X IAQVEC 2019

10th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings

PROGRAM
5 TH - 6 TH - 7 TH September 2019
Bari - Italy

X IAQVEC 2019

10TH INTERNATIONAL CONFERENCE
ON INDOOR AIR QUALITY,
VENTILATION
AND ENERGY CONSERVATION
IN BUILDINGS

Conference theme:
Healthy Nearly Zero Energy Buildings

Main topics:
Ventilation and measurement techniques
IAQ and Indoor Environmental Quality
HVAC systems
Smart Technologies for ZEBs
ZEBs: design and energy modelling

www.iaqvec2019.org
info@iaqvec2019.org
Iaqvec2019
#Iaqvec2019

X IAQVEC 2019

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WELCOME MESSAGE FROM **GENERAL CHAIRS**

Dear Colleagues,

on behalf of the Organizers, it is our great pleasure and an honor to welcome you to the X IAQVEC 2019: nearly Zero Energy Buildings, which will be held on September 5th to 7th in Bari, Italy.

The Conference will be hosted by the Politecnico di Bari and co-organized by three universities, the Ryerson University (Ontario, Canada), the Politecnico di Bari (Italy) and the Universita del Sannio (Italy).

X IAQVEQ 2019 will be focused on the theme "Healthy nearly Zero Energy Buildings" and envisages the participation of a large number of scientists, researchers and practitioners and the submission of papers covering a broad range of topics relevant to the main subjects of Building Science.

This conference has been organized around the following five streams: Ventilation and measurement techniques; IAQ and Indoor Environmental Quality; HVAC systems; Smart Technologies for Zero Energy Buildings (ZEBs); and ZEBs: design and energy modeling.

The conference will provide a forum for the exchange of knowledge among scientists, researchers, and practitioners from all over the world.
It will help to disseminate technical information, new ideas, as well as the latest and future developments of research in the field of building science.

Moreover, the conference is expected to create a platform through which stakeholders from various countries will be able to exchange their knowledge, traditions, and experiences.

The Conference has attracted over 500 submissions from 77 countries around the world. The final X IAQVEC's technical program consists of over 280 oral presentations and about 50 poster presentations, including five keynote lectures to be delivered by prominent scientists, researchers, and professors.

Thanks are due to the many people who have freely given their time and goodwill to make X IAQVEC a success. We are grateful to the Politecnico di Bari for the valuable support in the conference.

We would like to thank the members of the International and National Scientific Committees and the additional Reviewers whose help has been essential to ensure a high level of quality. Their names are reported at the end of this introduction.

Important contributors to the conference have been made by the Authors, Presenters, and Delegates, without whom the conference could not take place. We, therefore, offer them our heartfelt thanks.

We hope that you will enjoy the conference program, and take some time to experience the rich culture and history of Bari. We wish you a productive, fruitful and enjoyable stay!

Dr. Umberto Berardi
Chair of the Organizing Committee IAQVEC 2019
Associate Professor
Faculty of Engineering and Architectural Science
Ryerson University, Toronto, ON.

Dr. Francis Allard
Chair of the Scientific Committee IAQVEC 2019
Professor
Université de La Rochelle
La Rochelle, France

ABOUT IAQVEC

IAQVEC is a premier international conference series, held once every three years, and hosted in different countries every time (in the past, it has been organized in Canada, France, China, Japan, USA, Czech Republic, and Korea).

The conference covers a wide range of key research areas with the goal of improving indoor environmental quality (IEQ) and energy efficiency enhancing wellbeing and sustainability.

IAQVEC 2019 is dedicated to Healthy Nearly Zero Energy Buildings, and is organized around the following five streams:
- Ventilation and measurement techniques;
- IAQ and Indoor Environmental Quality;
- HVAC systems;
- Smart Technologies for ZEBs;
- ZEBs: design and energy modelling.

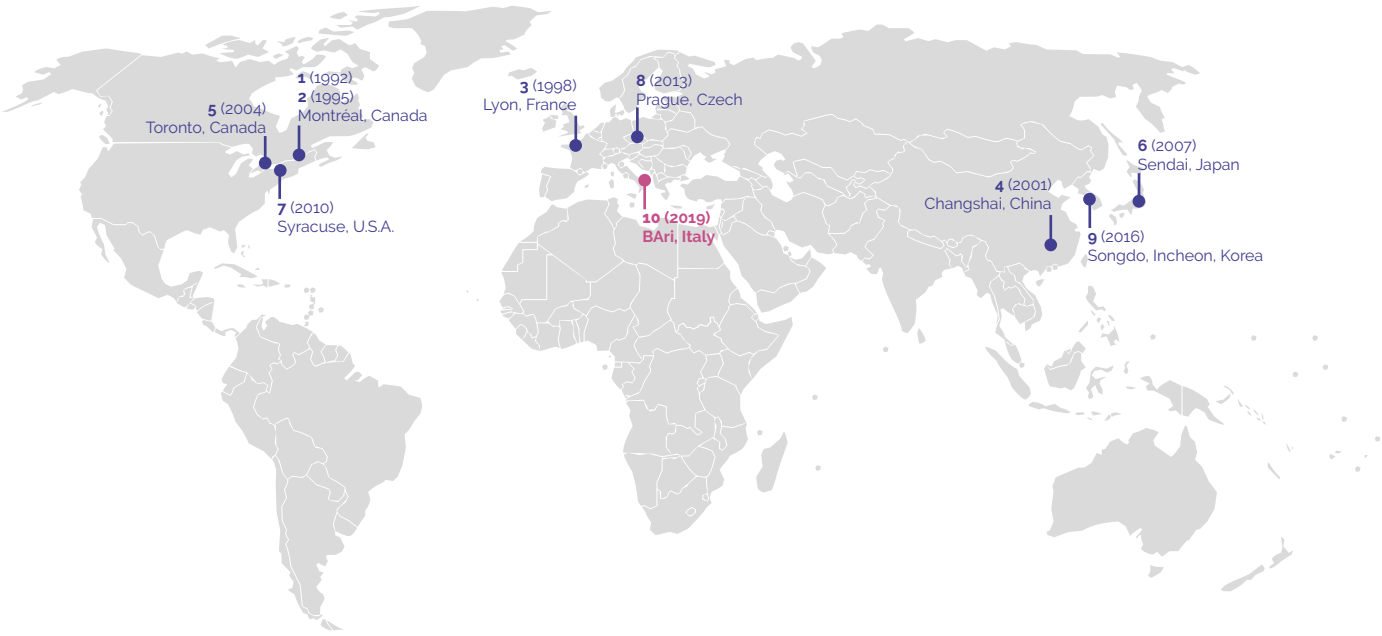
IAQVEC 2019 is a major international event, attracting delegates from around the world. So far the meeting has received support from many national and international societies, including AiCARR, Architectural Institute of Korea, Associazione della Fisica Tecnica Italiana, Association des Ingénieurs en Climatique, Ventilation et Froid (AICVF), Associazione Termotecnica Italiana, CIB, IBPSA-Canada, REHVA, the Society of Heating, Air conditioning and Sanitary Engineering of Japan, and many others.

This milestone anniversary of the IAQVEC conference has been organized in a beautiful Mediterranean city.

We are sure that the South of Italy will offer a fantastic backdrop of landscape and architecture, merged with outstanding food that the delegates will enjoy while they participate in the scientific program at IAQVEC 2019.

The conference will start on September 5th and will end on the afternoon of September 7th, 2019. IAQVEC will be host within the Politecnico di Bari, Italy (www.poliba.it).

The social program is enriched by events in each of the three nights.



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ABOUT
THE VENUE

The city of Bari, Puglia's provincial capital, is bathed by the Adriatic Sea, and is one of the finest destinations in southern Italy. It's a mix of history, culture and fun. Located in the sun-drenched, picturesque, coastal gem of the Apulia region (or Puglia, as it is known to the locals),

In recent years Bari has gradually built a reputation as a bridge between West and East, that mirrors an increasingly multi-cultural, open, tolerant and friendly community, connecting people, individuals and businesses, from different countries and cultures. More, Bari and the Puglia overall can boast some of the best Italy's food and wines, and a genuine authentic, simple and tasty vernacular cuisine.

Bari has a maritime flavour and deserves a glance for the panoramic seafront promenade, and the historic and atmospheric old town, called Bari Vecchia, a medieval warren of tight alleyways and graceful piazzas, narrow streets where you can admire the colors of the artisans' workshops; several cultural places; fascinating Romanesque-styled churches as Basilica of San Nicola (Largo Abate Elia, Bari) and the Cathedral of St. Sabino (Piazza dell'Odegitria, Bari).

Also the modern part and heart of the city, named Borgo Murattiano, is a great place to spend time, with a major shopping district and gorgeous architectures built in the 19th and early 20th centuries.

Among the things not to be missed are: Norman Swabian castle (Piazza Federico II di Svevia, Bari), Bari's symbol, at the entrance of the city, inside collections of archaeological Petruzzelli Theater (Corso Cavour, 12, Bari), built around 1903, Margherita Theater (Piazza IV Novembre, Bari) originally opened in 1914, is one of the city's most loved and iconic buildings.

Moreover, from Bari it is easy to reach the UNESCO World Heritage site of Castel del Monte; the fascinating village of Alberobello an UNESCO World Heritage site for its unusual districts of trulli, the characteristic white-washed conical-roofed houses of the area; and Matera, European Capital of Culture 2019, only one hour away (approximatively 50 km from Bari).

HOW TO REACH THE **CONFERENCE VENUE**

How to reach the Conference Venue:
By plane: Airport "Karol Wojtyla" Bari Palese (BRI) *(www.aeroportidipuglia.it/homepagebari)*

From the Airport to the city center/conference venue:

By Taxi: Taxis are readily available at the airport. Fixed fares by RadioTaxiBari (+39 080 554 33 33) taxi firm from the airport to the venue will cost around *€25 (www.taxibari.it/en)*

By Light Rail – to Bari Centrale Train Station:
The Ferrotramviaria regional railway company connects the airport to the train station, with the cost of a one-way ticket €5. Regular daily train services operate up to every 40 minutes, from 5:00am to 11:00pm. *(www.ferrovienordbarese.it)*

By Bus – to Bari Centrale Train Station:
The city of Bari is served by the Amtab local bus company. Take the no16 line from the airport going to the train station, and get off at the last stop.
Tickets can be bought directly from the bus driver at €1.5, and are available at newspaper kiosks and bars at €1.

By Shuttle – to Bari Centrale Train Station:
The Tempesta AutoServizi shuttle bus travels from the airport to the train station and runs 37 times a day between 5:00 am and midnight. The journey time is 30 minutes approximately, and the single ticket can be bought on the bus, at a cost of €4.00.

From the Bari Centrale Train station to the conference venue (Politecnico di Bari):

By walk: From the Bari Centrale Train Station, it is possible to reach by walk the Conference Venue (Politecnico di Bari) in 15 minutes.
Otherwise, Amtab local buses are available. Take the no21 line from the Bari Centrale Train Station going to the Via Re David - Politecnico di Bari.
Tickets can be bought directly from the bus driver at €1.5, and are available at newspaper kiosks and bars at €1. *(www.moovitapp.com)*


S. Scolastica
Piazza S.Pietro
Basilica S.Nicola
Lungomare Imperatore Augusto
Castle
Cathedral S.Sabino
Piazza Mercantile
Piazza Ferrarese
Theatre Margherita
Molo S.Nicola
Corso Vittorio Emanuele
Via Andrea da Bari
Via Sparano da Bari
Via Principe Amedeo
Via Dante Alighieri
Teatro Petruzzelli
Lungomare Araldo di Crollalanza
Corso Cavour
Piazza Umberto I
Piazza Aldo Moro
1,2 km
13 ′
Via Giuseppe Capruzzi
Viale Unità d'Italia
Via Giulio Petroni
Via Giovanni Amendola
1,6 km
17 ′
Via Gaetano Postiglione
Viale Antonio Meucci
Corso Benedetto Croce
Via Celso Ulpiani
Via Re David
Via E. Orabona
Via G. Salvemini
Via A. Omodeo
1
2
3
4
5
6
7

BARI
CITY MAP

1 **CONFERENCE VENUE**
POLITECNICO DI BARI
Via Edoardo Orabona, 4, Bari (Italy)

2 **WELCOMING PARTY**
FORTINO DI SANT'ANTONIO ABATE
Lungomare Imperatore Augusto, Bari (Italy)

3 **GALA DINNER**
BARION SPORTING CLUB
Molo S. Nicola, 5, Bari (Italy)

4 **PARTY**
LA BIGLIETTERIA BARI
Largo Adua, 3, Bari (Italy)

PUBLIC TRANSPORTATIONS

5 BARI CENTRALE TRAIN STATION
(from Bari Centrale Train station to the Airport)

6 AMTAB BUS STOP - line 21
(from Politecnico di Bari to Bari Centrale Train station)

7 AMTAB BUS STOP lines C or 4
(from Viale Unità d'Italia - close to Politecnico di Bari
to Camera di Commercio - close to points 2-3-4)

TOURIST SITES

BASILICA OF S. NICOLA
Largo Abate Elia, Bari (Italy)

CATHEDRAL OF S. SABINO
Piazza dell'Odegitria, Bari (Italy)

NORMAN SWABIAN CASTLE
Piazza Federico II di Svevia, Bari (Italy)

MARGHERITA THEATER
Piazza IV Novembre, Bari (Italy)

