model. Advisors: Prof. Alberto Montanari, Prof. Chris Paola and Prof. Les E. Hasbargen

Undergraduate

- Jun 2002 – Sept 2002
- **Visiting undergraduate research assistant** at the St Anthony Falls Lab - University of Minnesota, Twin Cities. Tutor: Prof. Chris Paola and Prof. Les E. Hasbargen
- Sept 2000 – May 2001
- **Visiting student** at the Department of Civil Engineering - University of Minnesota, Twin Cities

Awards

- Reviewer for the journals: Nature Communications, Atmospheric Environment, Journal of Environmental Monitoring, Atmosphere
- Invited seminar at the Regional Environmental Agency Emilia-Romagna (2014)
- Author of one of the top-50 most cited articles in Atmospheric Environment (period 2010-2011)
- Young Scientist's Travel Award for Europeans at the 2006 EGU General Assembly
- Young Scientist's Travel Award for Europeans at the 2004 EGU General Assembly
- Invited seminar at the Civil and Environmental Engineering Dept, University of Trento (2002)
- Scholarship from the Faculty of Engineering of the University of Bologna for the MS Thesis project (2002)
- Sommerfeld scholarship from the Civil Engineering Dept - University of Minnesota, Twin Cities (2001)
- Overseas scholarship from the University of Bologna as visiting student in the U.S. (2000)

Selected publications

- D. Brunner, I. Suter, L. Bernet, L. Constantin, S. K. Grange, P. Rubli, J. Li, J. Chen, **A. Bigi**, and L. Emmenegger. Building-resolving simulations of anthropogenic and biospheric CO₂ in the city of Zurich with GRAMM/GRAL. *Atmospheric Chemistry and Physics*, 25:14387–14410, 2025.
- S. Atabakhsh, L. Poulain, **A. Bigi**, M. Collaud Coen, M. Pöhlker, and H. Herrmann. Trends of pm1 aerosol chemical composition, carbonaceous aerosol, and source over the last 10 years at Melpitz (Germany). *Atmospheric Environment*, 346:121075, 2025.
- A. Baruah, D. Bousiotis, S. Damayanti, **A. Bigi**, G. Ghermandi, O. Ghaffarpasand, R. M. Harrison, and F. D. Pope. A novel spatiotemporal prediction approach to fill air pollution data gaps using mobile sensors, machine learning and citizen science techniques. *npj Climate and Atmospheric Science*, 7(310):1–12, 2024.
- **A. Bigi**, G. Veratti, E. Andrews, M. Collaud Coen, L. Guerrieri, V. Bernardoni, D. Massabò, L. Ferrero, S. Teggi, and G. Ghermandi. Aerosol absorption using in situ filter-based photometers and ground-based sun photometry in the Po valley urban atmosphere. *Atmospheric Chemistry and Physics*, 23(23):14841–14869, 2023.
- J. Shen, **A. Bigi**, A. Marinoni, J. Lampilahti, J. Kontkanen, G. Ciarelli, J.P. Putaud, T. Nieminen, M. Kulmala, K. Lehtipalo, and F. Bianchi. Emerging investigator series: COVID-19 lockdown effects on aerosol particle size distributions in Northern Italy. *Environmental Science: Atmospheres*, 1:214–227, 2021.
- G. Ciarelli, J. Jiang, I. El Haddad, **A. Bigi**, S. Aksoyoglu, A. S. H. Prévôt, A. Marinoni, J. Shen, C. Yan, and F. Bianchi. Modeling the effect of reduced traffic due to COVID-19 measures on air quality using a chemical transport model: impacts on the Po Valley and the Swiss Plateau regions. *Environmental Science: Atmospheres*, 1:228–240, 2021.
- F. Bianchi, H. Junninen, **A. Bigi**, V. A. Sinclair, L. Dada, C. R. Hoyle, Q. Zha, L. Yao, L. R. Ahonen, P. Bonaoni, S. Buenrostro Mazon, M. Hutterli, P. Laj, K. Lehtipalo, J. Kangasluoma, V.-M. Kerminen, J. Kontkanen, A. Marinoni, S. Mirme, U. Molteni, T. Petäjä, M. Riva, C. Rose, K. Sellegri, C. Yan, D. R. Worsnop, M. Kulmala, U. Baltensperger, and J. Dommen. Biogenic particles formed in the himalaya as an important source of free tropospheric aerosols. *Nature Geoscience*, 14(1):4–9, 2021.
- P. Laj, **A. Bigi**, C. Rose, E. Andrews, C. Lund Myhre, M. Collaud Coen, Y. Lin, A. Wiedensohler et al. A global analysis of climate-relevant aerosol properties retrieved from the network of global atmosphere watch (GAW) near-surface observatories. *Atmospheric Measurement Techniques*, 13(8):4353–4392, 2020.
- M. Collaud Coen, E. Andrews, **A. Bigi**, G. Martucci, G. Romanens, F. P. A. Vogt, and L. Vuilleumier. Effects of the prewhitening method, the time granularity, and the time segmentation on the mann-kendall trend detection and the associated sen's slope. *Atmospheric Measurement Techniques*, 13(12):6945–6964, 2020.
- **A. Bigi**, M. Mueller, S. K. Grange, G. Ghermandi, and C. Hueglin. Performance of NO, NO₂ low cost sensors and three calibration approaches within a real world application. *Atmospheric Measurement Techniques*, 11(6):3717–3735, 2018.
- **A. Bigi**, F. Bianchi, G. De Gennaro, A. Di Gilio, P. Fermo, G. Ghermandi, A. S. H. Prévôt, M. Urbani, G. Valli, R. Vecchi, and A. Piazzalunga. Hourly composition of gas and particle phase pollutants at a central urban background site in milan, italy. *Atmospheric Research*, 186:83–94, 2017.
- V. Bernardoni, M. Elser, G. Valli, S. Valentini, **A. Bigi**, P. Fermo, A. Piazzalunga, and R. Vecchi. Size-segregated aerosol in a hot-spot pollution urban area: Chemical composition and three-way source apportionment. *Environmental Pollution*, 231, Part 1:601 – 611, 2017.
- **A. Bigi** and G. Ghermandi. Trends and variability of atmospheric PM_{2.5} and PM_{10-2.5} concentration in the Po valley, Italy. *Atmospheric Chemistry and Physics*, 16(24):15777–15788, 2016.
- P. Kupiszewski, E. Weingartner, P. Vochezer, M. Schnaiter, **A. Bigi**, M. Gysel, B. Rosati, E. Toprak, S. Mertes, and U. Baltensperger. The Ice Selective Inlet: a novel technique for exclusive extraction of pristine ice crystals in mixed-phase clouds. *Atmospheric Measurement Techniques*, 8(8):3087–3106, 2015.
- **A. Bigi** and G. Ghermandi. Long-term trend and variability of atmospheric PM₁₀ concentration in the Po valley. *Atmospheric Chemistry and Physics*, 14(10):4895–4907, 2014.

Selected publications (continued)

- **A. Bigi**, G. Ghermandi, and R. M. Harrison. Analysis of the air pollution climate at a background site in the Po valley. *Journal of Environmental Monitoring*, 14:552–563, 2012.
- **A. Bigi** and R. M. Harrison. Analysis of the air pollution climate at a central urban background site. *Atmospheric Environment*, 44:2004–2012, 2010.