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# 10 tips for writing a truly terrible journal article



Prof. dr. ir. Bert Blocken

Department of the Built Environment  
Eindhoven University of Technology  
The Netherlands

**TU/e** Technische Universiteit  
Eindhoven  
University of Technology

Department of Civil Engineering  
KU Leuven  
Belgium

**KU LEUVEN**

1 March 2017

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About the speaker

## About the speaker

Bert Blocken (\*1974, Hasselt, Belgium)

**1998:** MSc Civil Engineering, KU Leuven, Belgium

**2004:** PhD Civil Engineering, Building Physics, KU Leuven, Belgium

**2004:** Postdoc Research Fund Flanders, KU Leuven & Concordia University, Montreal, Canada

### Currently:

Full prof. Dept. Built Environment, Eindhoven Univ. Technology, NL

Part-time full Prof. Dept. Civil Engineering, KU Leuven, Belgium

**Expertise:** Urban Physics, Wind Engineering, Sports Aerodynamics

**Editor:** Building & Environment

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To publish or not to  
publish...

## Why should you publish your results?

*“When you are long gone, your scientific legacy is, in large part, the literature you left behind and the impact it represents.”*

(Bourne 2005)

## On scientific knowledge

*“The object of research is to extend human knowledge beyond what is already known.”*

*“But an individual’s knowledge enters the domain of science only after it is presented to others in such a fashion that they can independently judge its validity.”*

*“Science is a shared knowledge based on a common understanding of some aspect of the physical or social world.”*

(National Academies Press, “On being a scientist”, 1995)

# Why should you publish your results?

## Reason 1:

*“A paper is an organized description of hypotheses, data and conclusions, intended to instruct the reader. If your research does not generate papers, it might just as well not have been done.”*  
(Whitesides 2004)

*“If it wasn’t published, it wasn’t done.”*  
(Miller 1993)

*“If it is good and useful, why keep it a secret?”*

# Why should you publish your results?

## **Reason 2:**

Your responsibility towards society and funding organizations: return on investment.

## **Reason 3:**

Supporting your department, university, institute (international rankings)

## **Reason 4:**

Essential for building your own (scientific) career



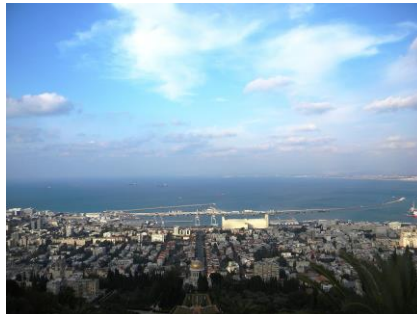
# Why should you publish your results?

**Other reasons** (*Modified from Wellington 2003*):

- Joining the research community
- Vanity, self-esteem or self-fulfillment
- Financial reward
- Challenging a published viewpoint or orthodoxy
- Getting you to a conference in nice places



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# Scientific misconduct



# What is scientific misconduct?

Office of Research Integrity – US Department of Health and Human Services:

Research misconduct means **Fabrication**, **Falsification**, or **Plagiarism** (FFP) in proposing, performing, or reviewing research, or in reporting research results.

1. **Fabrication**: making up data or results and recording or reporting them.
2. **Falsification**: manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.
3. **Plagiarism**: the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

Note: Not honest error or differences of opinion.

# What is scientific misconduct?

Other items of scientific/publishing misconduct

1. **Duplicate publication/submission.**
2. ...
3. ...
4. ...

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# 10 tips for writing a truly terrible journal article



## Motivation

1. Experiences with early career researchers (ECR) as research supervisor, reviewer and editor.
2. Frequency of occurrence and obstinacy of some errors by ECRs.
3. Efficiency: reducing waste of time for supervisors (including myself), reviewers (including myself) and editors (including myself).
4. Humoristic touch: attempt to make the advice better stick to mind.

→ *highlighting 10 things you should certainly NOT do.*

## Motivation of this webinar

Inform, maybe entertain but also try to give you a scare.

## Disclaimers

1. Intended for early-career researchers (ECRs). Others will probably know all the information in this webinar already.
2. Not complete: evidently, as there are only 10. 10 others are given at the end of this webinar. But still these 20 will not be complete.
3. Tips are based on my experiences in the exact sciences/ engineering fields, but some of them may well hold true, whatever your discipline.

