# Peng Qin

Address: Building Physics and Services, Department of Built Environment,
Eindhoven University of Technology, 5600 MB Eindhoven, The Netherlands
Email: p.qin@tue.nl | Tel: (+31) 640714908 | Website: https://peng-qin-94.github.io/


## SUMMARY


A highly motivated researcher with a PhD in Building Physics and extensive expertise in computational fluid dynamics (CFD), wind-tunnel testing, ventilation, particle/gas dispersion modeling, and indoor and outdoor air quality. My research spans from outdoor urban climate challenges to indoor air quality — from pollutant dispersion and thermal studies in urban areas to COVID-related studies on indoor ventilation and particle dispersion studies. I am proficient in large-scale numerical modeling in UNIX/Linux environments using ANSYS Fluent/OpenFOAM. I am passionate about addressing environmental health issues (e.g. contaminant exposure due to limited ventilation, urban overheating, and indoor/outdoor air quality) and supporting government and stakeholder policy and decision-making.


## EDUCATION

**Eindhoven University of Technology** — Eindhoven, the Netherlands
Ph.D., Building Physics — Sep. 2018 - June 2025
Dissertation topic: *CFD Modeling of Air Pollution in an Urban Street Canyon: Sensitivity Analyses and Recommendations*
**Tongji University** — Shanghai, China
MSc., Architecture and Civil Engineering — Sep. 2015 - June 2018
**Xiamen University** — Xiamen, China
B.S., Architecture and Civil Engineering — Sep. 2011 - July 2015

## WORKING EXPERIENCE

**Eindhoven University of Technology** — Eindhoven, the Netherlands
Postdoc Researcher[1] — June 2025 - present
University Researcher[2] — Sep. 2022 - June 2025

## RESEARCH INTERESTS

Building physics, building ventilation, particle/pollutant dispersion, indoor and outdoor air quality, thermal comfort, CFD

## PUBLICATIONS

### Journal Papers (7 peer-reviewed and 3 in preparation)

1. **Qin, P.**, Ricci, A., Blocken, B. (2025). CFD simulation of pollutant dispersion in a street canyon with realistic car sources: The potential of green infrastructure configurations. *Urban Climate (Q1)*, 62, 102544. doi:10.1016/j.uclim.2025.102544
2. **Qin, P.**, de Lange, A., van Hooff, T., Traversari, R., Loomans, M. (2025). Experimental and CFD analysis of particle distribution in a controlled test facility: Impact of exhalation flow velocity and direction. *Building and Environment (Q1)*, 283, 113328. doi:10.1016/j.buildenv.2025.113328
3. **Qin, P.**, Ricci, A., Blocken, B. (2024). Modeling traffic pollutants in a street canyon by CFD: Idealized line sources versus multiple realistic car sources. *Science of The Total Environment (Q1)*, 955, 177099. doi:10.1016/j.scitotenv.2024.177099
4. **Qin, P.**, Ricci, A., Blocken, B. (2024). On the accuracy of idealized sources in CFD simulations of pollutant dispersion in an urban street canyon. *Building and Environment (Q1)*, 265, 111950. doi:10.1016/j.buildenv.2024.111950
5. **Qin, P.**, Ricci, A., Blocken, B. (2024). CFD simulation of aerodynamic forces on the DrivAer car model: Impact of computational parameters. *Journal of Wind Engineering and Industrial Aerodynamics (Q1)*, 248, 105711. doi:10.1016/j.jweia.2024.105711
6. **Qin, P.**, Zhou, Z. (2022). Aerodynamic analysis of the top structure of a monopole telecommunication tower: Impact of wind directions and diameters of the hexadecagonal tube body. *Journal of Wind Engineering and Industrial Aerodynamics (Q1)*, 224, 104946. doi:10.1016/j.jweia.2022.104946
7. Blocken, B., van Druenen, T., Ricci, A., Kang, L., van Hooff, T., **Qin, P.**, Xia, L., Alanis Ruiz, C., Arts, D., Diepens, J. F. L., Maas, G. A., Gillmeier, S. G., Vos, S. B., Brombacher, A. C. (2021). Ventilation and air cleaning to limit

[1] Detailed assessment of different advanced ventilation and air cleaning concepts to reduce long-range and short-range transmission as much as possible without jeopardizing – among other things – thermal comfort and efficient energy use.
[2] Focusing on COVID-related research and using experimental and CFD techniques to investigate the impact of ventilation on the dispersion of pathogen-laden aerosol particles, exposure risk, and infection control.