PETRUZZELLI THEATER
Corso Cavour, 12, Bari (Italy)

POLITECNICO DI BARI
MAP

PLENARY SESSIONS 1
AULA MAGNA ATTILIO ALTO
I floor

COFFE BREAK/LUNCH 2
ATRIO COPERTO
Ground floor

PARALLEL SESSIONS 3
AULE 3-5-7-9-11
II floor

FORUM/PARALLEL SESSIONS 4
AULA 2
II floor

ENTRANCES

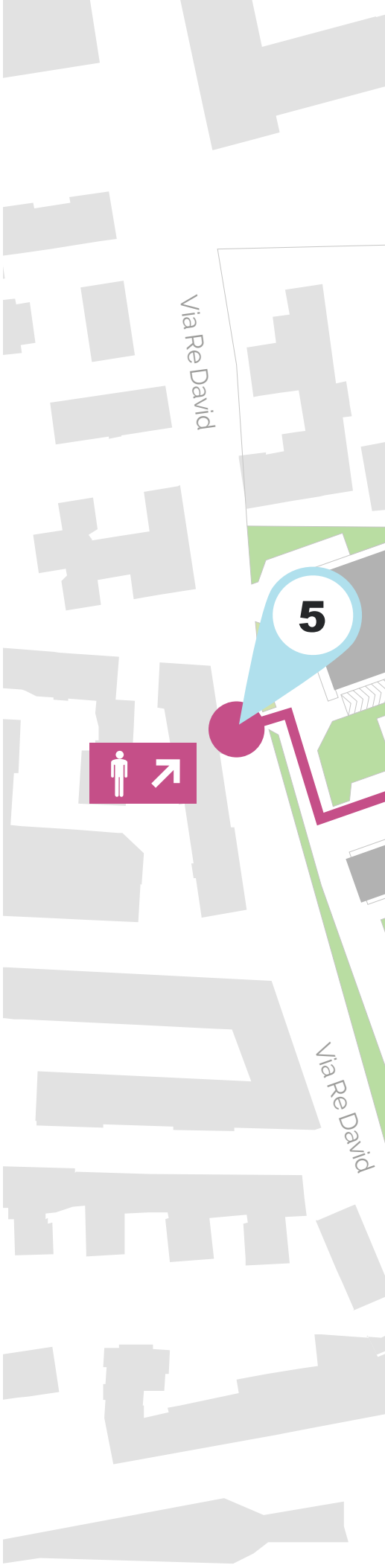
ENTRANCE 5
Via Re David

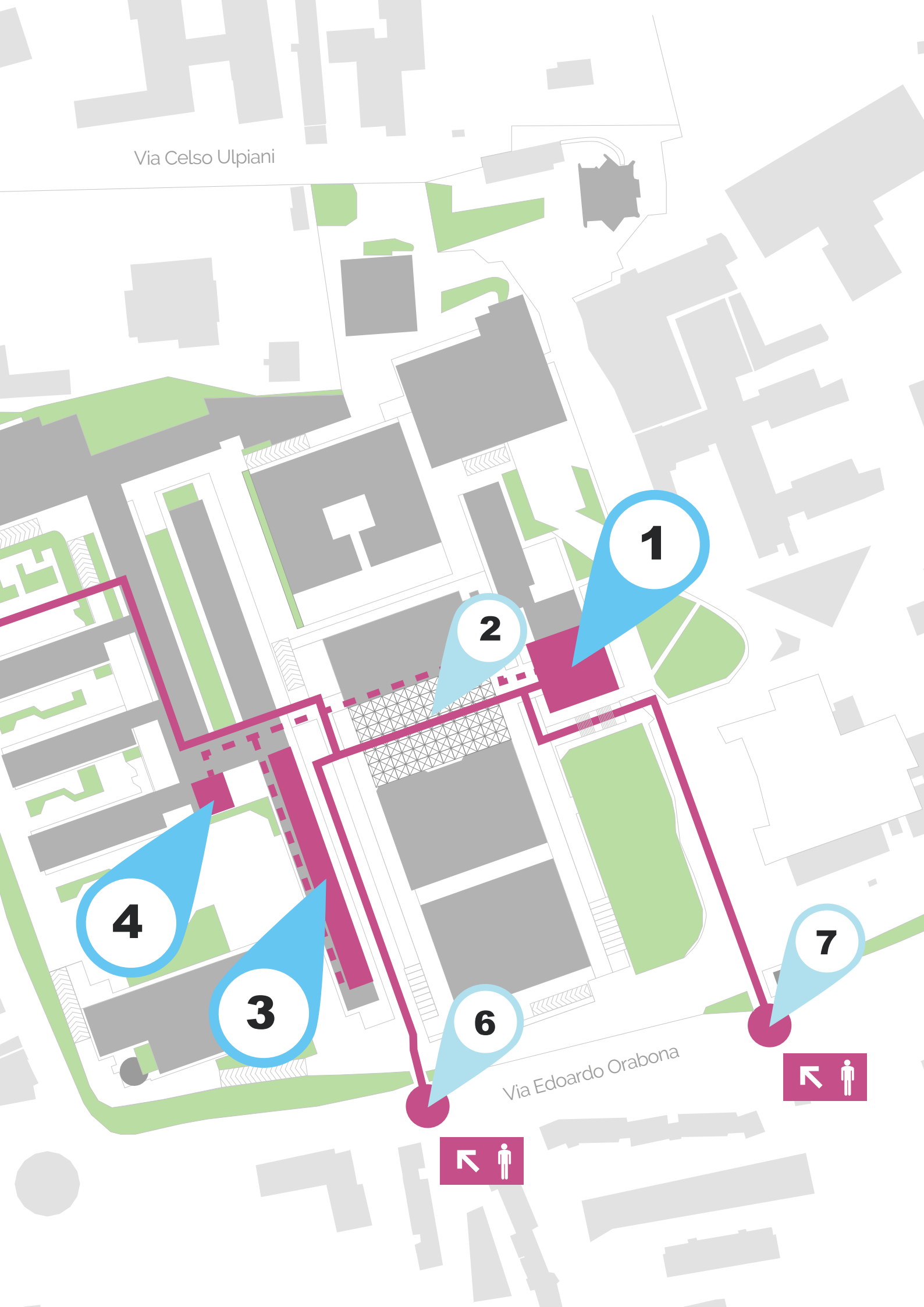
ENTRANCE 6
Via Orabona

ENTRANCE 7
Via Orabona

Ground floor

II floor




Via Celso Ulpiani
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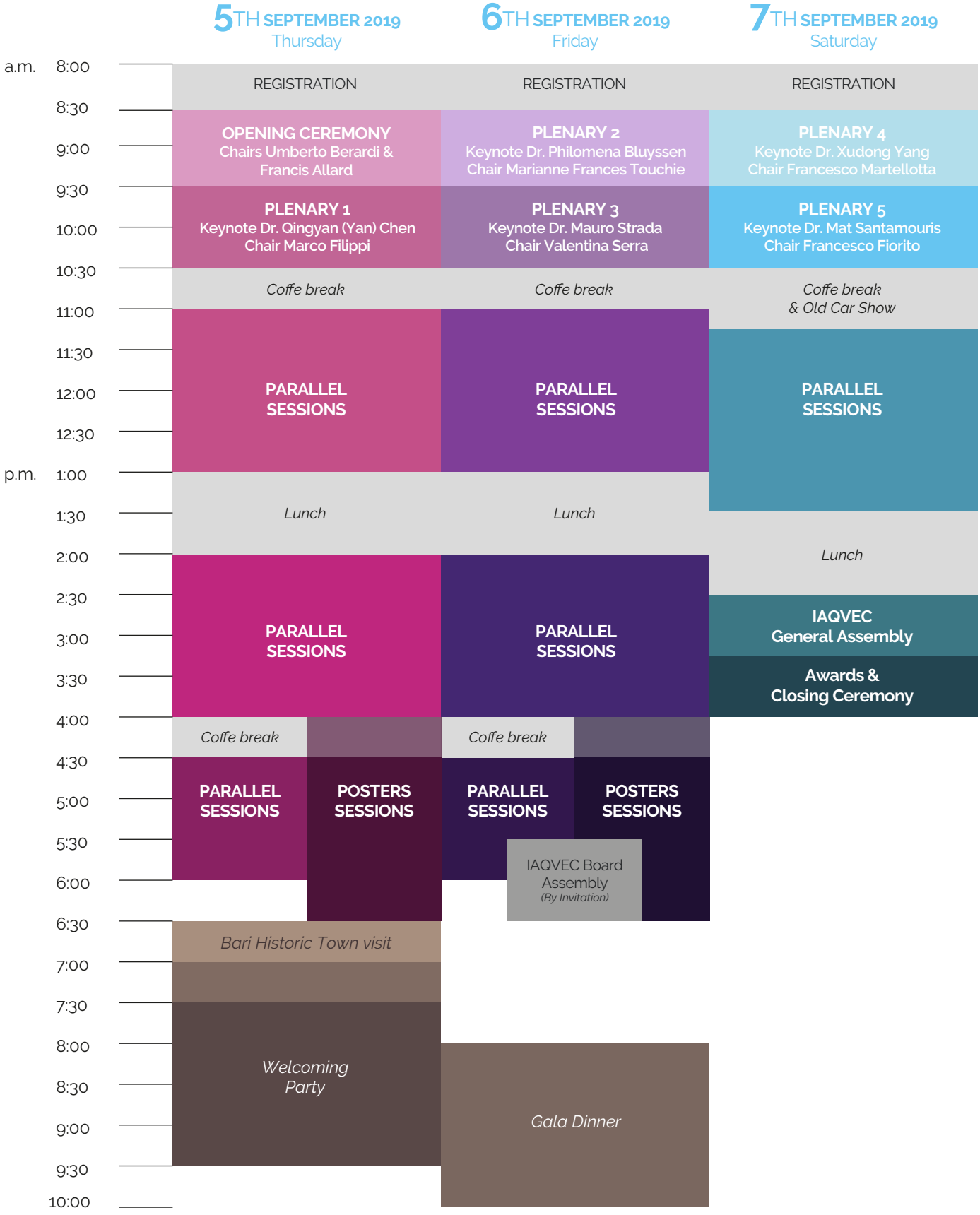
Via Edoardo Orabona

PROGRAM
SUMMARY SCHEME



PLENARY SESSIONS
KEYNOTE SPEAKERS

PLENARY 1

Dr. Qingyan (Yan) Chen
Ventilation strategies and measurement techniques
James G. Dwyer Professor of Mechanical Engineering
Purdue University, West Lafayette,U.S.A.

A Holistic Approach to Natural Ventilation Study

Dr. Qingyan "Yan" Chen is the James G. Dwyer Professor of Mechanical Engineering at Purdue University, USA. He serves also as the Editor-in-Chief of the international journal "Building and Environment". Dr. Chen earned his degrees from Tsinghua University in China and Delft University of Technology in the Netherlands. He worked as a Research Scientist at ETH-Zurich, as a Project Manager at TNO, and as a professor at MIT. Dr. Chen has been an Honorary/Named/Affiliated/Visiting/Guest Professor in 15 institutions in Australia, China, Denmark, Finland, and UK. Dr. Chen's current research topics include indoor environments; aircraft cabin environments; and energy-efficient, healthy, and sustainable building design and analysis. He has received a total funding exceeding US$35M. He has also published three books, more than 230 journal papers and more than 200 book chapters and conference papers and has been invited to deliver more than 160 lectures internationally. Google Scholar shows that his journal publications have been cited by more than 13,000 times and his H-index is 64. Dr. Chen has received the Distinguished Achievement Award for from International Building Performance Simulation Association (IBPSA) in 2013. Chen has also received several technical paper and poster awards and Distinguished and Exceptional Service Awards from ASHRAE. He is a fellow of the ASHRAE and the International Society of Indoor Air Quality.

PLENARY 2

Dr. Philomena Bluyssen
IAQ and Indoor Environmental Quality
Professor Indoor Environment
Delft University of Technology, Netherlands

Towards an integrated analysis of the indoor environment and its effects on occupants

Prof. dr. Philomena M. Bluyssen received her building engineering degree in 1986 at the Technical University of Eindhoven, and in 1990 her PhD at the Technical University of Denmark with a thesis on 'Air quality evaluated by a trained panel'.
After working for more than twenty years as researcher with TNO, where she coordinated among others several European projects on optimization of Indoor Environment Quality and energy use, she was appointed full Professor Indoor Environment in 2012 at the Faculty of Architecture and the Built Environment, of the Delft University of Technology in Delft. At the TU Delft she initiated the SenseLab, a recently opened semi-lab environment partly open to the public, sponsored by 25 companies and organizations (https://vimeo.com/220927174).
Prof. Bluyssen is member of many organizations, including TVVL, REVHA, ASHRAE, ISIAQ and CIB. She is co-founder of the Dutch ISIAQ chapter and was the first president of ISIAQ.nl. She has contributed and/or authored to more than 220 publications. For 'The Indoor Environment Handbook: How to make buildings healthy and comfortable', she received the prestigious Choice Outstanding Academic Titles of 2010 Award.' Her book 'The Healthy Indoor Environment – How to assess occupants' wellbeing in buildings', was published in 2014 and received the IDEC 2016 Book Award.