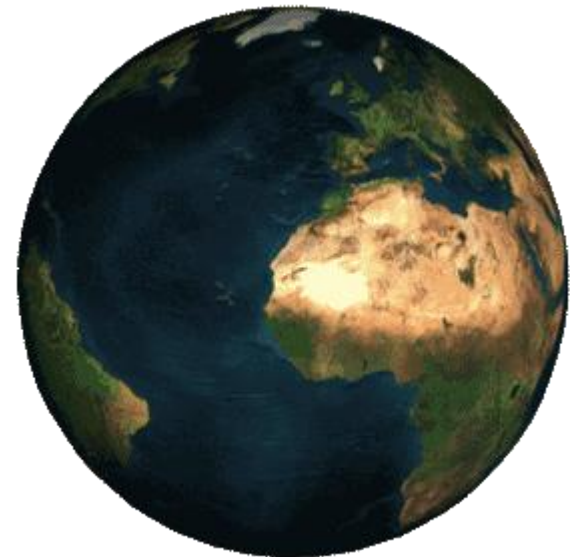


# You only get once chance to make a first impression

A truly terrible article will reflect negatively on yourself and your co-authors.

**Scenario 1:** rejected by editors and reviewers.

**Scenario 2:** published, digitally archived, visible for whole world for as long as electronic records will exist.



## 10 tips

1. Refuse to read the previous literature published in your field
2. Take the lazy route and plagiarize
3. Omit key article components
4. Disrespect previous publications
5. Overestimate your contribution
6. Excel in ambiguity and inconsistency
7. Apply incorrect referencing of statements
8. Prefer subjective over objective statements
9. Give little care to grammar, spelling, figures and tables
10. Ignore editor and reviewer comments

## **TIP 1: Refuse to read the previous literature published in your field**

- Xxx
- Xxx
- Xxx

## TIP 2: Take the lazy route and plagiarize

- If during your literature review, you read something you like, why not copy it? Simply copy and paste one or a group of sentences without adding the proper quotation marks and citations to the original work. Or maybe copy the results themselves?
- Mind you: sooner or later, plagiarism will be detected.
- Most academic publishers have installed very elaborate procedures to detect plagiarism, such as *Crossref Similarity Check*.

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Particle levels at different microenvironments at an academic institute in India and regional dose deposition in lungs of students

BY ANUBHA GOEL

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Manuscript Draft

Manuscript Number:

Title: Particle levels at different microenvironments at an academic institute in India and regional dose deposition in lungs of students

Article Type: Original Research Paper

Keywords: Particles,  
Fine,  
Coarse,  
Multiple-Path Particle Dosimetry,  
Deposition fraction,  
Microenvironments

6  
Corresponding Author: [REDACTED]

Corresponding Author's Institution: [REDACTED]

First Author: [REDACTED]

Order of Authors [REDACTED]

Abstract: This study examines regional deposition of particulate matter in the respiratory tract for students exposed to ambient levels in different microenvironments frequented over a day during winter period (January 2016) at an academic institute, IIT Kanpur, India. Particle size distributions (0.25-10  $\mu\text{m}$ ) were measured by Optical Particle Counter in hostel room, dining room, classroom, play court, canteen etc. within IIT Kanpur premises. Fine (PM<sub>1</sub>) mass concentration exceeded coarse (PM<sub>10-1</sub>)

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10	Crossref Ashok, Vaishali, Tarun Gupta, Shefali Dubey, and Rajmal Jat. "Personal exposure measurement of students to var	34	<1%
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More knowledge on human exposure, deposition, clearance and toxicity hazard of the deposited particles is needed.

