

Dr. Bert Blocken

## CIRCLE Distinguished Lecture Series

### Urban physics and the grand societal challenges: from city scale to building scale

**ABSTRACT:** Urban physics is the science and engineering of physical processes in urban areas. It basically refers to the transfer of heat and mass in the outdoor and indoor urban environment, and its interaction with humans, fauna, flora and materials. Urban physics is a rapidly increasing focus area as it is key to understanding and addressing the grand societal challenges climate change, energy, health, security, transport and aging. This presentation provides three examples of recent urban physics research from the city scale to the building scale. It focuses on COVID-19 related aerosol ventilation in buildings ranging from classrooms to soccer stadiums, on heat waves in cities, overheating in buildings and adaptation against heat waves at city and building scale, and on air pollution by particulate matter, both outdoor and indoor. The presentation aims to demonstrate the importance of a multiscale approach in urban physics research, linking outdoor and indoor physical processes.

**Bio:** Bert Blocken holds a PhD in Civil Engineering / Building Physics from KU Leuven in Belgium. He is Full Professor in the Department of the Built Environment at Eindhoven University of Technology (TU/e) in the Netherlands and part-time Full Professor in the Department of Civil Engineering at KU Leuven in Belgium. He has led the design and construction of the Eindhoven Atmospheric Boundary Layer Wind Tunnel and currently acts as its Scientific Director. His main areas of expertise are urban physics, city and building aerodynamics and sports aerodynamics. He has published 218 papers in international peer-reviewed journals. He is editor of the peer-reviewed journal Building and Environment and associate editor of the journal Sports Engineering. He has graduated 25 PhD students. He is supervising a team of 5 senior researchers and 21 PhD students.

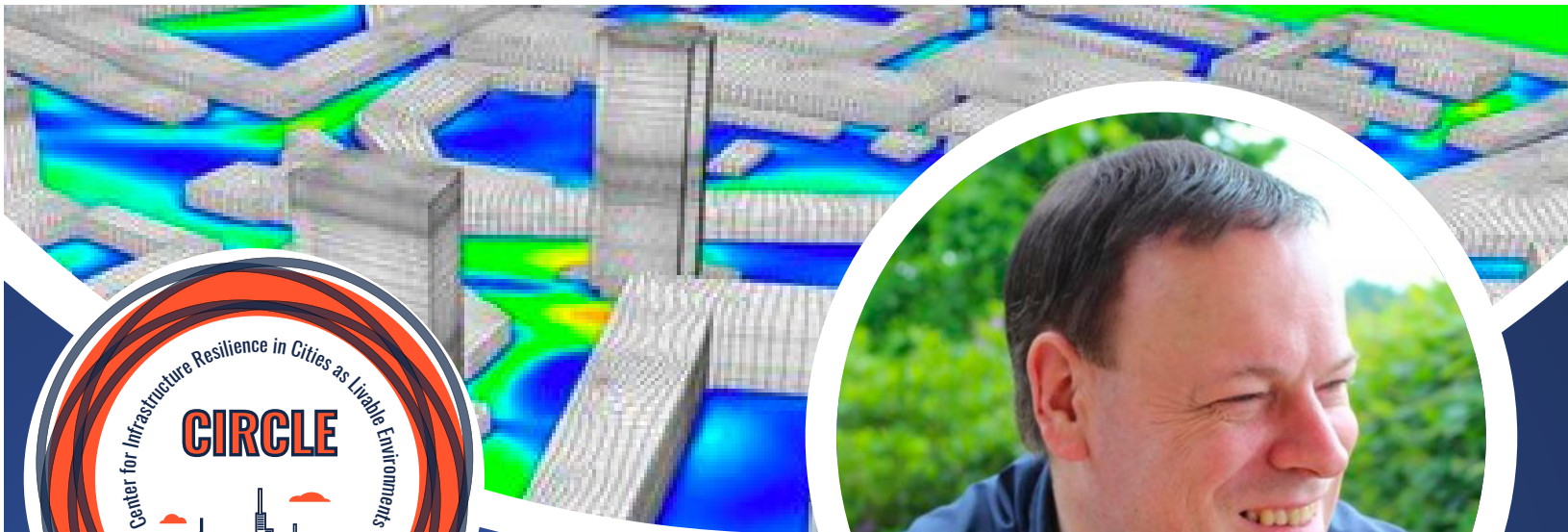
**CIRCLE:** The Center for Infrastructure Resilience in Cities as Livable Environments is one of three research themes supported by the joint Dynamic Research Enterprise for Multidisciplinary Engineering Sciences (DREMES), established between the University of Illinois at Urbana-Champaign (UIUC) and Zhejiang University (ZJU). The CIRCLE Distinguished Lecture Series is intended to provide opportunities for faculty and students to meet and interact with internationally renowned experts in the field.

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杰出讲座系列

## 城市物理学相关的社会挑战： 从城市尺度到建筑尺度

**摘要：**城市物理学聚焦城市区域中物理过程的科学与工程问题。它主要指室内外城市环境中的热量和质量的转移，以及它与人类、动物、植物和物质的相互作用。城市物理学是一个快速发展的重要领域，因为它是理解和应对气候变化、能源、健康、安全、交通和老龄化等重大社会挑战的关键。本讲座将介绍从城市尺度到建筑尺度的三个近期城市物理学研究示例。它们分别聚焦：（1）从教室到足球场等多种建筑中与 COVID-19 相关的气溶胶通风问题；（2）城市中的热浪、建筑的过热问题及其应对；（3）颗粒物造成的室内外空气污染问题。本讲座旨在展示城市物理研究中多尺度方法的重要性，并在室外和室内物理过程之间建立联系。

**简介：**Bert Blocken教授。他在比利时鲁汶大学获得土木工程/建筑物理学博士学位，获聘埃因霍芬理工大学 (TU/e) 建筑环境系教授、比利时鲁汶大学土木工程系兼职教授。他领导了埃因霍芬大气边界层风洞的设计和建造，并担任其科学总监。他主要从事城市物理学、城市和建筑空气动力学以及体育空气动力学领域的研究，曾在同行评议的国际期刊上发表 218 篇论文，并担任同行评议期刊《建筑与环境》编辑、《体育工程》副主编。他已培养博士毕业生25名，并正领导着一个由 5 名高级研究人员和 21 名博士生组成的团队。

**CIRCLE：**宜居城市基础设施韧性中心是伊利诺伊大学厄巴纳-香槟分校 (UIUC) 格兰杰工程学院和浙江大学 (ZJU) 建立的三个联合研究中心之一。CIRCLE 杰出讲座系列旨在为教师和学生提供与该领域国际知名专家会面和互动的机会。

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2022年11月2日



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