PLENARY SESSIONS
KEYNOTE SPEAKERS

PLENARY 3

Dr. Mauro Strada
HVAC systems
Former Professor at IUAV in Venice
President and Technical Director of STEAM srl, Italy

Recent experience in HVAC design for High Performance Buildings

Prof. Strada has taught from 1974 till 1992 in the Engineering Faculty of Padua University giving classes in Technical Physics, Refrigeration Technology and Applied Acoustic.
From 1990 till 2010 he got the position of Full Professor of Environmental Control Technology at the Faculty of Architectural Construction at IUAV, the University Institute of Architecture of Venice.
Prof. Strada has carried out his professional activity in the sectors of HVAC, especially concerning with laboratories, sports facilities, combined production of heat and electricity plants, hospitals, and airports.
He has written more than 170 publications among which two didactical volumes.
From 2007 to 2012, he was Associate Directo r of the branch based in Doha (Qatar) of the joint venture between Steam Srl and Technital S.p.A. designing the Dukhan College and other buildings in Doha. He was Chief Designer and Supervisor of Works of many huge hospitals in Italy and abroad e.g. the new Treviso Hospital, the new Galliera Hospital in Genoa, the new Este/Monselice Hospital, the refurbishment and development of the three Hospitals of Nis, Novi Sad and Kragujevac in the Republic of Serbia. From 2008 to 2011, he was a member of the team of the Iraq Health Task Force at the Italian Ministry of Foreign Affairs.

PLENARY 4

Dr. Xudong Yang
Smart Technologies for ZEBs
Chang-Jiang Chair Professor - Deputy Director
Department of Building Science
Tsinghua University, Beijing, China

The Role of Simulation in Preventing Indoor Air Pollution: A Foregone

Dr. Xudong Yang is presently the Chang-Jiang Professor and Deputy Director of the Institute of Built Environment, Tsinghua University, China. He received his Ph.D. from MIT and was a tenured Associate Professor at the University of Miami, USA. Dr. Yang is a Fellow ASHRAE and ISIA. He currently serves as the founding Editor-in-Chief of Building Simulation and associate editor of Building and Environment. He is also an executive committee member and representative of China in the IEA-EBC and an advisor to various Chinese ministries and cities on energy and environment intervention programs. He has co-authored eight books, more than 120 papers in leading international journals, 110 papers in international conferences and Chinese journals, and holds 36 patents. Dr. Yang's research interests center on fundamental and practical aspects of indoor environmental quality and sustainable buildings within the following thematic areas: (1) understanding and modeling various indoor air pollutant sources and sinks; (2) developing new air pollutant control technologies; and (3) energy intervention and environmental improvement in rural household and communities. His work has been covered by Nature, the Wall Street Journal, CCTV, PBS, etc. Award from the Chinese Bureau of Energy (2015) and the ASHRAE Exceptional Service Award (2018).

PLENARY SESSIONS
KEYNOTE SPEAKERS

PLENARY 5

Dr. Mattheos Santamouris
ZEBs: design and energy modelling
Anita Lawrence Professor of High Performance Architecture
University of New South Wales, Sydney, Australia

Urban Overheating and Impact on Buildings

Dr. Mat Santamouris is a Scientia Professor of High Performance Architecture at UNSW, and past Professor in the University of Athens, Greece. Visiting Professor of the Cyprus Institute, Metropolitan University London, Tokyo Polytechnic University, Bolzano University, Brunnel University and National University of Singapore. Past president of the National Center of Renewable and Energy Savings of Greece.
Editor in Chief of the Energy and Buildings Journal, Past Editor in Chief of the Advances Building Energy Research, Associate Editor of the Solar Energy Journal and Member of the Editorial Board of 14 Journals. Editor of the Series of Book on Buildings, published by Earthscan Science Publishers.
Editor and author of 14 international books published by Elsevier, Earthscan, Springer, etc. Dr. Santamouris is also the author of 320 scientific articles published in journals. Reviewer of research projects in 29 countries including USA, UK, France, Germany, Canada, and Sweden.

CONFERENCE **AGENDA**

Date: Thursday, 05/Sep/2019

8:00am - 9:00am Registration

8:30am - 9:30am

Opening Ceremony
Location: **Aula Magna**
Chair: **Umberto Berardi & Francis Allard**

9:30am - 10:30am

Pleanary I: Dr. Qingyan (Yan) Chen
Location: **Aula Magna**
Chair: **Marco Filippi**

10:30am - 11:00am *Coffee break*

11:00am - 1:00pm

Forum: HVAC: HVAC systems Control Approaches towards Energy Efficient Building
Location: **Room 2**
Chair: **Yundan Liao**

This workshop aims to have a deep discussion about progress and challenges, as well as future perspectives of control issues for energy efficient buildings. The focus is on control strategies and their adaptability in the perspectives of practical requirements of energy efficient buildings.

Presentations:

Optimal control of HVAC systems for today's and future buildings and its benefits;

Improving energy performance and thermal comfort in large office buildings: lessons from a multi-objective optimization of HVAC set points;

Active control of natural ventilation towards healthy and energy efficient buildings;

Building passive conditioning method and its effect on the building microclimate and energy consumption);

Building simulation and fire safety control;

Optimal design and control of HVAC system concerning uncertainty and robustness.

HVAC 1
Location: **Room 3**
Chair: **Livio de Santoli**

11:00am - 11:15am

Residential dual core energy recovery ventilation system for cold climates and its impacts on ventilation and IAQ

Boualem Ouazia, Doyun Won, Chantal Arsenault, Yunyi Li

11:15am - 11:30am

Experimental and Numerical Investigation of a Thermal Storage Medium for Ground Source Heat Pump Applications

Aggrey Mwesigye, Hiep V. Nguyen, David Salt, Seth B. Dworkin

11:30am - 11:45pm

Validation of thermoregulation human model considering mist wettedness on mist spraying environment

Wonseok Oh, Ryozo Ooka, Junta Nakano, Hideki Kikumoto, Osamu Ogawa

IAQ 1
Location: **Room 5**
Chair: **Sumin Kim**

11:00am - 11:15am

Conception and deployment of the Apolline sensor network for IAQ monitoring

Benjamin Hanoune, Redha Kassi, Bernard Verbeke, Eliane Assy, Laurent Clavier, Suzanne Crumeyrolle, Samuel Degrande, Xavier Le Pallec, Romain Rouvoy

11:15am - 11:30am

Personal inhalation risk assessment based on a hybrid method using CFD-CSP-PBTK modeling: quantification of time-averaged and peak concentration differences

Alicia Maria Murga Aquino, Kazuki Kuga, Sung-Jun Yoo, Kazuhide Ito

11:30am - 11:45am

Investigation of indoor air quality in a low energy high school building combining micro gas sensors and unsupervised learning

Alexandre Caron, Nathalie Redon, Coddeville Patrice, Benjamin Hanoune

IAQ 2
Location: **Room 7**
Chair: **Fariborz Haghighat**

11:00am - 11:15am

Optimization of fibrous air filter on the basis of particle condensational growth during the air cooling and de-humidification process using numerical simulations

Zhuangbo Feng, Shi-Jie Cao

11:15am - 11:30am

Numerical evaluation of a ductless personalized ventilation (DPV) combined with a radiant HVAC system: Thermal comfort

Jiying Liu, Yingying Zhao, Zhuangzhuang Li, Shengwei Zhu, Linhua Zhang, Jelena Srebric

11:30am - 11:45am

Experimental Study on the Performance Evaluation of Active Chilled Beams in Cooling Operation under Varied Boundary Conditions

Marc-Antoine Jean, Rohit Upadhyay, Mike Koupriyanov, Rodrigo Mora

Ventilation 1
Location: **Room 9**
Chair: **Shi-Jie Cao**

11:00am - 11:15am

Influence of the intermittent cooling methods combined active with passive on building energy consumption

Jiandong Ran, Ke Xiong, Mingfang Tang, Zhenjing Yang

11:15am - 11:30am

Sensitivity analysis of control strategies for mechanical ventilation in low-energy apartment buildings

Jakub Kolarik, Mathias Jørgen Larsen, Johan Bojsen, Daria Zukowska-Tejsen

11:30am - 11:45am

Experimental comparison on turbulent characteristics of airflows produced by pulsating and steady air supply under stratum ventilation

Xue Tian, Bozheng Li, Yong Cheng

ZEB 1
Location: **Room 11**
Chair: **Lamberto Tronchin**

11:00am - 11:15am

Building performance monitoring: from in-situ measurement to regression-based approaches

Lamberto Tronchin, Massimiliano Manfren, Benedetto Nastasi, Vincenzo Vodola, Fabio Bisegna, Fabio Nardecchia

11:15am - 11:30am

Towards resilient cities: advancements allowed by a multi-criteria optimization tool to face the new challenges of European Union's climate and energy goals

Antonio Buggin, Maria La Gennusa, Giorgia Peri, Gianfranco Rizzo, Gianluca Scaccianoce, Massimiliano Scarpa, Luigi Schibuola, Chiara Tambani

11:30am - 11:45am

BIM-BEM support tools for early stages of zero-energy building design

Giulia Spiridigliozzi, Laura Pompei, Cristina Cornaro, Livio De Santoli, Fabio Bisegna

CONFERENCE AGENDA

11:45pm - 12:00pm

Performance comparison between metal-organic framework (MOFs) and conventional desiccants (silica gel, zeolite) for a novel high temperature cooling system

Kan Zu,
Shuqing Cui,
Menghao Qin

12:00pm - 12:15pm

Performance evaluation on VRF systems based on large scale monitoring data in China

Hua Liu,
Mingyang Qian,
Da Yan,
Umberto Berardi

12:15pm - 12:30pm

Theoretical Models of Particles Detachment from the Rotating Wheel in Indoor Environment

Jinwei Song,
Hua Qian,
Xiaohong Zheng,
Fan Liu

12:30pm - 12:45pm

Numerical Simulation of a UV-PCO Plate Reactor

Hao Luo,
Guangxin Zhang,
Lexuan Zhong,
Zaher Hashisho

11:45am - 12:00pm

Development of Metabolic Rate Prediction Model Using Deep Learning via Kinect Camera in an Indoor Environment

Hooseung Na,
Taeyeon Kim

12:00pm - 12:15pm

Relationship of Indoor/Outdoor particles in residential buildings in Korea

Kyungmo Kang,
Taeyeon Kim,
Yun Gyu

12:15pm - 12:30pm

A physiological chamber experiment to explore human thermal adaption on the seasonal scale

Wenjie Ji,
Bin Cao,
Yingxin Zhu

12:30pm - 12:45pm

IoT network-based ANN for ventilation pattern prediction and actuation to optimize IAQ in educational spaces

Lavinia Chiara Tagliabue,
Fulvio Re Cecconi,
Stefano Rinaldi,
Angelo Luigi Camillo Ciribini

11:45am - 12:00pm

Comparative study of commercial home air cleaners

Philippe Berne,
Christophe Brouard,
Luana Golanski,
Arthur Roussey,
Barnabé Wayser,
Arnaud Guiot,
Simon Clavaguera,
Olivier Delléa

12:00pm - 12:15pm

Evaporation and dispersion of exhaled droplets in thermally-stratified indoor environments

Fan Liu,
Hua Qian,
Xiaohong Zheng,
Jinwei Song

12:15pm - 12:30pm

Effect of Air - Exhaust Location on Surgical Site Particle Distribution in an Operating Room

Aleyna Agirman,
Yunus Emre Cetin,
Mete Avci,
Orhan Aydin

12:30pm - 12:45pm

Application of the Ecological Valency concept to buildings' environmental control systems

Ardeshir Mahdavi,
Helene Teufl,
Christiane Berger

11:45am - 12:00pm

Effect of Mechanical Ventilation on Air Infiltration Rate in a Concert Hall

Yuchen Shi,
Xiaofeng LI

12:00pm - 12:15pm

A benchmark for room air distribution: The backward facing step flow

Peter Vilhelm Nielsen,
Chen Zhang,
Rasmus L. Jensen,
Christina Kjær,
Daniel Leiria,
Henriette Nørholm,
Truls Ramstad,
Anastasios Rovithakis

12:15pm - 12:30pm

Air conditioning online control by incorporating low-dimensional linear models and artificial neural network

Chen Ren,
Shi-Jie Cao

12:30pm - 12:45pm

Residential balanced ventilation and its impacts on indoor pressure, ventilation and IAQ

Boualem Ouazia,
Doyun Won,
Daniel Aubin,
Chantal Arsenault,
Stephanie So,
Wenping Yang

11:45am - 12:00pm

Static and dynamic thermal properties of construction components: A comparison in idealized and experimental conditions using lumped parameter models

Lamberto Tronchin,
Massimiliano Manfren,
Vincenzo Vodola,
Fabio Bisegna,
Fabio Nardecchia

12:00pm - 12:15pm

Enhancing values of roofs albedo for lowering cities air temperature and electric demand of buildings: a simple economic evaluation.

