COUNTING THE COST OF COMFORT IN A CHANGING WORLD

International Conference held 10th - 13th April 2014, at Cumberland Lodge, Windsor Great Park, UK

8th Windsor Conference 2014

ORGANIZING COMMITTEE
Fergus Nicol, Susan Roaf, Luisa Brotas and Michael Humphreys

SCIENTIFIC COMMITTEE
Michael Adebamowo (NG), Edward Arens (US), Philomena Bluyssen (NL), Atze Boerstra (NL), Gail Brager (US) Luisa Brotas (UK), Richard de Dear (AU), Dusan Fiala (DE), Andy Ford (UK), Rajat Gupta (UK), Jake Hacker (UK), George Havenith (UK), Michael A Humphreys (UK), Tri Harso Karyono (ID), Madhavi Indraganti (SA), Maria Kolokotroni (UK), Jarek Kurnitski (EE), Alison Kwok (US), Ashok Lall (IN), Roberto Lambert (BR), Hal Levin (US), Giancarlo Mangone (NL), Azadeh Montazami (UK), Fergus Nicol (UK), María Nikolaoupolou (UK), Bjarne W. Olesen (DK), Mark Olweny (UG), Ryozo Ooka (JP), Ken Parsons (UK), Jens Pfafferott (DE), Adrian Pitts (UK), Ifikhar Raja (PK), Hom Rijal (JP), Kosonen Risto (FI), Susan Roaf (UK), Darren Robinson (UK), Matheos Santamouris (GR), Olli Seppänen (FI), Fionn Stevenson (UK), Shin-ichi Tanabe (JP), Despoina Teli (UK), Paul Tuohy (UK), Peter Wouters (BE), Da Yan (CN), Runming Yao (UK)

COLLABORATORS
Kevin Bowe, Jonida Murataj

TIMETABLE

Thursday 10th April 2014

After Dinner Talk - Invited Chair: Fergus Nicol

Gail Brager
20:00 Evolving opportunities in providing thermal comfort

Friday 11th April 2014

SESSION 1: Affordable domestic comfort in the 21st Century
Invited Chairs: Maria Kolokotroni and Ryozo Ooka

09:00 - 11:00

Hom B. Rijal, Michael A. Humphreys and J. Fergus Nicol
09:00 Development of the adaptive model for thermal comfort in Japanese houses

Angela Simone, Marta Avantaggiato, Michele De Carli and Bjarne W. Olesen
09:15 Effect of passive cooling strategies on overheating in low energy residential buildings for Danish climate

Mikk Maivel, Jarek Kurnitski and Targo Kalamees
09:30 Summer Thermal Comfort in New and Old Apartment Buildings

Anna Mavrogianni, Jonathon Taylor, Chrysoula Thoua, Michael Davies and John Kolm-Murray
09:45 A coupled summer thermal comfort and indoor air quality model of urban high-rise housing

Haiyan Yan and Liu Yang
10:00 Indoor thermal conditions and thermal comfort in residential buildings during the winter in Lhasa, China

Elangovan Rajasekar, R. Soumya and Rajan Venkateswaran
10:15 Challenges in designing for comfort – Comfort and energy use characterization in residential apartments
11:30 - 13:00

SESSION 2: Controlling Comfort
Invited Chairs: Hom Rijal and Madhavi Indraganti

Alfio Ferdhay-Gonzalez
10:35 Characterization of Thermal Comfort in a Passively Cooled Building Located in a Hot-Arid Climate

Hikaru Imagawa and Hom B Rijal
10:40 Survey on the thermal comfort and occupant behaviour in the bedrooms of Japanese houses

Discussion
10:45

COFFEE BREAK
11:00

SESSION 3: Comfort in Offices and Educational buildings
Invited Chairs: Richard de Dear and Sue Roaf

Alkis Kotopouleas and Marianela Nikolopoulos
14:00 Understanding thermal comfort conditions in airport terminal buildings

Madhavi Indraganti, Ryozo Ooka, Hom B Rijal and Gail S Brager
14:15 Occupant behaviour and obstacles in operating the openings in offices in India

Richard de Dear, Jungsoo Kim, Christhina Candido and Max Deuble
14:30 Summertime Thermal Comfort in Australian School Classrooms

Simi Hoque and Ben Weil
14:45 Cold comfort: thermal satisfaction in academia

A. Hussin, E. Salleh, H.Y. Chan and S. Mat
15:00 Thermal Comfort during daily prayer times in an Air-Conditioned Mosque in Malaysia

Eefke van den Ouweland, Wim Zeiler, Yvonne de Kort, Gerarda Nierman, Gert Boxem and Wim Maassen
15:15 A holistic approach to comfort in offices
16:30 - 18:30
Flitcroft Room