aerosol particle concentrations in a gym during the COVID-19 pandemic. *Building and Environment (Q1)*, 193, 107659. doi:10.1016/j.buildenv.2021.107659

8. **Qin, P.**, van Hooff, T., Loomans, M. Toward an accurate CFD modeling of the ventilation supply element: Impact of computational and physical parameters. In Preparation.
9. **Qin, P.**, de Lange, A., van Hooff, T., Traversari, R., Loomans, M. Impact of source locations on the particle concentration in a controlled test facility via experimental and numerical studies. In Preparation.
10. **Qin, P.**, Ma, H., Zheng, X. Large eddy simulation of heated facades on pollutant dispersion in an urban street canyon: Impact of building morphology. In Preparation.

**Conference Presentations (13 conference contributions in total)**

1. **Qin, P.**, Ricci, A., Blocken, B. (2025). CFD simulation of pollutant dispersion in a street canyon with realistic car sources: The potential of green infrastructure configurations. *COBEE 2025, Eindhoven, the Netherlands*.
2. **Qin, P.**, de Lange, A., van Hooff, T., Traversari, R., Loomans, M. (2025). Experimental and CFD analysis of particle distribution in a controlled test facility: Impact of exhalation flow velocity and direction. *COBEE 2025, Eindhoven, the Netherlands*.
3. **Qin, P.**, van Hooff, T., Loomans, M., Traversari, R. (2024). Contaminant exposure in a pharmacy cleanroom with mixing ventilation: Impact of air-change rates. *RoomVent 2024, Stockholm, Sweden*.
4. **Qin, P.**, Ricci, A., Blocken, B. (2023). CFD simulation of pollutant dispersion in a street canyon: Impact of idealized and realistic sources. *IAQVEC 2023, Tokyo, Japan*.
5. **Qin, P.**, Ricci, A., Blocken, B. (2023). CFD simulations of pollutant dispersion in a street canyon: impact of idealized and realistic sources. *Burgers Symposium 2023, Lunteren, the Netherlands*.
6. **Qin, P.**, Ricci, A., Blocken, B. (2023). Aerodynamic force prediction on the DrivAer model by CFD: Impact of the turbulence modeling approach, *ICWE 2023, Florence, Italy*.
7. **Qin, P.**, Ricci, A., Blocken, B. (2022). CFD simulations of pollutant dispersion in a street canyon: Impact of ideal versus realistic source emissions, *COBEE2022, Montreal, Canada*.
8. Loomans, M., Xia, L., **Qin, P.**, van Hooff, T. (2025). Ventilation and air cleaning in the context of infection risk: results from two large Dutch research projects, *Healthy Buildings Europe 2025, Reykjavík, Iceland*.
9. Kang, L., **Qin, P.**, Diepens, J., van Hooff, T., Loomans, M. (2024). CFD-aided ventilation design for a large experimental chamber to study aerosol dispersion and removal, *RoomVent 2024, Stockholm, Sweden*.
10. Xia, L., Ricci, A., **Qin, P.**, Blocken, B. (2023). Experimental and numerical analysis of aerosol concentration in a multi-zone ventilated indoor environment, *ICWE 2023, Florence, Italy*.
11. Xia, L., Ricci, A., **Qin, P.**, Blocken, B. (2022). Reducing aerosol particle concentration in indoor spaces with mechanical ventilation and air cleaning: Evidences and challenges, *COBEE 2022, Montreal, Canada*.
12. Xia, L., Ricci, A., **Qin, P.**, Blocken, B. (2022). Using ventilation and air cleaning to reduce the aerosol concentration in a laboratory room, *AERO 2022, Toulouse, France*.
13. Cosnefroy, M., **Qin, P.**, Ricci, A., Gillmeier, S., van Hooff, T., Hornikx, M. C. J. (2022). A database of scale model measurements for urban sound propagation in a moving atmosphere and first comparisons with simulations, *ICA2022, Gyeongju, Korea*.

**Articles in Professional Journals/Magazines (2 contributions in total)**

1. Pelkmans, D., **Qin, P.**, Ricci, A., Blocken, B. (Academic Year 2020-21). 3D Steady RANS Simulation of Pollutant Dispersion in Streets. Inside Information, Mollier, pp 49. Mollier, Eindhoven University of Technology, the Netherlands.
2. Blocken, B., van Druenen, T., Ricci, A., Kang, L., van Hooff, T., **Qin, P.**, Xia, L., Alanis Ruiz, C., Arts, D., Diepens, J. F. L., Maas, G. A., Gillmeier, S. G., Vos, S. B., Brombacher, A. C. (2021). Ventilatie en luchtreiniging tegen aerosoldeeltjes in sportscholen, TVVL Magazine, 50–54.