Diletta Di Lorenzo,
Barbara Maini Lo Casto,
Giorgia Peri,
Gianfranco Rizzo,
Gianluca Scaccianoce,
Chiara Tambani

12:15pm - 12:30pm

Effects of Energy Efficiency Measures on building performance – An analysis in seven European cities

Tullio de Rubeis,
Mirco Muttillo,
Vincenzo Stornelli,
Dario Ambrosini

12:30pm - 12:45pm

Fast computation approaches for parameterized design and simulation of vertical ground heat exchangers and GCHP systems

Youming Chen,
Bingbing Pang,
Xunshui Zhang

CONFERENCE AGENDA

		12:45pm - 1:00pm **Comparison of local equivalent temperatures and subjective thermal comfort ratings with regard to passenger comfort in a train compartment** Pascal Lange, Daniel Schmeling, Hans-Jürgen Hörmann, Andre Volkmann	**12:45pm - 1:00pm** **Benchmarking thermal performance of buildings and identifying preferred thermal conditions with highly deployable IoT devices** Georgios Kokogiannakis, Wenye Lin, Massimo Fiorentini, Laia Ledo-Gomis, Paul Cooper, Eve Hoskins, Tim Elgood	**12:45pm - 1:00pm** **Reviewing MnOx-Based Catalyst for Decomposition of Indoor Ozone** Marzieh Namdari, Chang-Seo Lee, Fariborz Haghighat, Ali Bahloul, Melanie Huard	**12:45pm - 1:00pm** **Full-scale experimental study of moisture condensation on the glazing surface: condensation rate characterization** Chi-Kien Nguyen, Cătălin Teodosiu, Frédéric Kuznik, Damien David	**12:45pm - 1:00pm** **A Techno-Socio-Economic Approach to Management of Exposure to Volatile Organic Compounds in Indoor Air Environment: Case study in China** Nasrin Khalili, Lanh Nguyen, Yanglong Wang, Sohail Murad, Weiquan Cheng, Andrew Kumiega
1:00pm - 2:00pm	*Lunch*					
2:00pm - 4:00pm	**HVAC 2** Location: Room 2 Chair: **Antonio Marco Pantaleo**	**IAQ 3** Location: Room 3 Chair: **Valentina Serra**	**IAQ 4** Location: Room 5 Chair: **Rajat Gupta**	**Ventilation 2** Location: Room 7 Chair: **Tomasz Kisilewicz**	**ZEB 2** Location: Room 9 Chair: **Michael Robert Donn**	**ZEB 3** Location: Room 11 Chair: **Sergio Camporeale**
	2:00pm - 2:15pm **Characterization of heat load profiles in buildings and their impact on demand side flexibility** Harald Taxt Walnum, Maria Justo Alonso, John Clauß, Karen Byskov Lindberg	**2:00pm - 2:15pm** **Investigation of Indoor Air Quality in Six Office Buildings in Chengdu, China based on Continuous Monitoring Data** Yang Qiu, Ya Tang	**2:00pm - 2:15pm** **Numerical investigation of particle distribution in a floor heated room with different air change rates** Mustafa Mutlu	**2:00pm - 2:15pm** **Characterizing the efficiency of natural ventilation with a motorized skylight and ventilated window** Diane Bastien	**2:00pm - 2:15pm** **Measurement Data Analysis for Heat Balance of Air Conditioning System in Actual Office Space** Shogo Tamaki, Hayato Horie, Shinichi Ito, Mamoru Hamada, Takehiro Koyano	**2:00pm - 2:15pm** **Warm climate performance of water-filled double-glazing** Tin Tai Chow, Wenjie Liu
	2:15pm - 2:30pm **Energy consumption for domestic hot water use in Norwegian hotels and nursing homes** Harald Taxt Walnum, Åse Lekang Sørensen, Bjørn Ludvigsen, Dmytro Ivanko	**2:15pm - 2:30pm** **A comparison of indoor air quality and employee absenteeism in 'local' and 'imported' green building standards** Rana Abd Elnaklah, Sukumar Natarajan	**2:15pm - 2:30pm** **Ventilation mode effect on thermal comfort in a mixed mode building** Jungsoo Kim, Richard de Dear, Federico Tartarini, Thomas Parkinson, Paul Cooper	**2:15pm - 2:30pm** **Study on energy loss through door open while air conditioner running in commercial store** Sihwan Lee	**2:15pm - 2:30pm** **Data-driven prediction models of multi-dimensional energy consumed in public buildings** Yibo Chen, Umberto Berardi	**2:15pm - 2:30pm** **Thermal performance of a wall-type thermosyphon used in solar heating** Chi-Ming Lai, C.S. Huang, R.H. Chen, C.J. Ho
	2:30pm - 2:45pm **Simulation and Analysis of Load Shifting and Energy Saving Potential of CO2-Based Demand-Controlled Ventilation in a Sports Training Center** Hamidreza Heidar Esfehani, Jakob Schäuble, Elena Paul, Dirk Bohne	**2:30pm - 2:45pm** **Improving the indoor climate of the traditional ottoman houses in the medina of algiers** Marwa Benchekroun, Samia Chergui, Francesco Ruggiero, Silvia Di Turi	**2:30pm - 2:45pm** **Comparative evaluation of the link between measured and perceived indoor environmental conditions in naturally and mechanically ventilated office environments** Rajat Gupta, Alastair Howard	**2:30pm - 2:45pm** **An Analysis of the ventilation rates in residential building** Jihyun Yoo, Seungrim Lee, Junseok Park	**2:30pm - 2:45pm** **Lessons learned after one-year use of a high efficient neighborhood in Norway** Maria Justo Alonso, Tor Line, Randi Kalskin Ramstad, Erling Naess, Peter Breuhaus, Kirsti Midttømme	**2:30pm - 2:45pm** **Performance comparison between building insulating materials made of straw bales and EPS for timber walls** Gianpiero Evola, Stefano Cascone, Gaetano Sciuto, Chiara Baroetto Parisi

CONFERENCE AGENDA

2:45pm - 3:00pm

Prediction of DHW energy use in a hotel in Norway

Dmytro Ivanko, Natasa Nord, Åse Lekang Sørensen, Igor Sartori, Thale Sofie Wester Plesser, Harald Taxt Walnum

3:00pm - 3:15pm

Smart Heat Storage Building Material Development with Hwangtoh and SSPCM for Zero Energy Buildings

Sungwoong Yang, Seunghwan Wi, Jongki Lee, Beom Yeol Yun, Ji Hun Park, Sumin Kim

3:15pm - 3:30pm

Towards an Ontology for Holistic Building Occupant Information Modeling

Shide Salimi, Mazdak Nik-Bakht, Amin Hammad

3:30pm - 3:45pm

From awareness to energy saving: using user engagement to change occupants' behaviour

Ubaldo Ayr, Davide Guarini, Francesco Martellotta, Daniela Porcelli, Antonio Sacchetti, Masimiliano Siliberti, Leonardo Sulpasso

3:45pm - 4:00pm

Numerical Simulation the Effect of Natural Ventilation on Indoor Environment Quality in the Inner-corridor-type Student Dormitory in Winter

Zhuangzhuang Li, Kaiyue Li, Jin Chang, Huazhen Wu, Jiying Liu

2:45pm - 3:00pm

An approach to develop a green technology database for residential buildings

Jialei Shen, Jianshun Zhang

3:00pm - 3:15pm

Methodology for assessing the indoor environmental quality in low energy buildings in the Czechia

Karel Kabele, Zuzana Veverkova, Miroslav Urban

3:15pm - 3:30pm

Investigation into the Risk of Overheating in New Zealand's Public Libraries

Lesley Metibogun, Regan Potangaroa, Nigel Isaacs

3:30pm - 3:45pm

IEQ and energy improvement of existing buildings by prefabricated façade additions: the case of a student house in Athens

Giovanni Semprini, Annarita Ferrante, Anastasia Fotopoulou, Davide Cantelli, Chrysanthi Efthymiou, Dimitra Papadaki, Margarita-Niki Assimakopoulos

3:45pm - 4:00pm

Analysis of thermal performance improvement technology for window of old Buildings in South Korea

Suin Lee, Gyeong-Seok Choi, Jae-Sik Kang, Hyun-Jung Choi

2:45pm - 3:00pm

Evaluation of vertical ventilation concepts for a typical mid-size car in terms of heating and cooling dynamics

Tobias Dehne, Andreas Westhoff

3:00pm - 3:15pm

An improved integrated comfort control with cooling and ventilation systems to maintain occupants' thermal comfort

Sun Ho Kim, Jeong Won Kim, Young Ran Yoon, Hyeun Jun Moon

3:15pm - 3:30pm

Night Ventilation Hollow Core Slab Activation for Cooling Load Reduction Under the Operative Temperature Criterion

Christopher Raghubar, Umberto Berardi

3:30pm - 3:45pm

Demand-controlled ventilation: do different user groups require different CO2-setpoints?

Martine Borgen Haugland, Aileen Yang, Sverre Bjørn Holøs, Kari Thunshelle, Mads Mysen

3:45pm - 4:00pm

Ventilation characteristics of window types in naturally ventilated residential buildings in Asaba, Nigeria

Ben Ugochukwu Iwuagwu, Marcel Okafor, Ikechukwu Onyegirir, Charles Chime

2:45pm - 3:00pm

Ventilative cooling potential of buildings in Australia

Federico Tartarini, Massimo Fiorentini, Laia Ledo Gomis, Paul Cooper

3:00pm - 3:15pm

Estimating Ventilation Rates In Schools In Indian Context

Sandhiya Jayakumar, Michael G Apte

3:15pm - 3:30pm

Optimal night mechanical ventilation control strategy in office buildings

Rui Guo, Yue Hu, Mingzhe Liu, Per Heiselberg

3:30pm - 3:45pm

Case study assessment for natural ventilation performance of heritage buildings located in the Mediterranean city Alexandria, Egypt.

Ahmed K. Taher, Oriel Prizeman, Bakr Gomaa, Simon Lannon

3:45pm - 4:00pm

Experimental characterization of the impact of unsteady airflows on tracer gas measurements

Gabriel Remion, Bassam Moujalled, Mohamed El Mankibi

2:45pm - 3:00pm

A data mining model for building occupancy prediction based on deep learning methods

Yaping Zhou, Zhun Yu, Jun Li, Guoqiang Zhang

3:00pm - 3:15pm

Occupant behavior: a major issue for building energy performance

Yousra Laaroussi, Myriam Bahrar, Mohamed Elmankibi, Draoui Abdeslam, Amir el Arbi

3:15pm - 3:30pm

Understanding the driving factors and patterns of window opening and closing behavior in French households

Jun Li, Karthik Panchabikesan, Zhun {Jerry} Yu, Fariborz Haghighat, Mohamed El Mankibi, Guoqiang Zhang

3:30pm - 3:45pm

District household electricity consumption pattern analysis based on auto-encoder algorithm

Yuan Jin, Da Yan, Xingxing Zhang, Mengjie Han, Xuyuan Kang, Jingjing An, Hongsan Sun

3:45pm - 4:00pm

Towards net zero energy buildings: building performance optimization, simulation and analysis

Sadaf Alam

2:45pm - 3:00pm

Control Method for Adaptive Façades based on Energy Conservation and Glare Protection Strategies

Dongseok Lee, Kyung Hwan Ji, Jae Hun Jo

3:00pm - 3:15pm

Towards more sustainable patterns of building design trough ventilated rainscreens

Francesco Paolo Rosario Marino, Filiberto Lembo

3:15pm - 3:30pm

Dynamic simulation of cross-ventilated buildings with night-flush cooling in neighbourhood environment using integrated CFD-CFD-BES strategy

Ruijun Zhang, Parham A. Mirzaei, Benjamin M. Jones

3:30pm - 3:45pm

Microstructure and Chemical Characterization of Foam Insulations

Jelena Madzarevic, Umberto Berardi

3:45pm - 4:00pm

Energy use and indoor air quality in indoor swimming pool facilities

Therese Nitter, Snorre Olsen, Salvatore Carlucci

CONFERENCE AGENDA

4:00pm - 4:30pm — *Coffee break*

4:00pm - 6:30pm — **Poster Sessions**

4:30pm - 6:00pm

HVAC 3
Location: Room 2
Chair: **Hiroshi Yoshino**

4:30pm - 4:45pm

Modelling and Optimization of Helical Steel Piles as In-Ground Heat Exchangers for Ground Source Heat Pumps
Sarah Ruth Nicholson, Aggrey Mwesigye, Seth Dworkin

4:45pm - 5:00pm

Performance investigation of ground source heat exchanger desiccant-based hybrid cooling system in humid climate
Ghassem Heidarinejad, Umberto Berardi, Saeed Rayegan

5:00pm - 5:15pm

Numerical investigation on the impact of different supply air terminal devices on the performance of the newly combined ventilation and heating system
Parastoo Sadeghian, Joanna Polak, Alireza Afshari, Sasan Sadrizadeh

5:15pm - 5:30pm

Application of air-source heat pump (ASHP) technology for residential buildings in Canada
Artur Udovichenko, Lexuan Zhong

IAQ 5
Location: Room 3
Chair: **Gloria Pignatta**

4:30pm - 4:45pm

An extensive study on the relation between energy use, indoor thermal comfort, and health in social housing: the case of the New South Wales, Australia
Shamila Haddad, Gloria Pignatta, Riccardo Paolini, Afroditi Synnefa, Mattheos Santamouris

4:45pm - 5:00pm

Effect of ventilation on perceived air quality in 18 classrooms
Aileen Yang, Sverre Bjørn Holøs, Kari Thunshelle, Mads Mysen

5:00pm - 5:15pm

Modelling drivers of variance and adaptation for the prediction of thermal perception and energy use in zero energy buildings
Marcel Schweiker

5:15pm - 5:30pm

Building Energy and IAQ improvement by Coupled Model
Seyed Mohammadreza Heibati, Wahid Maref, Hamed Saber