Majority of studies have related health effects to particles exposure (the inhaled concentration) but the negative outcomes mainly occur by the consequent deposition of particles in the respiratory tract during breathing (Salma et al., 2002). Lung deposition efficiency of particles may also be an important factor (Asgharian and Price, 2007). Hence, in order to fully understand the mechanisms behind the health responses, it is crucial to determine the respiratory tract deposition fraction (DF) of aerosol particles, which is their probability of depositing, and the dose (amount of inhaled particles deposited) (Löndahl et al., 2009). For aerosols, this dose can be given as mass, surface area or number concentration of the deposited particles. The dose of particles in the human respiratory tract (HRT) depends on various factor, including particle exposure concentrations, exposure duration, and exposed subject characteristics, like age, gender, state of health, lung morphology, and breathing parameters (Heyder, 2004; Glytsos et al., 2010; Hofmann, 2011). However, studies on health impact of aerosol inhalation have linked the known health effects with daily mean concentrations from fixed ambient air quality monitoring stations, instead of personal exposure to particles at the indoor and outdoor places where the subject may be active (Aleksandropoulou et al., 2008). Due to experimental constraints, the regional dose in the respiratory system (head, tracheobronchial, and pulmonary regions) cannot be found experimentally and is mainly computed by means of mathematical models. Several dosimetry models have been produced over the years and put into computing dose deposition (ICRP, 1994; Asgharian, 2004; Kopeis, 2006; Aleksandropoulou and Lazaridis, 2013). Regional deposition results from these models have been compared to experimental studies, with a fair correlation being obtained between model predictions and experimental measurements (Asgharian and Price, 2007; Löndahl et al., 2008).

This study has been conducted on campus of an academic institute, IIT Kanpur India with the aim to assess personal exposure to different particle sizes encountered by students at different

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### 3.2.1 Variability in DF

**Influence of particle size and activity level.** The DF at Head region and total DF increased with increase in particle size whereas DF at TB decreased with increased in particle size. The DF at Pulmonary region initially decreased from 0.23 to 0.5  $\mu\text{m}$  but then increased from 0.65 to 1.6  $\mu\text{m}$  and then again decreased onwards for activity level including sit and sleep. However, activity level including light exercise and heavy exercise showed monotonous decrease in DF at Pulmonary region.

In this study, among the regions of lungs considered, percentage deposition for all activity levels was maximum in the Head region. These values are in agreement with other studies where among all particle sizes, the coarse particles show the highest DFs in the nasal head region (Behera et al., 2015; Sarigiannis et al., 2015). It is due to a combination of sedimentation and the impaction of particles onto the larynx and airway bifurcations (Behera et al., 2015). Saber and Heydari (2012) computed the DF for distinct particle sizes and breathing velocities in the Head and the initial three generations of branches in the TB region. Their results revealed that the higher breathing intensity caused the higher DF in all respiratory regions regardless of particle size. Observations in this study are similar, but only in the Head region.

**Influence of Ventilation Parameters and Mode of Inhalation.** In another study done in Budapest, Hungary (Salma et al., 2015) for women in different microenvironments for the particle size range  $\text{PM}_{10}$ , it was reported that mean DF in the extra-thoracic region (Head) decreased from 26% for sleeping to 9.4% for heavy exercise and in the pulmonary region mean DF increased from 14.7% for sleep to 34% for heavy exercise. In contrast, our study shows light and heavy exercise experiencing their maximum DF values in the Head region whereas maximum DF for sit and sleep activities occurs in the Pulmonary region. These differences in observation in both the studies can be explained by examination of mode of inhalation considered. The study reported by Salma et al. (2015), oral breathing was taken into account under light and heavy exercise, which led to a smaller deposition in

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## 1 Introduction

Particulate matter is a complex mixture of significantly small particles and liquid droplets suspended in the atmosphere originating from various sources (such as traffic, industry, energy production or domestic combustion). Consequently, its composition and size are broadly variable in space and time. Urban population is daily exposed to air particulate pollution from different sources in the ambient environment and different microenvironments (home, workplace, schools, etc). In fact, the exposure to airborne particles depends on the lifestyle of every individual and the unlike microenvironments frequented (Buonanno et al., 2011). Epidemiological and toxicological studies have shown associations between particles and adverse health effects (Dominici et al., 2006; Pope and Dockery, 2006; Schikowski et al., 2007). It has been estimated that particulate matter alone is responsible for around 2.1 million of premature deaths per year globally (Kelly and Fussell, 2012; Kim et al., 2015). Airborne particle size is relevant to health considerations as aerodynamic diameters decide where each particle is probable to deposit in the human respiratory tract (Raabe et al., 1986).