WORKSHOP 1: Comfort, user behaviour and energy efficiency
Invited Chairs: Jens Pfafferott and Atze Boerstra

15:20 Cost effectiveness of thermal mitigation based on the long term thermal analysis of a large office building
A. Merlino, S. Viazzo, D. Freda, P. Capone, M. Del Gaudio, P. Lenzuni

15:25 Choosing a method of thermal comfort for mixed-mode office buildings located in hot-humid summer climate
Riccardo Forgiarini Rupp and Enedir Ghisi

15:30 Indoor thermal comfort survey in campus buildings (classrooms) in Beijing for a long time
Min Li, Bin Cao and Yingxin Zhu

15:35 Adaptive comfort relations and comfort temperature ranges from a field study in undergraduate laboratories
Asit Kumar Mishra and Maddali Ramgopal

15:40 Case study: thermal comfort evaluations in prayer halls in two continents.
Ashak Nathwani

15:45 Thermal comfort in primary schools: a field study in Chile
Maureen Trebilcock, Jaime Soto and Rodrigo Figueroa

Discussion
15:50

COFFEE BREAK
16:00

16:30 - 18:30
Flitcroft Room

WORKSHOP 2: Schools and young people
Invited Chairs: Despoina Teli and Azadeh Montazami

16:30 Schools and young people

Workshop description

16:30 Comfort, user behaviour and energy efficiency
Fionn Stevenson, Magda Baborska-Narozny

16:40 Designing resilient housing for co-evolutionary adaptivity
Anoop Honnekeri, Gail Brager, Shivraj Dhaka and Jyotirmay Mathur

17:00 Comfort and adaptation in mixed-mode buildings in a hot-dry climate
Discussion
17:20

16:30 - 18:30
Hodgson Room

WORKSHOP 3: Overheating in buildings
Invited Chair: Fergus Nicol

16:30 Overheating in buildings
Linda Gichuya and Koen Steemers

16:40 Indoor Overheating Risk and Climate Change. Modelling sensitivity of building design parameters for a free-running building

Discussion
17:25
WORKSHOP 4: Dynamic thermal environment: What is the mechanism? How to create, control and evaluate it?  
Invited Chair: Yingxin Zhu

16:30 - 18:30  
Sandby Room

WORKSHOP description
16:30 Dynamic thermal environment: What is the mechanism? How to create, control and evaluate it?

Li Huang, Yingxin Zhu, Edward Arens, Hui Zhang and Qin Ouyang

16:40 Applicability of elevated air movement for maintaining thermal comfort in warm environments

Ryozo Ooka, Madhavi Indraganti and Hom B Rijal

17:00 Comfort temperature and the adaptive use of environmental controls in offices in Japan

Alexandre Freire, José Luis Alexandre and Fergus Nicol

17:20 Adaptive comfort opportunities under mechanically conditioned environment

V. Fabi, V. Maggiora, SP. Corgnati and Rune Andersen


Discussion

17:30

POSTERS Session I  
18:30 - 19:00

DINNER
19:00

After Dinner Talks
Invited Chair: Michael Humphreys

20:30 - 21:30

Miles Allen
20:30 Climate change and the limits of comfort

Wouter van Marken Lichtenbelt
21:00 Turning up the heat – physiological implications of a changing thermal environment

Saturday 12th April 2014

SESSION 4: The physiology of thermal comfort
Invited Chairs: Lisje Schellen and Jacob Verhaart

09:00 - 11:00

Hannah Pallubinsky, Lisje Schellen and Wouter van Marken Lichtenbelt
09:00 Thermoregulatory behaviour in response to switching thermal environments – a pilot experiment prior to a mild warm acclimation study

Wouter van Marken Lichtenbelt, Lisje Schellen, Christel Jacquot and Boris Kingma
09:15 Energy efficient living - INTEWON Physiology and behaviour: the elastic thermal comfort zone and the need for categorization

Lisje Schellen, Hannah Pallubinsky and Wouter van Marken Lichtenbelt
09:30 The relation between the thermoneutral zone and thermal comfort zone - Determination of the thermoneutral zone and the influence on thermal behaviour

Madhavi Indraganti, Juyoun Lee, Hui Zhang and Edward A. Arens
09:45 Versatile Indian sari: Clothing insulation with different drapes of typical sari ensembles
SESSION 5: Lighting, acoustics and building physics 11:30 - 13:00
Invited Chairs: Luisa Brotas and Adrian Pitts