Ventilation 3
Location: Room 5
Chair: **Piercarlo Romagnoni**

4:30pm - 4:45pm

Development of a procedure to measure the performance of ventilation filters for nanoparticles
Ali Bahloul, Clothilde Brochot, Pooya Abdolghader, Fariborz Haghighat

4:45pm - 5:00pm

Minimize the airborne particle migration to the operating rooms during door opening and passage
Merethe Cecilie Lind, Sasan Sadrizadeh, Cong Wang, Parastoo Sadeghian, Bård Venås, Sture Holmberg, Trond Thorgeir Harsem

5:00pm - 5:15pm

Contamination risk in a cleanroom with weakened aerodynamic barrier
Lasse Lind Knudsen, Kiril Georgivev Naydenov, Carsten Rasmussen, Arsen Krikor Melikov, Lei Fang

5:15pm - 5:30pm

Operating room ventilation with laminar air flow ceiling and a local laminar air flow system near the operating table for the patient
Laurențiu Tăcutu, Ilinca Năstase, Florin Bode

Ventilation 4
Location: Room 7
Chair: **Ardeshir Mahdavi**

4:30pm - 4:45pm

Numerical Modeling and Experimental Validation of PCM-to-Air Heat Exchangers - Application of Ventilated Building Envelopes
Mohamed Dardir, Mohamed El-Mankibi, Fariborz Haghighat

4:45pm - 5:00pm

Experimental study of thermal characteristics for a novel ventilation roof with composite phase change material (VRCPCM)
Xiangfei Kong, Xiaofei Li, Xu Qiao, Yufan Chang, Wanhe Chen

5:00pm - 5:15pm

Curved wall jets and their effect on the airflow in a generic enclosure: validation of RANS models
Jo-Hendrik Thysen, Twan van Hooff, Bert Blocken, GertJan van Heijst

5:15pm - 5:30pm

Steady RANS CFD simulations for air curtain flows
Adelya Khayrullina, Twan van Hooff, Bert Blocken, GertJan van Heijst

ZEB 4
Location: Room 9
Chair: **Pietro Stefanizzi**

4:30pm - 4:45pm

Towards a universal ranking system for design parameters impact on buildings' lifecycle energy
Rafaela Panizza, Mazdak Nik-Bakht

4:45pm - 5:00pm

Analysis of energy performances of a nZEB kindergarten building in Bisceglie (Apulia region)
Monica Misceo, Luca Peralta, Sabrina Angelillo, Pietro Stefanizzi

5:00pm - 5:15pm

A Nearly Zero Energy Building in Mediterranean climate: A case study in Mesagne (Apulia)
Roberto Stasi, Salvatore Paterno, Antonio Stragapede, Stefania Liuzzi, Pietro Stefanizzi

5:15pm - 5:30pm

Numerical and experimental performances of a multi-family nZEB in Putignano (Bari, Italy)
Pietro Stefanizzi, Alessandra Altobello, Monica Misceo, Piero Russo, Ilaria Vignola

CONFERENCE AGENDA

	5:30pm - 5:45pm **Multiple Regression Model and Benchmarking for HVAC Energy Consumption of Railway Passenger Stations** Ziyi Su, Xiaofeng Li 5:45pm - 6:00pm **Exergy analysis of solar thermal energy utilization for buildings Comparison between Multiple source & Multiple use Heat Pump (MMHP) and Solar Water Heater (SWH) systems for winter season** Daisuke Inagaki, Ryozo Ooka, Masanori Shukuya, Wonjun Choi	5:30pm - 5:45pm **Experimental Investigation on Thermal Insulation Performance of Air Interlayer under an Impinging Jet at High Temperature** Jian Cai, Wei Ye, Chengqiang zhi, Yixiang Huang, Xu Zhang 5:45pm - 6:00pm **Prefabricated and low impact residential modules: optimization of environmental quality** Santi Maria Cascone, Giuseppe Russo, Nicoletta Tomasello, Matteo Vitale	5:30pm - 5:45pm **Long-term performance of fibrous ventilation/air cleaner filter for particle removal** Lili JI, Jingjing Pei, Wenlong Liu 5:45pm - 6:00pm **The displacement ventilation patterns in two parallel-connected chambers with a mechanical extraction device** Yi-Jiun Peter Lin, Shang-Qian Li	5:30pm - 5:45pm **Controlled inlet airflow in ventilated prototypes: a numerical analysis** Marianna Pergolini, Giulia Ulpiani, Orjena Shehi, Costanzo Di Perna, Francesca Stazi 5:45pm - 6:00pm **Beyond Recovery: Measuring ventilation strategies and their impact on energy.** Nilesh Bakshi, Michael Robert Donn, Sanjeev Ganda, James Wallace	5:30pm - 5:45pm **Heating demand and indoor air temperature prediction in a residential building using physical and statistical models: A comparative study** Ying Sun, Mahmood Mastani Joybari, Karthik Panchabikesan, Alain Moreau, Miguel Robichaud, Fariborz Haghighat 5:45pm - 6:00pm **Hourly dynamic and monthly semi-stationary calculation methods applied to nZEBs: Impacts on energy and comfort** Elisa Di Giuseppe, Giulia Ulpiani, Serena Summa, Costanzo Di Perna, Marco D'Orazio, Luca Tarabelli
6:30pm - 7:30pm	*Bari Historic Town visit*				
7:00pm - 9:30pm	*Welcoming*				

CONFERENCE **AGENDA**

Date: Friday, 06/Sep/2019

8:00am - 8:30am — Registration

8:30am - 9:30am

Plenary 2: Dr. Philomena Bluyssen
Location: **Aula Magna**
Chair: **Marianne Frances Touchie**

9:30am - 10:30am

Plenary 3: Prof. Mauro Strada
Location: **Aula Magna**
Chair: **Valentina Serra**

10:30am - 11:00am — *Coffee break*

11:00am - 1:00pm

Forum: Data-driven: Data-driven approaches for building energy modelling (IBPSA-China update)

Location: **Room 2**
Chair: **Chris Bales**
Chair: **Da Yan**

Integrating data from building management systems (BMS) in energy simulation using unsupervised learning and Gaussian processes;

Occupancy and usage profiling in energy simulation of residential buildings;

District household electricity consumption pattern analysis based on auto-encoder algorithm;

A review of reinforcement learning methodologies on control systems for building energy;

Data-driven procedure to model occupancy and occupant-related electric load profiles in multi-residential buildings for use in energy simulation;

Impact of electrical vehicle (EV) penetration on the cost-optimal building integrated photovoltaics (BIPV) at a small residential district in Sweden.

HVAC 4

Location: **Room 3**
Chair: **Alberto Muscio**

11:00am - 11:15am

Smart use of mechanical ventilation for energy retrofit of residential dwellings
Simone Pedrazzi, Chiara Ferrari, Giulio Allesina, Alberto Muscio

11:15am - 11:30am

Energy Flexibility of Office Buildings Using Passive Thermal Mass Storage and Global Temperature Adjustment
Fei Lu, Zhenyu Yu, Xudong Yang, Yu Zou

11:30am - 11:45am

Auto-tuning method for data-driven models in building energy consumption prediction: a case of cooling load prediction
Xuyuan Kang, Da Yan, Yuan Jin, Hongsan Sun

IAQ 6

Location: **Room 5**
Chair: **Marco Perino**

11:00am - 11:15am

A Personal Visual Comfort Model: Predict Individual's Visual Comfort Using Occupant Eye Pupil Size and Machine Learning
Lingkai Cen, Joon-Ho Choi, Xiaomeng Yao, Yolanda Gil, Shrikanth Narayanan, Maryann Pentz

11:15am - 11:30am

Design of Online Platform and Visualization System based on Three-Dimensional Spatial Information for Occupant Satisfaction with Indoor Environment Quality
Jong-Won Lee, Deuk-Woo Kim

11:30am - 11:45am

Measuring and identifying background noises in offices during work hours
Elena Rossi, Domenico De Salvio, Dario D'Orazio, Massimo Garai

IAQ 7

Location: **Room 7**
Chair: **Francis Allard**

11:00am - 11:15am

Impact of essential-oil-based cleaning products on indoor air quality: From liquid composition to test chamber emission evaluation
Shadia Carolina Angulo Milhem, Marie Verriele, Mélanie Nicolas, Frédéric Thevenet

11:15am - 11:30am

Formaldehyde Monitoring in Office Buildings Located in Tropical Climates of India
Kiran Kumar D E V S, Jyothi Latha T, Suresh R, Arunvel T

11:30am - 11:45am

Model-Based Testing and Evaluation of VOC Emission Sources and Sinks in the Indoor Environment: Theory and Applications
Jianshun Jensen Zhang, Zhenlei Liu, Beverly Bing Guo

Ventilation 5

Location: **Room 9**
Chair: **Stefano Fantucci**

11:00am - 11:15am

The effect of airflow rate control on the performance of a fan-assisted solar air heating façade
Francesco Isaia, Stefano Fantucci, Valentina Serra, Valeria Longo

11:15am - 11:30am

Façade Integrated Greenery for Bio-dynamic Filtration of Air
Vincenzo Gentile, Marco Simonetti

11:30am - 11:45am

The effect of changing emissivity on the natural ventilation rate of narrow air cavity integrated in a transparent insulation façade
Miroslav Čekon, Jakub Čurpek, Richard Slávik

ZEB 5

Location: **Room 11**
Chair: **Michele Zinzi**

11:00am - 11:15am

The energy retrofit of building façades in 22@ innovation district of Barcelona: impact of the energy performance analysis on the business model.
Mauro Manca, Zuzana Prochazkova, Umberto Berardi, Silvana Flores Larsen, Felipe Pich-Aguilera, Teresa Batlle

11:15am - 11:30am

Analysis of monitoring data for a nZEB in Mediterranean climate
Fabrizio Ascione, Martina Borrelli, Rosa Francesca De Masi, Filippo de Rossi, Giuseppe Peter Vanoli

11:30am - 11:45am

Cost-efficient Nearly Zero-Energy Buildings (NZEBs)
Heike Erhorn-Kluttig, Hans Erhorn, Micha Illner, Kirsten Engelund Thomsen, Kim Wittchen, Ove Mørck, Miriam Sanchez Mayoral Gutierrez, Michele Zinzi, Benedetta Mattoni, Gaetano Fasano, Marjana Šijanec-Zavrl, Marko Jacimovic

CONFERENCE AGENDA

11:45am - 12:00pm

A Robust Chiller Sequencing Control Method for Enhancing Cooling Supply Reliability and Energy Efficiency

Yundan Liao,
Zhenbing Cai,
Zhaosong Fang

12:00pm - 12:15pm

Frost reduction in mechanical balanced ventilation by efficient means of preheating cold supply air

Simon Härer,
Behrouz Nourozi,
Qian Wang,
Adnan Ploskic

12:15pm - 12:30pm

Tuning Approach of Dynamic Control Strategy of Temperature Set-point for Existing Commercial Buildings

Zakia Afroz,
GM Shafiullah,
Tania Urmee,
Gary Higgins

12:30pm - 12:45pm

Case Study of Smart Dual Fuel Switching System (SDFSS)

Saunak Shukla,
King Tung,
Danilo Yu,
Alan S. Fung

11:45am - 12:00pm

Climate and Occupancy Based Investigation of Air Pollutants in Office Spaces

Ulrike Passe,
Farzad Hashemi

12:00pm - 12:15pm

Impacts of energy retrofits on indoor CO_2 concentrations and air change rates

Virpi Leivo,
Tadas Prasauskas,
Anu Aaltonen,
Dainius Martuzevicius,
Ulla Haverinen-Shaughnessy

12:15pm - 12:30pm

Optimizing Indoor Environmental Quality in Hot Arid Climates

Dalia Wagdi,
Khaled Tarabieh,
Phillipa Grant

12:30pm - 12:45pm

The effect of student activity and outdoor condition on particulate matter concentration in university classroom

Sowoo Park,
Doosam Song

11:45am - 12:00pm

Development of a novel method for determining the gas-phase concentration of emitted phthalates from indoor materials at room temperature

Tamara Ghanem Braish,
Mélanie Nicolas,
François Maupetit,
Valérie Desauziers

12:00pm - 12:15pm

Active coating including microorganism for indoor formaldehyde degradation

Tangi Senechal,
Cristiana Cordeiro de Castro,
Julian Viseur,
Aline Ducoulembier,
Anne-Lise Hantson,
Driss Lahem

12:15pm - 12:30pm

Experimental and Numerical Investigation of Submicron Particle Deposition Enhancement by Patterned Surface

Haolun Xu,
Tsz Wai Lai,
Sau Chung Fu,
Chili Wu,
Huihe Qiu,
Christopher Y.H. Chao

12:30pm - 12:45pm

Evaluation of the occupants' exposition to the indoor environment

Jakub Wladyslaw Dziedzic,
Da Yan,
Vojislav Novakovic

11:45am - 12:00pm

A test bed for thermal fluid dynamic analysis of double skin facade systems

Aleksandar Jankovic,
Francesco Goia,
David Eckert,
Philipp Müller

12:00pm - 12:15pm

The Influence of urban microclimate vertical variations on the building performance of a high-rise office building at different floors

Jing Li,
Michael Donn,
Geoff Thomas

12:15pm - 12:30pm

Effect of cavity ventilation on hygrothermal performance of heavyweight building envelope

Marina Bagaric, Banjad Pecur, Bojan Milovanovic

12:30pm - 12:45pm

Simulations of a novel demand-controlled room-based ventilation system for renovated apartments