The mechanisms of toxic effects linked to airborne particles are still poorly understood but several leading hypotheses focus on the size distribution of airborne particles and their chemical composition. Inhalation of submicron particles ( $PM_{10}$ ) can constitute an excess health risk compared to coarse particles ( $PM_{2.5}$ ) of similar chemical composition (Kreyling et al., 2006). Health effects are largely linked with the higher concentration of insoluble particles deposited in human respiratory tract, their very small size and large total surface area (Carvalho et al., 2011). Significance of the possible lung overburden by accumulation of submicron particles in the human body is indecisive. More knowledge on human exposure, deposition, clearance and toxicity hazard of the deposited particles is needed.

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Building and Environment

Dear 

Your paper is evaluated as a severe case of plagiarism from several papers by other authors, in particular the following:

- 1) "An approach to assess the Particulate Matter exposure for the population living around a cement plant: modelling indoor air and particle deposition in the respiratory tract" in Environmental Research, 2015.
- 2) "Deposition of aerosol particles from a subway microenvironment in the human respiratory tract" in Journal of Aerosol Science, 2015.

This violation of publication ethics is unacceptable to us. You are therefore hereby banned from submitting papers to Building & Environment now and in the future.

Yours sincerely,

Bert Blocken, PhD, MSc  
Editor  
Building and Environment

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- Example: actions taken by Elsevier as a result of very severe plagiarism of one of my articles.

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### Application of computational fluid dynamics in building performance simulation for the outdoor environment: an overview

Bert Blocken<sup>a</sup>; Ted Stathopoulos<sup>b</sup>; Jan Carmeliet<sup>c</sup>; Jan L. M. Hensen<sup>a</sup>

<sup>a</sup> Building Physics and Systems, Eindhoven University of Technology, Eindhoven, Netherlands <sup>b</sup>

Department of Building, Civil and Environmental Engineering, Concordia University, Montreal,

Quebec, Canada <sup>c</sup> Swiss Federal Institute of Technology, ETHZ, Zürich, Switzerland, and Laboratory

for Building Science and Technologies, Empa, Swiss Federal Laboratories for Materials Testing and Research, Switzerland

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Based on literature review of more than 350 articles and books

### **Application of computational fluid dynamics in building performance simulation for the outdoor environment: an overview**

Bert Blocken<sup>a\*</sup>, Ted Stathopoulos<sup>b</sup>, Jan Carmeliet<sup>c</sup> and Jan L.M. Hensen<sup>a</sup>

<sup>a</sup>*Building Physics and Systems, Eindhoven University of Technology, P.O. Box 513, Eindhoven, 5600, MB Netherlands;*

<sup>b</sup>*Department of Building, Civil and Environmental Engineering, Concordia University, 1455 de Maisonneuve Blvd. West, Montreal, Quebec, H3G 1M8, Canada;* <sup>c</sup>*Swiss Federal Institute of Technology, ETHZ, Zürich, Switzerland, and Laboratory for Building Science and Technologies, Empa, Swiss Federal Laboratories for Materials Testing and Research, Überlandstrasse 129, CH-8600 Dübendorf, Switzerland*

*(Received 3 May 2010; final version received 8 July 2010)*

This article provides an overview of the application of computational fluid dynamics (CFD) in building performance simulation for the outdoor environment, focused on four topics: (1) pedestrian wind environment around buildings, (2) wind-driven rain on building facades, (3) convective heat transfer coefficients at exterior building surfaces and (4) air pollutant dispersion around buildings. For each topic, its background, the need for CFD, an overview of some past CFD studies, a discussion about accuracy and some perspectives for practical application are provided. This article indicates that for all four topics, CFD offers considerable advantages compared with wind tunnel modelling or (semi-)empirical formulae because it can provide detailed whole-flow field data under fully controlled conditions and without similarity constraints. The main limitations are the deficiencies of steady Reynolds-averaged Navier–Stokes modelling, the increased complexity and computational expense of large eddy simulation and the requirement of systematic and time-consuming CFD solution verification and validation studies.