## RESEARCH PROJECTS

**MItigation STrategies for Airborne Infection Control** — Eindhoven, The Netherlands
*Key Participant* — June 2025 - Present

- Ventilation, development of ventilation concepts, air sanitization, CFD.

**Urban Heat, Air Quality and Vehicle Emission Studies** — Eindhoven, The Netherlands
*Project Lead* — Sep. 2018 - June 2025

- Developed a systematic framework for optimising CFD settings to model realistic vehicle geometry.
- Investigated the accuracy of idealized versus realistic sources in simulating vehicle emissions and pollutant dispersion in urban street canyons.
- Assessed the impact of green infrastructure layouts on mitigating pollution from traffic emissions.
- Estimated the thermal and pollutant interactions in a street canyon by considering different street canyon morphologies and solar wall heating.

**Programma Pandemische Paraatheid en Ventilatie (Pandemic Preparedness and Ventilation Program)** — Eindhoven, The Netherlands
*Key Participant* — June 2023 - June 2025

- Evaluated the performance of **Eulerian-Eulerian and Eulerian-Lagrangian approaches** in CFD simulations to accurately model the dispersion behaviour of pathogen-laden bioaerosol particles.
- Conducted CFD analyses to assess the impact of **human respiration modes** (e.g., sinusoidal vs. constant breathing) on the dispersion and exposure risk of bioaerosols in indoor environments.
- Investigated the effects of **human movement** on particle concentration distribution by comparing four modeling methods: (*i*) explicit modeling using overset mesh; (*ii*) implicit modeling with a momentum source term; (*iii*) modeling with both momentum and heat source terms; (*iv*) without incorporating movement.
- Analysed the impact of varying **air-change rates** on contaminant and bioaerosol exposure levels in controlled settings such as a pharmacy cleanroom.
- Developed CFD-aided **ventilation designs** for a large experimental chamber to optimise aerosol dispersion control and enhance air cleaning strategies.
- Performed integrated experimental and CFD studies to evaluate the impact of **source conditions** (e.g., exhalation flow direction and velocity) on bioaerosol distribution in a self-built test chamber.
- Simulated the effects of different **source locations** on aerosol concentration levels within a controlled test facility, providing improved ventilation placement in common rooms.
- Investigated physical and numerical parameters through combined experimental and CFD analysis to achieve accurate modeling of supply velocity profiles, critical for accurate CFD modeling of indoor bioaerosol dispersion.
- Modelled particle concentration distribution in a **realistic living room** setting, integrating findings to advanced strategies for indoor air quality improvement and bioaerosol mitigation.

**CLAIRE LSHM22032 - Clean Air for Everyone Project** Eindhoven, The Netherlands
*Key Participant* Sep. 2022 - June 2023

- Long-term measurements of $CO_2$ and particle concentrations in schools and classrooms in Belgium and the Netherlands

**Case Studies of COVID-19, Ventilation and Air cleaning in various settings** Eindhoven, The Netherlands
*Key Participant* June 2020 - Mar. 2021

- Measurements of aerosol particle concentrations in **a fitness center** (886 $m^3$) with 35 test persons performed physical exercise. $CO_2$ concentrations, air temperature, and relative humidity were also obtained during the measurement.
- Measurement of aerosol particle concentrations in **Jumbo-Visma team bus**, and analysis of air cleaner performance in reducing the aerosol particle concentrations for riders.
- Measurement of aerosol particle concentrations in **a football stadium**: (*i*) test with artificial aerosol generators; (*ii*) test with 5000 spectators in the stadium; (*iii*) CFD simulations of ventilation/air cleaning in a modern football stadium.
- Measurement of aerosol particle concentrations in **a mega disco in Belgium**, and analysis of the ventilation potential.
- Performance of 10 air cleaners in reducing aerosol concentrations in a self-constructed room by TU/e and PlasmaMade.

**Wind Tunnel Testing on Structures** Shanghai, China
*Key Participant* Sep. 2015 - June 2018

- Force measurements on transmission towers, transmission conductors, and semi-submerged ships.
- Force and displacement measurements on a bridge section model of the Xuanmen Bay Bridge.
- Aero-elastic full model testing of Xiangxi Yangtze River Bridge.