Kevin Michael Smith,
Jakub Kolarik

11:45am - 12:00pm

Survey and solutions to identify potential cost reduction in the design and construction process of nearly zero energy multi-family houses

Michele Zinzi,
Benedetta Mattoni,
Fabio Bisegna

12:00pm - 12:15pm

End-users' opinion on living in multi-family Nearly Zero Energy Buildings

Marjana Šijanec Zavrl,
Marko Jaćimović,
Heike Erhorn-Kluttig,
Hans Erhorn,
Micha Illner,
Kirsten Thomsen,
Kim Wittchen,
Ove Christen Mørck,
Miriam Sanchez Mayoral Gutierrez,
Michele Zinzi,
Benedetta Mattoni,
Gaetano Fasano

12:15pm - 12:30pm

Solutions sets for cost optimisation of nearly zero energy buildings (NZEBs) in four European countries

Kim B. Wittchen,
Kirsten Engelund Thomsen,
Ove Mørck,
Heike Erhorn-Kluttig,
Hans Erhorn,
Micha Illner,
Miriam Sanchez Mayoral Gutierrez,
Michele Zinzi,
Benedetta Mattoni,
Gaetano Fasano,
Marjana Šijanec-Zavrl,
Marko Jacimovic

12:30pm - 12:45pm

Life-cycle cost and environmental assessment of nearly zero-energy buildings (NZEBs) in four European countries

Ove Christen Mørck,
Miriam Sanchez Mayoral Gutierrez,
Kirsten Engelund Thomsen,
Kim Bjarne Wittchen

CONFERENCE AGENDA

		12:45pm - 1:00pm **An Effective Ventilation System for Preventing Indoor PM2.5 Dispersion** Hangyeol Park, Haneul Choi, Kyung Mo Kang, Hyung Keun Kim, Taeyeon Kim	**12:45pm - 1:00pm** **Acoustic Environment of Large Terminal Airside Concourse in China** Huang Yenhsiang, Zhu Yingxin, Zhang Zhongchen, Lin Borong	**12:45pm - 1:00pm** **Thermal comfort and visual interaction: a subjective survey** Laura Bellia, d'Ambrosio Alfano, Francesca Romana, Fragliasso Francesca, Boris Igor Palella, Riccio Giuseppe	**12:45pm - 1:00pm** **Climatic potential maps of ventilative cooling techniques in Italian climates including resilience to climate changes** Giacomo Chiesa	**12:45pm - 1:00pm** **Model House F3 in Ljubljana - Nearly Zero Energy Building** Damjana Varsek, Gaj Rak
1:00pm - 2:00pm	*Lunch*					
2:00pm - 4:00pm	**HVAC 5** Location: **Room 2** Chair: **Marianne Frances Touchie**	**HVAC 6** Location: **Room 3** Chair: **Lexuan Zhong**	**IAQ 8** Location: **Room 5** Chair: **Richard de Dear**	**Ventilation 6** Location: **Room 7** Chair: **Carsten Rode**	**ZEB 6** Location: **Room 9** Chair: **Jianshun Jensen Zhang**	**ZEB 7** Location: **Room 11** Chair: **Francesco Asdrubali**
	2:00pm - 2:15pm **Introduction of Hybrid Radiant Cooling System for adapting Hot and Humid Climates** Moon Keun Kim	**2:00pm - 2:15pm** **The Thermodynamic Investigation and Optimization of an Ejector Refrigeration System using R1233zd(E) as a Working Fluid** Aggrey Mwesigye, Amir Kiamari, Seth B. Dworkin	**2:00pm - 2:15pm** **On the temporal dimension of adaptive thermal comfort mechanisms in residential buildings** Jihye Ryu, Jungsoo Kim, Wonhwa Hong, Richard de Dear	**2:00pm - 2:15pm** **Key findings of IEA EBC Annex 68 - Indoor Air Quality Design and Control in Low Energy Residential Buildings** Carsten Rode, Marc Abadie, Menghao Qin, John Grunewald, Jakub Kolarik, Jelle Laverge	**2:00pm - 2:15pm** **Experimental assessment of the combined effect of retroreflective façades and pavement in urban canyons** Beatrice Castellani, Andrea Nicolini, Alberto Maria Gambelli, Mirko Filipponi, Elena Morini, Federico Rossi	**2:00pm - 2:15pm** **Simulation-supported shading design optimisation for a multi-storey building with passive cooling** Sören Eikemeier, Robert Wimmer, Ardeshir Mahdavi
	2:15pm - 2:30pm **Analysis of the energy saving benefits of a radiant cooling system integrating phase change materials** Andres Gallardo, Umberto Berardi	**2:15pm - 2:30pm** **Method identifying oversizing of mechanical ventilation systems in office buildings using airflow and electrical power measurements** Donya Sheikh Khan, Jakub Kolarik, Christian Anker Hviid, Peter Weitzmann	**2:15pm - 2:30pm** **Bayesian Inference of Thermal Comfort: Evaluating the Effect of "Well-Being" on Perceived Thermal Comfort in Open-Plan Offices** Sarah Crosby, Steven Rogak, Adam Rysanek	**2:15pm - 2:30pm** **Body fat rate and human thermal comfort relativity study with BIA in HVAC condition** Mengyuan Liu	**2:15pm - 2:30pm** **Effects of Increasing Urban Reflectivity on Energy Consumption in Buildings in Toronto during the 2018 Heat Wave Period** Zahra Jandaghian, Umberto Berardi	**2:15pm - 2:30pm** **A Natural Ventilation "Calculator" and** Michael Robert Donn, Nilesh Bakshi
	2:30pm - 2:45pm **Study on the heat transfer performance of the ceiling radiant panel** Yuki Ichikawa, Ryoichi Kuwahara, Hideki Sato	**2:30pm - 2:45pm** **Assessment of Natural Ventilation: Case Study of Landmark Building** Marc-Antoine Jean, Rohit Upadhyay, Chris Flood, Rodrigo Mora	**2:30pm - 2:45pm** **A field study on the effect of cold radiation on human thermal comfort in winter** Zhaojun Wang	**2:30pm - 2:45pm** **Experimental investigation into thermal comfort and energy utilization efficiency of stratum ventilation under heating mode** Shuangshuang Liang, Bozheng Li, Xue Tian, Yong Cheng	**2:30pm - 2:45pm** **Influence of microclimate boundary conditions in net zero energy settlements on HVAC efficiency** Matteo Di Grazia, Cristina Piselli, Anna Laura Pisello	**2:30pm - 2:45pm** **Impact of effective conductivity value of building insulation materials on estimating heating and cooling load using typical and historical weather data** Chun Yin Siu, Yu Ying Wang, Zaiyi Liao

CONFERENCE AGENDA

2:45pm - 3:00pm

Exergetic review on passive and active systems for ventilation

Masanori Shukuya

3:00pm - 3:15pm

Simulation and control of radiant floor cooling systems: intermittent operation and weather-forecast-based predictive controls

Linfang Zhang, Hao Li, Jiying Liu, Moon Keun Kim, Linhua Zhang

3:15pm - 3:30pm

Performance of Occupancy-Controlled Smart Thermostats in Contemporary Multi-Unit Residential Building Suites

Helen Stopps, Marianne F Touchie

3:30pm - 3:45pm

Creation of a simulated dataset for Smart and Continuous Commissioning

Rony Shohet, J. J. McArthur

3:45pm - 4:00pm

Development of Numerical Heat and Mass Transfer Model for Predicting Total Heat Exchange Performance in Energy Recovery Ventilator

Hajime Sotokawa, Keiji Kameishi, Juyeon Chung, Sung-Jun Yoo, Kazuhide Ito

2:45pm - 3:00pm

Monitoring and Evaluation of Nearly-Zero Energy House (NZEH) with Hybrid HVAC System for Cold Climate - Canada

Gulsun Demirezen, Navid Ekrami, Alan S. Fung, Danilo Yu

3:00pm - 3:15pm

Investigation on the thermal performance of the diaphragm wall in deep buried engineering: a simulation study

Chao zeng, Yanping Yuan, Fariborz Haghighat, Xiaoling Cao, Liangliang Sun, Bo Xiang

3:15pm - 3:30pm

Application of data mining in understanding the operation of thermal storage tank in a residential building: A case study

Maryam Sadat Mirnaghi, Karthik Panchabikesan, Fariborz Haghighat

3:30pm - 3:45pm

Optimal Control for the Natural Ventilation in Buildings with Large Depth

Fulin Wang, Rui Yan, Yansheng Liu

3:45pm - 4:00pm

Energy and exergy analysis of waste-water heat recovery in a multi-family residential complex

Genku Kayo, Masanori Shukuya, Ivo Martinac

2:45pm - 3:00pm

Usability and comfort in Canadian offices: Interview of 170 university employees

Mohamed Ouf, Ruth Tamas, William O'Brien

3:00pm - 3:15pm

The impact of internal gains on thermal stratification for public buildings

Nisrine Laghmich, Zaid Romani, Remon Lapisa, Abdeslam Draoui

3:15pm - 3:30pm

Manufacture of optimized PCM within thermal comfort range to improve building energy performance

Ji Hun Park, Seunghwan Wi, Jongki Lee, Beom Yeol Yun, Sungwoong Yang, Sumin Kim

3:30pm - 3:45pm

Analysing the effects of thermal comfort and indoor air quality in design studios and classrooms on student performance

Ali Ranjbar, Yasemin Afacan

3:45pm - 4:00pm

An experimental study of spray foam insulation products - evidence of 1,2-dichloropropane and 1,4-dioxane emissions

Dzhordzhio Naldzhiev, Dejan Mumovic, Matija Strlic

2:45pm - 3:00pm

Comfort-oriented control strategies for decentralized ventilation using co-simulation

Nicolas Carbonare, Thibault Pflug, Constanze Bongs, Andreas Wagner

3:00pm - 3:15pm

Analysis of the field tests efficiency of indoor environmental control and energy saving technology: The cases of Solar Decathlon China 2018

Haitian Zhao, Borong Lin, Yingxin Zhu, Zhe Wang, Jinghua Zhang, Hongli Sun

3:15pm - 3:30pm

Prediction of thermal sensation using low-cost infrared array sensors monitoring system

Yuxin Wu

3:30pm - 3:45pm

Considerations for Providing Healthy, Comfortable, Energy-Efficient Whole-House Mechanical Ventilation During Humid Weather in Near Zero Energy Homes

Charles Richard Withers Jr

3:45pm - 4:00pm

Improving the Energy Performance Certificate recommendations accuracy for residential building through simple measurements of key inputs

Alex Gonzalez-Caceres, Tor Arvid Vik

2:45pm - 3:00pm

Robust and resilient buildings: A framework for defining the protection against climate uncertainty

Amin Moazami, Salvatore Carlucci, Stig Geving

3:00pm - 3:15pm

Weather Data Analysis in Energy Simulation

Yu Ying Wang, Chun Yin Siu, Zaiyi Liao

3:15pm - 3:30pm

Study on building performance considering climate characteristics for university facility in Japan

Yuki Naito, Ryoichi Kuwahara

3:30pm - 3:45pm

Assessing the annual power reliability of a residential building in relation to its ventilation system type: The case study of the off-grid container house in Shanghai

Daniel Satola, Audun Bull Kristiansen, Jakub Wladyslaw Dziedzic, Arild Gustavsen

3:45pm - 4:00pm

Ventilated slabs: Energy consumption mitigation and thermal comfort augmentation

Murat Özdenefe, Soad Abokhamis Mousavi, Uğur Atikol

2:45pm - 3:00pm

A systematic methodology for energy modeling improvement of cross-ventilated buildings in dense urban areas

Mohammadreza Shirzadi, Parham Mirzaei Ahranjani, Mohammad Naghashzadegan

3:00pm - 3:15pm

Analysis of the heating energy demand of a generic shop with an air curtain through coupled CFD and building energy simulations

Claudio Alanis Ruiz, Twan van Hooff, Bert Blocken, GertJan van Heijst

3:15pm - 3:30pm

DanBERA: A Tool for Danish Buildings Energy Renovation Design and Assessment

Muhyiddine Jradi, Sandra Sommer Schmidt Andersen, Morten Hagenau

3:30pm - 3:45pm

An early-design stage assessment method based on constructibility for building performance evaluation

Francesca Contrada, Andrea Kindinis, Jean- François Caron, Christophe Gobin

3:45pm - 4:00pm

Green roof for Zero Energy Buildings: a pilot project

Francesco Asdrubali, Luca Evangelisti, Claudia Guattari

CONFERENCE **AGENDA**

4:00pm - 4:30pm — *Coffee break*

4:00pm - 6:30pm — **Poster Sessions**

4:30pm - 6:00pm

HVAC 7
Location: Room 2
Chair: **Ryozo Ooka**

4:30pm - 4:45pm

RELaTED, Decentralized & Renewable Ultra Low Temperature District Heating, Concept Conversion from traditional District Heating
Mikel Lumbreras, Roberto Garay, Victor Sanchez

4:45pm - 5:00pm

District heating thermal plant fed by biomass residues in a rural area of Central Italy
Mattia Manni, Alessandro Petrozzi, Andrea Nicolini, Franco Cotana

5:00pm - 5:15pm

Heat analysis for energy management in neighbourhoods: Case study of a large housing cooperative in Norway
Åse Lekang Sørensen, Karen Byskov Lindberg, Harald Taxt Walnum, Igor Sartori, Ulf Roar Aakenes, Inger Andresen