**Keywords:** computational fluid dynamics; wind comfort; wind-driven rain; surface transfer coefficients; air pollution; review


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present situation in which CFD can technically be applied for case studies involving complex geometries and flow fields (Figure 1).

However, while the use of CFD in engineering practice is becoming quite well established for indoor environment applications, this is considerably less pronounced for outdoor environment applications. In complex case studies, wind environmental problems such as pedestrian wind nuisance and air pollutant dispersion are still typically investigated in atmospheric boundary layer wind tunnels (Stathopoulos 2002), while WDR exposure and convective heat transfer coefficients (CHTCs) at exterior building surfaces are generally estimated from simplified empirical or semi-empirical formulae (Blocken and Carmeliet 2004a, 2010, Palyvos 2008, Defraeye *et al.* 2010). An important disadvantage of wind tunnel measurements however is that usually only point measurements are obtained. Techniques such as particle image velocimetry (PIV) and laser-induced fluorescence (LIF) in principle allow planar or even full 3D data to be obtained, but the cost is considerably higher and application for complicated geometries can be hampered by laser-light shielding by the obstructions constituting the urban model. Another disadvantage is the required adherence to similarity criteria in reduced-scale testing. This can be a problem for, e.g., multi-phase flow problems and buoyant flows. Examples are WDR and pollutant dispersion studies. Empirical and semi-empirical formulae generally only provide a first, crude indication of the relevant parameters, often in averaged form (e.g. surface-averaged) or at a few discrete positions. Examples are the semi-empirical formulae for WDR intensities (Lacy 1965, Sanders 1996, Straube and Burnett 2000, Blocken and Carmeliet 2004a, 2010, ISO

2009) and the (semi-)empirical expressions for CHTCs (e.g. Sharples 1984, Loveday and Taki 1996, Liu and Harris 2007, Palyvos 2008). In addition, a recent study comparing validated CFD simulations with the two most commonly used semi-empirical WDR models identified some important physical deficiencies in these models (Blocken *et al.* 2010). Also, a sensitivity study demonstrated the very large impact of changes in heat transfer coefficients and the related mass transfer coefficients on the drying behaviour of ceramic bricks in facades (Janssen *et al.* 2007a). The information provided by empirical and semi-empirical formulae is often also too simplified compared with the well-established building performance simulation tools in which this information is used, such as BE-HAM transfer tools and BES software.

Numerical modelling with CFD can be a powerful alternative because it can avoid some of these limitations. It can provide detailed information on the relevant flow variables in the whole calculation domain ('whole-flow field data'), under well-controlled conditions and without similarity constraints. However, the accuracy of CFD is an important matter of concern. Care is required in the geometrical implementation of the model, in grid generation and in selecting proper solution strategies and parameters. The latter include choices between steady Reynolds-averaged Navier-Stokes (RANS), unsteady RANS (URANS), large eddy simulation (LES) or hybrid URANS/LES, between different turbulence models or subgrid-scale turbulence models, discretization schemes, etc. In addition, numerical and physical modelling errors need to be assessed by solution verification and validation studies.

This article provides an overview of the application of CFD in building performance simulation for



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buildings. Wise (1970) reports about shops that are left untenanted because of the windy environment, which discouraged shoppers. Lawson and Penwarden (1975) report the death of two old women due to an unfortunate fall caused by high wind speed at the base of a tall building. Today, many urban authorities only grant a building permit for a new high-rise building after a wind comfort study has indicated that the negative consequences for the pedestrian wind environment remain limited. Note that a wind comfort study is generally performed by a combination of three types of information/data: (1) statistical meteorological information; (2) aerodynamic information and (3) a comfort criterion. CFD or wind tunnel data can be used to provide part of the aerodynamic information.

### 4.2. CFD versus wind tunnel measurements

Wind comfort studies require knowledge of at least the mean wind velocity vector field at pedestrian height ( $z = 1.75$  or  $2$  m). This information can be obtained by wind tunnel modelling or by CFD. Wind tunnel tests are generally point measurements with laser Doppler anemometry (LDA) or hot wire anemometry (HWA). In the past, also area techniques such as sand erosion (Beranek and van Koten 1979, Beranek 1982, 1984, Livesey *et al.* 1990, Richards *et al.* 2002) and infrared thermography (Yamada *et al.* 1996, Sasaki *et al.* 1997, Wu and Stathopoulos 1997) have been used. They are however considered less suitable to obtain accurate quantitative information. Instead, they can be used as part of a two-step approach: first, an area technique is used to qualitatively indicate the most important problem locations, followed by accurate point measurements at these most important locations (Blocken and Carmeliet 2004b).