## GRANT APPLICATION EXPERIENCE

**MSCA Postdoc Fellowship 2025 (Proposal submitted on Sep. 10, 2025)**

- Collaborating with Dr. Alessio Ricci (IUSS Pavia) in applying for the MSCA postdoc fellowship 2025, aiming to use the machine learning technology to map the green potential in urban environments under the wind-thermal-pollutant nexus.

**Hong Kong General Research Funding (ongoing)**

- Collaborating with Dr. Xing Zheng (City University of Hong Kong) to study heat and pollutant dispersion in urban road systems under the influence of vehicle movement.

**Computing Time on the Dutch Supercomputer Snellius**

- Secured allocations for 3 pilot projects (∼1 million core hours per year) and 1 large compute project (∼12 million core hours), supporting advanced CFD analyses relevant to flow and dispersion modeling.

## TEACHING EXPERIENCE

**Heat, Air, and Moisture Transfer / CFD2 Courses** Eindhoven, The Netherlands
*Co-lecture* 2022 - 2025

- Delivered CFD demonstration sessions and tutorials, linking theoretical concepts with urban environmental challenges.
- Provided guidance and Q&A on topics in CFD, indoor ventilation, thermal comfort, and urban climate modeling (e.g. pedestrian-level wind comfort).

## SUPERVISING EXPERIENCE

**Two PhD Students** Eindhoven, The Netherlands
*Co-supervisor* 2025 - present

- *Mohamed Zayed*: Airborne infection control through localised ventilation and air cleaning.
- *Rui Carneiro*: Airborne infection control through ventilation in time-dependent situations.

**Two MSc Theses** Eindhoven, The Netherlands
*Co-supervisor* 2021–2022

- *Lynn Passlack*: Using CFD and computational acoustics to analyse wind effects on urban noise levels.
- *Dean Pelkmans*: Numerical simulations of pollutant dispersion in a street canyon: Comparing an idealized point source with a DrivAer model under idling conditions.

## SERVICE & MEMBERSHIP

**Journal Reviewer**

- Regular reviewer for about 10 ISI journals including *Sustainable Cities and Society (Q1, IF = 12.0), Science of the Total Environment (Q1, IF = 8.2), Building and Environment (Q1, IF = 7.1), Urban Climate (Q1, IF = 6.0), Building Simulation (Q1, IF = 5.9)* and others.

**COBEE2025 Conference Organizer Assistant**

- COBEE2025 conference publicity and organization, establishing a network for more than 200 experts in the field of building environment and energy, which facilitates the updating of conference details and the sharing of research information.

**Professional Memberships**

- Member of J.M. Burgerscentrum (JMBC), Dutch-Flemish Wind Engineering Society (KIVI section), and Youth Group of the Italian Association for Wind Engineering (ANIV-G).

## CERTIFICATE

- Invited Presentation at Building and Vehicle Air Environment Seminar of Young Scholars, hosted by Tianjin University (China) and Dalian University of Technology (China). 31 Aug 2025 - present

## SKILLS

- **Programming:** Python (numpy, pandas, matplotlib), Matlab, C++
- **Computational Tools:** Experience with high-performance computing and UNIX/Linux environments
- **CFD Software:** ANSYS Fluent (proficient), OpenFOAM (experienced)
- **Data Analysis:** Experience with GIS and spatial analysis of environmental datasets
- **Experimental Methods:** On-site measurements, wind tunnel testing
- **Languages:** Mandarin Chinese, English, Dutch (elementary)

## REFERENCES

**Prof. Bert Blocken**
Institute of Mechanical, Process and Energy Engineering
Heriot-Watt University
Edinburgh EH14 4AS, United Kingdom
b.blocken@hw.ac.uk

**Assoc. Prof. Twan van Hooff**
Department of the Built Environment
Eindhoven University of Technology
5600 MB Eindhoven, The Netherlands
t.a.j.v.hooff@tue.nl

**Assoc. Prof. Marcel Loomans**
Department of the Built Environment
Eindhoven University of Technology
5600 MB Eindhoven, The Netherlands
m.g.l.c.loomans@tue.nl

**Assist. Prof. Alessio Ricci**
Department of Science, Technology and Society
University School for Advanced Studies IUSS of Pavia
27100 Pavia, Italy
alessio.ricci@iusspavia.it