5:15pm - 5:30pm

New substation and booster systems for Ultra Low Temperature District Heating
Mikel Lumbreras, Roberto Garay, Victor Sanchez, Kasper Korsholm, Matteo Caramaschi

IAQ 9
Location: Room 3
Chair: **Boris Igor Palella**

4:30pm - 4:45pm

Thermal environment perceptions considering length of stay for cardiovascular inpatients in hospitals: a statistical approach
Badr Saad Alotaibi, Stephen Lo

4:45pm - 5:00pm

Understanding indoor environmental conditions and occupant's responses in houses of older people
Veronica Soebarto, Terence Williamson, Andrew Carre, Larissa Arakawa Martins

5:00pm - 5:15pm

179/5000 The strategies of natural ventilation for hospitals in Rio de Janeiro: a comparative study between hospitals in the city of Rio de Janeiro and the Brazilian standard of thermal performance
Kátia Fugazza, Mirna Gobbi, Mauro Santos

5:15pm - 5:30pm

Investigation into the adaption of PMV to evaluation of the medical staff in hospitals in Guangzhou
Zhaosong Fang, Xiangfei Ji, Yundan Liao

Ventilation 7
Location: Room 5
Chair: **Hiroshi Yoshino**

4:30pm - 4:45pm

The investigation of Indoor Air quality and Ventilation of an Airport Terminal Building in China
Hong Jiajie, Lin Borong

4:45pm - 5:00pm

A study of low-temperature zone in tunnel with large longitudinal ventilation
Jun Wang, Miao-cheng Weng, Fang Liu

5:00pm - 5:15pm

A smoke exhausting method through a baffle-coupled shaft during tunnel fires
Qiankun Hou, Miao-cheng Weng, Fang liu

5:15pm - 5:30pm

Influences of stack effect and longitudinal ventilation on the movement of buoyancy-driven contaminants in slopping tunnels
Ping Li, Tao Du, Dong Yang

ZEB 8
Location: Room 7
Chair: **Adolfo Palombo**

4:30pm - 4:45pm

Modelling of a Net-Zero Energy Condo in a Cold Climate Using an Interdisciplinary Design Framework
Sarah Ruth Nicholson, Rony Shohet, Alan Fung

4:45pm - 5:00pm

Techno-economic feasibility of sewage wastewater heat recovery (WWHR) based community energy network (CEN) in a cold climate-a case study of Ryerson university, Toronto, Canada
Usama Sohail, Conrad Kwiatek, Alan Fung, Darko Joksimovic

5:00pm - 5:15pm

Solar Strategies for Net-zero Energy Housing in Canadian North
Li Ma, Hua Ge, Asok Thirunavukarasu, Andreas Athienitis

5:15pm - 5:30pm

Using Smart Technologies to IdentifyOccupancy and Plug-in Appliance Interaction Patterns in an Office Environment
Zeynep Duygu Tekler, Raymond Low, Lucienne Blessing

ZEB 9
Location: Room 9
Chair: **Fabio Fatiguso**

4:30pm - 4:45pm

Roadmap Toward NZEB in Quito
Elizabeth Ordoñez, David Mora, Karl Gaudry

4:45pm - 5:00pm

A developed tool allowing the south-mediterranean cities to establish their sustainable energy plans
Sabine Younes Saad, Adel Mourtada, Marwan El Brouche, Mazen Ghandour

5:00pm - 5:15pm

Building Energy Demand Within a Climate Change Perspective
Pouriya Jafarpur, Umberto Berardi

5:15pm - 5:30pm

Development of a multi criteria analysis method to optimize the sustainable architectural design of residential buildings
Iris Reuter, Sigrid Reiter

CONFERENCE AGENDA

	5:30pm - 5:45pm **Pipe sizing based on domestic hot water consumption in Norwegian hotels, nursing homes and apartment buildings** Karolina Stråby, Harald Taxt Walnum, Åse Lekang Sørensen	5:30pm - 5:45pm **Improvement of Thermal Comfort in Naturally Ventilated Classroom by Phase Change Material Roof in Taiwan** Sheng-Fen Chang, Ruey-Lung Hwang, Kuo-Tsung Huang	5:30pm - 6:00pm **Clean Energy Technologies research at the Imperial College London UCL** Christos Markides	5:30pm - 5:45pm **Nearly Zero Energy - Construction Site Temporary Office Buildings** Ishan Kalra, Michael Boyle, Nilesh Deshpande	5:30pm - 5:45pm **Prediction of buildings' cooling energy demand: A comparison of simulation-based and prescriptive approaches** Mahmoud Alhayek, Ameer Wadi, Ulrich Pont, Ardeshir Mahdavi
	5:45pm - 6:00pm **Building To Vehicle To Building approach for the NZEB target at a micro-grid level: a comprehensive sensitivity and parametric post-optimality analysis** Giovanni Barone, Annamaria Buonomano, Cesare Forzano, Adolfo Palombo	5:45pm - 6:00pm **Daylighting provision and glare prevention in side-lit rooms** Dayan de Loyola Ramos Garcia, Fernando Oscar Ruttkay Pereira		5:45pm - 6:00pm **Re-designing a temporary pavilion into a NZEB Open Lab for a university campus** Graziano Salvalai, Marco Imperadori, Marta Maria Sesana, Marco Baccaro, Luca Del Favero, Andrea Tagliabue	5:45pm - 6:00pm **Impact of electrical vehicle (EV) penetration on the cost-optimal building integrated photovoltaics (BIPV) at a small residential district in Sweden** Marco Lovati, Xingxing Zhang
5:30pm - 6:30pm	IAQVEC Board Assembly *(By Invitation)*				
8:00pm - 10:00pm	*Gala Dinner*				

CONFERENCE **AGENDA**

Date: Saturday, 07/Sep/2019

8:00am - 8:30am — Registration

8:30am - 9:30am

Plenary 4: Dr. Xudong Yang
Location: **Aula Magna**
Chair: **Francesco Martellotta**

9:30am - 10:30am

Plenary 5: Dr. Mat Santamouris
Location: **Aula Magna**
Chair: **Francesco Fiorito**

10:30am - 11:15am — *Coffee break and Old Car Show*

11:15am - 1:30pm

Forum: Annex 68: Indoor Air Quality Design and Control in Low Energy Residential Buildings

Location: **Room 2**
Chair: **Carsten Rode**

Key findings of IEA EBC Annex 68 - Indoor Air Quality Design and Control in Low Energy Residential Buildings.

Chair: Carsten Rode, Technical University of Denmark (DTU) - Co-chair: Menghao Qin, DTU

Speakers:

Carsten Rode, Technical University of Denmark

Jensen Zhang, Syracuse University

Menghao Qin, Technical University of Denmark

Xudong Yang, Tsinghua University

Weihui Liang, Nanjing University

Forum: Annex 69: IEA EBC Annex 69

Location: **Room 3**
Chair: **Richard de Dear**

The planned deliverables from this Annex are:

Database with user interface including information of human thermal reaction together with their behavior and energy consumption;

Model and criteria for the application of adaptive thermal comfort in built environment;

Guidelines for low energy building design based on adaptive thermal comfort concept;

Guidelines for personal thermal comfort systems in low energy buildings.

HVAC 8 / ZEB 10

Location: **Room 5**
Chair: **Oronzio Manca**

11:15am - 11:30am

Cementitious plasters for façade finishing with phase change materials and thermochromic pigments

Shahrzad Soudian, Umberto Berardi

11:30am - 11:45am

A simulation study on the performance of double skin façade through experimental design methods and analysis of variance

Aleksandar Jankovic, Francesco Goia

11:45am - 12:00pm

A performance comparison between two novel technologies for building integration: a focus on perovskite-based cells and solid-state electrochromic glazing

Alessandro Cannavale, Francesco Martellotta, Ubaldo Ayr

IAQ 10

Location: **Room 7**
Chair: **Karel Kabele**

11:15am - 11:30am

VOC concentrations in healing environments: a protocol for monitoring activities in inpatient wards and its application on some case studies

Gaetano Settimo, Marco Gola, Stefano Capolongo

11:30am - 11:45am

Comparative inhalation exposure/toxicology analysis of e-cigarette vapors with different puff ing behaviors using PBPK-CSP-CFD approach

Kazuki Kuga, Kazuhide Ito

11:45am - 12:00pm

Performance of Surface Fluorinated P25-TiO2 on the Photocatalytic Degradation of Volatile Organic Compounds in Indoor Environment

Zahra Shayegan, Fariborz Haghighat, Chang-Seo Lee

IAQ 11

Location: **Room 9**
Chair: **Da Yan**

11:15am - 11:30am

Analysis of airtightness performance improvement technology for window of dilapidated dwellings in South Korea

Suin Lee, Gyeong-Seok Choi, Hyun-Jung Choi, Jae-Sik Kang

11:30am - 11:45am

Indoor air quality solutions for commercial buildings

Sean Menezes

11:45am - 12:00pm

Novel methodology for the diagnosis of the causes associated with mould growth in dwellings

Paula Lopez-Arce, Hector Altamirano-Medina, James Berry, Dimitrios Rovas, Fernando Sarce, Steve Hodgson

12:00pm - 12:15pm

Optimizing Indoor Environmental Quality in Hot Arid Climates

Dalia Wagdi, Khaled Tarabieh, Phillipa Grant

Ventilation 8

Location: **Room 11**
Chair: **Giovanni Semprini**

11:15am - 11:30am

Including EAHX (earth-to-air heat exchanger) in early-design phases considering local bioclimatic potential and specific technological requirements

Giacomo Chiesa

11:30am - 11:45am

Ventilation Performance in Single-zone Occupied Space Ancient Myanmar Multistage Roof Buildings

May Zune, Conrad Pantua, Lucelia Rodrigues, Mark Gillott

11:45am - 12:00am

Passive systems in traditional house in Middle East Areas: solutions and effects of natural ventilation

Kindah Mousli, Giovanni Semprini

12:00am - 12:15pm

Villa Aeolia (Costozza, Italy) cooling system detailed analysis: comfort from ancient palladian villas to modern-day structures

Margherita Ferrucci, Fabio Peron

CONFERENCE AGENDA

12:00pm - 12:15pm

Thermal insulating cementitious composite containing aerogel and phosphate cement

Mohammad Hajmohammadian Baghban

12:15pm - 12:30pm

Dynamic heat transfer analysis on hwangtoh with PCM/eco-material for improving thermal inertia

Seunghwan Wi, Sungwoong Yang, Jongki Lee, Beom Yeol Yun, Ji Hun Park, Sumin Kim

12:30pm - 12:45pm

A cost-effective building in the Mediterranean area: Passivhaus design and energy modelling

Piero Russo, Giuseppe Colaci De Vitis, Grazia Gentile

12:45pm - 1:00pm

Primary air treatment vs energy saving: comparison between different design solutions

Giuseppe Emmi, Angelo Zarrella, Michele De Carli, Marco Mariotti

1:00pm - 1:15pm

A new air handling unit system for residential buildings: experiment and simulation based analysis

Emanuele Lazzarini, Angelo Zarrella, Giuseppe Emmi, Enrico Biasin

1:15pm - 1:30pm

Improved Thermal Comfort of Light Weight Structure with Macro-Encapsulated PCM

Rok Stropnik, Eva Zavrl, Uroš Stritih

12:00pm - 12:15pm

A Simulation Study on Correlation between Indoor Volatile Organic Compounds and Carbon Dioxide Concentration in Beijing, China

Weihui Liang

12:15pm - 12:30pm

Impact of essential-oil-based cleaning products on indoor air quality: From liquid composition to test emission chamber

Shadia Carolina Angulo Milhem, Marie Verriele, Mélanie Nicolas, Frédéric Thevenet

12:30pm - 12:45pm

Residential Indoor Pollution by Nitrogen Dioxide

Aukse Miskinyte, Audrius Dedele

12:45pm - 1:00pm

Concentration levels and impact factors of benzene series in Chinese dwellings

Yihui Yin, Beibei Hou, Jingjing Pei, Junjie Liu

1:00pm - 1:15pm

Indoor environmental monitoring of residential buildings in Saudi Arabia, Makkah: a case study

Mosaab Alaboud, Mohamed Gadi

1:15pm - 1:30pm

Numerical prediction of surface radiation effect on thermal comfort and indoor air quality in a ventilated cavity heated from below

Lounes Koufi, Stéphane Ginestet, Zohir Younsi

12:15pm - 12:30pm

Sensitivity analysis of envelope design on the summer thermal comfort of naturally ventilated classrooms in Taiwan

Ying-Hsiang Chen, Ruey-Lung Hwang, Kuo-Tsang Huang

12:30pm - 12:45pm

Simulations on potential moisture-related issues in relation to mandated ventilation rates for NZEBs in China

Shengyi Tang, Wei Ye, Xing Su, Xu Zhang

12:45pm - 1:00pm

Higher risk of radon-induced lung cancer in rented accommodation?