One of the main advantages of CFD in pedestrian-level wind comfort studies is avoiding this time-consuming two-step approach by providing whole-flow field data. Despite its deficiencies, steady RANS modelling with the  $k-\epsilon$  model or with other turbulence

models (Blocken and Carmeliet (2008), Tominaga *et al.* (2008a) and Mochida and Lun (2008)). Apart from these fundamental studies, also several CFD studies of pedestrian wind conditions in complex urban environments have been performed (Murakami 1990a, Gadilhe *et al.* 1993, Takakura *et al.* 1993, Baskaran and Kashef 1996, Stathopoulos and Baskaran 1996, He and Song 1999, Ferreira *et al.* 2002, Hirsch *et al.* 2002, Miles and Westbury 2002, Richards *et al.*, 2002, Westbury *et al.* 2002, Blocken *et al.* 2004, Yoshie *et al.* 2007, Blocken and Carmeliet 2008, Blocken and Persoon 2009). Some of the computational grids and some typical presentations of results of these studies are shown in Figure 3. Almost all these studies were conducted with the steady RANS approach and a version of the  $k-\epsilon$  model. An exception is the study by He and Song (1999) who used LES.

### 4.3. Accuracy of CFD

Attempts to provide general statements about the accuracy of steady RANS CFD for pedestrian-level wind environment studies can easily be compromised by the presence of a combination of numerical errors (such as discretization errors and iterative convergence errors) and physical modelling errors (by using steady RANS, a turbulence model, simplified boundary conditions, etc.). Statements on the accuracy of steady RANS with a certain turbulence model should therefore be based on CFD studies that have undergone solution verification, i.e. it should be proven that numerical errors are limited, so clear conclusions about the physical modelling errors can be made. Several studies have adopted this approach in their validation of CFD with wind tunnel measurements and on-site measurements. A general observation from these studies is that the prediction accuracy is a pronounced function of the location in the flow pattern, and therefore of the wind direction. While several validation studies have been performed for multi-building configurations, at least two of those have provided

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guidelines for CFD WDR simulation (Choi 1994a,b, Blocken and Carmeliet 2002, 2004b, 2006, Brüggen *et al.* 2009). It should be noted that the guidelines mentioned in Section 3 also apply for CFD WDR studies, as accurate calculation of the wind-flow pattern is the first step for successful WDR simulations. There are two main reasons for the current limited practical use of CFD for WDR studies: (1) the very time-consuming character of Lagrangian particle tracking of raindrops, in which the entire building facade needs to be covered by a large number of raindrops. Lagrangian particle tracking implies solving the equation of motion of individual raindrops within the wind-flow field. Note that this wind-flow field is generally obtained with an Eulerian approach, i.e. not focusing on individual particles but on fixed positions in space. Lagrangian tracking needs to be performed for a large number of combinations of reference wind speed, wind direction and raindrop diameter; (2) the fact that steady RANS generally does not allow accurate modelling of turbulence fields around buildings, and therefore also not of turbulent dispersion of raindrops, which is important for calculating WDR intensities at the lower part of high-rise building facades. Accurate turbulent dispersion modelling would require transient simulations with LES or hybrid URANS/LES, which would require even more intensive Lagrangian particle tracking efforts. To alleviate these problems, it might be necessary to abandon the traditional 'Eulerian-Lagrangian' framework in CFD WDR simulations, and to resort to 'Eulerian-Eulerian' modelling instead, in which not only the wind-flow pattern but also the WDR intensities are computed with an Eulerian approach. It implies that the rain phase, like the air phase, is treated as a continuum.

practice in BE-HAM tools (e.g. Künzeli 1994, Hens 1996, Janssen *et al.* 2007b, Blocken *et al.* 2007b, Scheffler 2008, Steeman *et al.* 2009a,c). Determining the values of exterior CHTC across building facades is a difficult task, because they are a complex function of a wide range of parameters including building geometry, environment topography, wind speed, wind direction, turbulence intensity, surface roughness, texture and geometry, and moisture content.

### 6.2. CFD versus measurements and (semi-)empirical correlations

In the past, CHTCs for exterior building surfaces have been determined using wind tunnel measurements (e.g. Kelnhofer and Thomas 1976) and full-scale measurements (e.g. Ito *et al.* 1972, Sharples 1984, Loveday and Taki 1996, Liu and Harris 2007), and many (semi-)empirical CHTC correlations have been provided (for a review, see Palyvos 2008). The main disadvantages of these assessment methods have been mentioned in the introduction. CFD could be a valuable alternative to avoid time-consuming and expensive experiments, and to provide more detailed and accurate information than (semi-)empirical formulae.

### 6.3. Accuracy of CFD

However, while a large number of valuable experimental investigations have been conducted, the number of CFD analyses for exterior CHTC for buildings is very small (Emmel *et al.* 2007, Blocken *et al.* 2009, Defraeye *et al.* 2010). This might seem strange given the very large number of such CFD studies that have been conducted in other disciplines, such as mechanical and electronic engineering. The main reason for this is the extremely high computer



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### Computational fluid dynamics, a building simulation tool for achieving sustainable buildings



<sup>a</sup> School of Energy Management, Shri Mata Vaishno Devi University, Katra 182320, J&K, India

<sup>b</sup> Sardar Swaran Singh National Institute of Renewable Energy, Kapurthala 144601 Punjab, India

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#### ABSTRACT

Buildings use about 40% of the global energy, thus making them the prime consumers and therefore the center of attention. The analysis of most of the building related problems such as the thermal analysis, effects of wind loading, ventilation analysis and the environmental effects etc. were conducted by the wind tunnel tests, earlier. However, now days, this test can be done effectively with the aid of a mathematical technique called computational fluid dynamics (CFD). This paper is a brief, non-exhaustive overview of the status of application of CFD in building performance simulation for the indoor and outdoor environment. The discussion is focused on the management of the thermal comfort based on the ventilation loss, thermal loss and some other topics like the effect of fire inside the building and the hospital environment along with the discussions on the movement of the pedestrians, effect of rain and wind or wind driven rain (WDR) and pollutants etc. on the buildings especially artifacts. It is seen that CFD technique offers many advantages over the wind tunnel testing and simplified empirical or semi-empirical equations. Difference of steady RANS and LES modeling, the need for high-resolution grids and lastly, the requirement of a valid CFD model and its verification poses some limitations. Still efforts are being done and will continue to focus on alleviating these limitations, but at least equally important is avoiding user errors.

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#### 1. Introduction

As stated by the United Nations Environment Programme the buildings use about 40% of the global energy and emit approximately 1/3 of green house gas (GHG) emissions. However, the energy

consumption in buildings can be reduced by 30–80% using proven technologies [1]. The impact of these technologies on improving building efficiencies can be further enhanced by use of mathematical techniques such as, Computational fluid dynamics (CFD).

In the past era of construction, the analysis of most build-

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### CFD simulation of the atmospheric boundary layer: wall function problems

Bert Blocken<sup>a,\*</sup>, Ted Stathopoulos<sup>b</sup>, Jan Carmeliet<sup>a,c</sup>

<sup>a</sup>*Building Physics and Systems, Technische Universiteit Eindhoven, P.O. Box 513, 5600 MB Eindhoven, The Netherlands*

<sup>b</sup>*Department of Building, Civil and Environmental Engineering, Concordia University, 1455 de Maisonneuve Blvd West, Montreal, Que., Canada, H3G 1M8*

<sup>c</sup>*Laboratory of Building Physics, Department of Civil Engineering, Katholieke Universiteit Leuven, Kasteelpark Arenberg 40, 3001 Leuven, Belgium*

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- Knowledge gap:
- Objective:
- Methodology:
- Results:
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### Introduction:

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- Knowledge gap
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# Conclusion

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(Rogers 2001)

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