Torben Valdbjørn Rasmussen

1:00pm - 1:15pm

Assessment of an experimental method for determining the three key parameters of VOC emission from solid materials

Florent Caron, Frédéric Thevenet, Marie Verriele, Romain Guichard, Laurence Robert

1:15pm - 1:30pm

Experimental setup and testing of an in-field system for real-time IEQ occupant feedback

Niels Lassen, Terje Josefsen

12:15pm - 12:30pm

Climate adaptability study on the roof buffer space of traditional Tujia folk dwellings

Xin Dong, Zhenjing Yang, Yanan Xu

12:30pm - 12:45pm

Technoeconomic assessment of solar combined heat and power systems based on hybrid PVT collectors in greenhouse applications

Kai Wang, Antonio Marco Pantaleo, Giacomo Scarascia Mugnozza, Christos N. Markides

12:45pm - 1:00pm

Thermal Analysis in Daytime Radiative Cooling

Jie Feng, Mattheos Santamouris, Kwok Wei Shah, Gianluca Ranzi

1:00pm - 1:15pm

Mitigation of rising urban temperatures starting from historic and modern street canyons towards zero energy settlement

Paola Lassandro, Silvia Di Turi, Sara Antonella Zaccaro

1:15pm - 1:30pm

HN_ZEB technologies applied for the construction of On Plein Air Tourist Villages and Standard Sustainable Production Villages

Roberto De Pascalis, Francesco Palmisano, Rocco Luciano Uva, Francesco Clori, Sergio Martano

CONFERENCE **AGENDA**

1:30pm - 2:30pm	*Lunch*
2:30pm - 3:15pm	**General Assembly** Location: **Aula Magna**
3:15pm - 4:00pm	**Awards and Closing Ceremony** Location: **Aula Magna**

POSTER SESSIONS I

	Contribution Title	Author(s)
1	Comparative analysis of thermal environment between raised-floor and row-based cooling in a campus data center	Jin, Chaoqiang; Bai, Xuelian; An, Yanan; Zhang, Xin
2	The impact of some factors (building materials, seasonality) on indoor radon content in Chelyabinsk region, Russia	Mashkova, Irina; Kostryukova, Anastasiya; Schelkanova, Elena; Slavnaya, Alina
3	Development and Performance Evaluation of Natural Building Materials with Pyrolyzed Agricultural By-Products for Carbon Reduction and Energy Saving	Yang, Sungwoong; Wi, Seunghwan; Lee, Jongki; Yun, Beom Yeol; Park, Ji Hun; Kim, Sumin
4	Simulation-based analysis of optimized PCM to improve building energy performance and indoor thermal environment	Park, Ji Hun; Wi, Seunghwan; Yun, Beom Yeol; Yang, Sungwoong; Lee, Jongki; Kim, Sumin
5	A Parametric Design Method for CFD-supported Wind-Driven Ventilation	Abbas, Günsu Merin; Gürsel Dino, İpek
6	Analysing the Challenges of designing Nearly Zero Energy Buildings and retrofitting of the existing housing stuck in Nigeria: A study of South-Eastern Nigeria.	Iwuagwu, Ben Ugochukwu; Onyegiri, Ikechukwu
7	Development human thermoregulation model for Korean young and older men	Choi, Heewon; An, Youngmin; Cho, Sungwon; Park, Junseok; Yun, Seoyeon; Kwak, Jiyoung; Chun, Chungyoon
8	Development of methods for sampling and quantifying emissions of isothiazolinones in indoor environments from building and consumer products	Ducup de Saint Paul, Léa; Nicolas, Mélanie; Quivet, Etienne
9	Energy consumption, thermal comfort and load match: study of a monitored nearly Zero Energy Building in Mediterranean climate	Erba, Silvia; Pagliano, Lorenzo; Charani Shandiz, Saeid; Pietrobon, Marco
10	Evaluation of Energy Conservation Measures for Deteriorated Single-Family House	An, Sang Min; Kim, Joo Han; Kim, Sung Wan; Lee, Kyung Hoi
11	Factor Controlling the Formaldehyde Emission Rate from Building Materials in Small, Airtight, Glass Desiccators	Kang, Yujin; Yoo, Sung-Jun; Ito, Kazuhide
12	Indoor Air Quality in Air-Conditioned Museum Gallery	Sulaiman, Raha; Kamaruzzaman, Syahrul Nizam; Yat Huang, Yau
13	Intervention field study in the Canadian arctic: Improving ventilation, indoor air quality, and the respiratory health in Nunavik dwellings and children	Aubin, Daniel; Ouazia, Boualem; Poulin, Patrick; Levesque, Benoit; Boulet, Louis-Phillipe; Duchaine, Caroline; Maltais, François; Brisson, Mario

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14	Investigating the impact of electrochromic glazing on energy performance in hot arid climate using parametric design	Lahmar, Imene; Zemmouri, Noureddine; Cannavale, Alessandro; Martellotta, Francesco
15	Optimization of Daylighting and Energy Performance in Hot - Arid Climate	Altemmamy, Mahmoud Zakria Shafik; Abd-Rabo, Lamiaa Mostafa Mostafa
16	Research Concerning the Amount of Energy Consumption of Heat Source Systems at Public Office Building	Sonoda, Yuya; Kuwahara, Ryoichi
17	Research on the Influence of Coal to Electric Heating on Regional Power Grid in Northern China	Ding, Xingli; Ma, Rongjiang; Shan, Ming; Wang, Xianlin; Rong, Xing; Yang, Xudong
18	Simulation analysis of Macro-Packed Phase Change Materials (MPPCM) to reduce building energy use	Yun, Beom Yeol; Yang, Sungwoong; Park, Ji Hun; Lee, Jongki; Wi, Seunghwan; Kim, Sumin
19	The Assessment of Natural Ventilation Performance for thermal comfort in Educational Space: A Case Study of Design Studio in the AAST-Alexandria	Sarhan, Alaa El Din; El Gelil, Rania Abd; Awad, Hana Ahmed Tarek
20	The challenges of designing a NRVU-BVU for energy efficiency and enhanced IAQ	Cross, Ana Cristina
21	Thermal Performance in Single-Zone Occupied Space Ancient Myanmar Multistage Roof Buildings	Zune, May; Rodrigues, Lucelia; Gillott, Mark
22	VOC concentrations in healing environments: a protocol for monitoring activities in inpatient wards and its application on some case studies	Settimo, Gaetano; Gola, Marco; Capolongo, Stefano
23	Cost-effective MEP solutions for a Passivhaus multi-family building in Mediterranean climate	Russo, Piero; Faganello, Stefano; Colaci De Vitis, Giuseppe
24	Performance Evaluation and Comparison between Rural New and Traditional House in Severe Cold Regions of China	Shao, Teng; Jin, Hong
25	The evaluation of air distribution considering different tuyere positions	Yang, Li
26	Passive Ventilative Cooling in Residential Buildings: A Review	Song, Ge; Ai, Zhengtao; Zhang, Guoqiang
27	A Field Study on the Indoor Air Quality of Wooden Welfare Facilities in Korea	Cho, Hyun Mi; Park, Ji Hun; Lee, Jongki; Wi, Seunghwan; Yang, Sungwoong; Yun, Beom Yeol; Kim, Sumin
28	Computer aided design of water-resistant adsorbent for formaldehyde abatement	Liu, Lumeng; Zhang, Dingchao; Liu, Junjie

POSTER SESSIONS II

	Contribution Title	Author(s)
1	The generation of building coincident weather data for load calculation and energy conservation	Fang, Zhengcheng; Chen, Youming
2	The emission rate of newly-regulated chemical substances from building materials	Kim, Hyun-tae; Tanabe, Shin-ichi; Koganei, Makoto
3	Influence of LCA procedure on the green building rating tools outcomes	Asdrubali, Francesco; Bisegna, Fabio; Evangelisti, Luca; Guattari, Claudia; Mattoni, Benedetta
4	Performance of mechanical filters used in general ventilation against nanoparticles	Brochot, Clothilde; Abdolghader, Pooya; Haghighat, Fariborz; Bahloul, Ali
5	Comparison of grey-box model and artificial neural network – Prediction of surface condensation in	Ju, Eun Ji; Lee, June Hae; Park, SungHo; Park, Cheol Soo; Yeo, Myoung Souk
6	Energy and environmental analysis of urban environment: methodology and application	Salamone, Francesco; Belussi, Lorenzo; Danza, Ludovico; Di Nunzio, Antonello; Ghellere, Matteo;
7	Assessment of the Ventilation in Long-Term Care Institutions in Computational Fluid Dynamics	Tu, Yi-Wen; Tseng, Chia-Ti; Chen, Jia-Kun; Tseng, Tzu-I
8	Active green wall ventilation system	Hung, Yi-Hsuan; Chen, Jia-Kun; Tseng, Chia-Ti; Tseng, Tzu-I
9	Design and testing of I-ZEB, a zero energy laboratory for the integrated evaluation of the performance of building components and HVAC systems	Danza, Ludovico; Belussi, Lorenzo; Ghellere, Matteo; Salamone, Francesco; Scrosati, Chiara; Scamoni, Fabio; Bellazzi, Alice; Devitofrancesco, Anna; Barozzi, Benedetta; Meroni, Italo; Maffè, Claudio; Depalma Michele
10	Effect of Gender on Thermal Comfort under Stratum Ventilation with Pulsating Air Supply	Li, Yunhao; Tian, Xue; Cheng, Yong
11	Effects of building parameters on occupant's window opening behaviour	An, Youngmin; Ko, Bomin; cho, Sungwon; Park, Junseok; Jeong, Jinhwa; Chae, Youngtae
12	Evaluation of Air Change Rates for Estimating Particle Dispersion on a Reduced Scale Model	Cetin, Yunus Emre; Avci, Mete; Aydin, Orhan
13	Field study on indoor air quality in a passive residential building in Chinese severe cold area	Wang, Zhaojun
14	Fusion of environmental monitoring components and gardening modules for manipulating indoor air quality	Chen, Jeng-Chung; Lin, Yi-Jiung; Yang, Zhi-Lun; Yu, Chien-Chung
15	Influence of building airtightness on the internal thermal comfort and air quality in the single family house	Kisilewicz, Tomasz; Nowak-Dzieszko, Katarzyna; Rojewska-Warchał, Małgorzata

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16	On the estimation of the radiant heating surface temperature and the heat transfer rate calculation: new transient simplified analytical model	Merabtine, Abdelatif; Kheiri, Abdelhamid; Mokraoui, Salim; Hawila, Abed El Waheed
17	Proposal of a method for predicting the airtightness performance in high-rise residential building using pressure difference	Park, Seung Hwan; Munkhbat, Undram; Yoon, Sung Min; Kang, Ki Nam; Song, Doo Sam
18	Sustainable Design for Zero Carbon Architecture	Altemmamy, Mahmoud Zakria Shafik; Abd-Rabo, Lamiaa Mostafa Mostafa
19	The Influence of urban microclimate vertical variations on the building performance of a high-rise office building at different floors	Li, Jing; Donn, Michael; Thomas, Geoff
20	Assessment of technical-financial analysis of a zero energy building for Brazilian hot and temperate tropical climate	Domingos, Renata Mansuelo Alves; Gabriel, Elaise; Guarda, Emeli Lalesca Aparecida da; Pereira, Fernando Oscar Ruttkay
21	Evaluation of thermal comfort and heat stress indices in different countries and regions of the world – A	Yasmeen, Sadia; Liu, Hong
22	Research on Design Method of Coupling Active Natural Lighting System for Prefabricated Buildings	Xu, Feng; Deng, Yuan; Li, Hongqiang
23	The Utilization Rate Of Potential Heat Accumulation Capabilities Using Latent Heat Of Phase-Change Materials	Nowak, Katarzyna; Zastawna-Rumin, Anna
24	A review of reinforcement learning methodologies on control systems for building energy	Han, Mengjie; Zhang, Xingxing; May, Ross; Xu, Liguo; Pan, Song; Wu, Jinshun
25	Improving the Energy Performance Certificate recommendations accuracy for residential building through simple measurements of key inputs.	Gonzalez Caceres, Alex
26	Measurement of airborne ultrafine particles in work and life environments: study design and preliminary trends in an Italian university site	Boccuni, Fabio; Ferrante, Riccardo; Tombolini, Francesca; Iavicoli, Sergio; Pelliccioni, Armando
27	A study on the evaluation of indoor air quality in small scale apartment house in Korea	Kim, Tae-Woo; Kim, Hyun-Tae; Hong, Won-Hwa
28	Analysis of mechanical ventilation systems in Chinese residential buildings	Zhao, Lei; Liu, Junjie

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Currency, Exchange, Credit card
The official currency in Italy is the Euro (€). You can change foreign currency in several banks and Currency Exchange Businesses. Bank cheques are not so popular and they are seldom accepted. Credit cards are very common in the urban areas. Shops and restaurants that normally accept credit cards display a list of these cards on their shop windows. It is advisable to carry some cash, since for small purchases shops do prefer to be paid cash. Bank are open: Mon-Fri, from 08:30 to 13:30 and from 14:30 to 16:30.

Electricy Supply
In Italy electricity is generally supplied at 220 volts and a frequency of 50 Hz. Plugs are normally with two or three pins. Plug adaptors or converters might be necessary for guests from United States, United Kingdom, Japan and others.

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Emergencies Numbers are free of charge:
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Shopping
The usual shopping hours in Bari are from 9 a.m. to 1 p.m and from 4 p.m. to 8 p.m. Large shopping centers are open from 9 a.m. to 9 p.m.

Smoking
Smoking is not allowed inside the Congress buildings, venues of social events and in all public places in the city. Smokers are kindly requested to smoke outdoors.

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There's free WIFI at the venue, please contact the Secretariat for the access keys.

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Ask the reception of your hotel or dial number:
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