10:00 Derek Vissers, Wim Zeiler, Gert Boxem, Michal Vezely and Jacob Verhaart
Neuron fire rates simulations of cold thermal sensations validated by measurements

10:15 Minjung Kim, Yoorim Choi, Jieun Han, Youngjoo Son and Chungyoon Chun
An experiment on attention ability based on Electroencephalogram (EEG) in different PMV Conditions

10:20 Yoorim Choi, Yongmin Kim and Chungyoon Chun
The occupants’ stress on each PMV condition – chamber study using brain wave

10:25 M. Veselý and W. Zeiler
Tracking hand movement in an infrared image

10:30 Masanari Ukai, Yuta Ichikawa and Tatsuo Nobe
Field Study of Thermal Environment Acceptability Using Ostracon Voting Device

Discussion

10:35 COFFEE BREAK
11:00

SESSION 6: Outdoor comfort and Urban Heat Island effect 14:00 - 16:00
Invited Chairs: Roberto Lamberts and Chungyoon Chun

14:00 Peter Bröde, Eduardo L. Krüger and Dusan Fiala
Residual analysis of UTCI predictions on outdoor thermal sensation survey data

14:15 Shinji Yoshida, Taiki Sato and Masayuki Oguro
Study on Evaluation of Effects of Inhomogeneous Radiant Environment for Pedestrian in Summer Season using a Coupled Numerical Simulation based on CFD Analysis
14:30 - 16:30  Daylight and Comfort  
Invited Chairs: Luisa Brotas and Jan Wienold  
Flitcroft Room

**WORKSHOP 5:** Daylight and Comfort  
16:30 - 18:30
Invited Chairs: Luisa Brotas and Jan Wienold  
Flitcroft Room

**Workshop description**
16:30  Daylight and Comfort

- **Zoltán Nagy, Mike Hazas, Mario Frei, Dino Rossi and Arno Schlüeter**  
16:40  Illuminating Adaptive Comfort: Dynamic Lighting for the Active Occupant

- **V. Fabi, V. Camissasi, F. Causone, SP. Corgnati and Rune Andersen**  
17:00  Light switch behaviour: occupant behaviour stochastic models in office buildings

- **Isabelle Leysens and Ulrike Passe**  
17:20  Towards a Dynamic Daylight Understanding

**Discussion**
17:40

**WORKSHOP 6:** Using statistics correctly to analyse comfort and behaviours  
16:30 - 18:30
Invited Chairs: Jane & Rex Galbraith with Michael Humphreys  
Sandby Room

**Workshop description**
16:30  Using statistics correctly to analyse comfort and behaviours

- **Abdulrahman Alshaikh, Susan Roaf and Robert Smith**  
16:40  What is the relationship between humidity and comfort at high temperatures? In search of new ways of looking at the issue

**Discussion**
17:00

**WORKSHOP 7:** Instrumentation and climate chambers  
16:30 - 17:30
Invited Chairs: Andreas Wagner and Marcel Schweiker  
Greening Room

**Workshop description**
16:30  Instrumentation and climate chambers

- **Marcel Schweiker, Sabine Brasche, Maren Hawighorst, Wolfgang Bischof and Andreas Wagner**  
16:40  Presenting LOBSTER, an innovative climate chamber, and the analysis of the effect of a ceiling fan on the thermal sensation and performance under summer conditions in an office-like setting

**Discussion**
17:00
WORKSHOP 8: Negotiated comfort 17:30 - 18:30  
Invited Chair: Gary Raw  
Greening Room

- **Workshop description**
- **17:30** Negotiated comfort
- **Rajat Gupta and Mariam Kapsali**
  - **17:40** Evaluating the effect of occupant behaviour and expectations on actual energy use and environmental conditions in ‘sustainable’ social housing in South East England

**Discussion**

DINNER 19:00

WORKSHOP 9: Standards: developments of EN15251 17:30 - 18:30  
Invited Chair: Bjarne Olesen  
Hodgson Room

- **Workshop description**
- **17:30** Standard prEN15251 and new standard ISO-DIS 17772
- **A.C. Boerstra, J. van Hoof and A.M. van Weele**
  - **17:40** A New Hybrid Thermal Comfort Guideline for the Netherlands (ISSO 74: 2014)
- **Renata De Vecchi, Márcio J. Sorgato, Miguel Pacheco, Christhina Cândido and Roberto Lamberts**
  - **17:55** Application of the adaptive model proposed by ASHRAE 55 in the Brazilian climate context: raising some issues

**Discussion**

POSTERS Session II 18:30 - 19:00

- **DINNER**
- 19:00

**SESSION 7: Thermal comfort, productivity and occupant behaviour** 09:00 - 11:00  
Invited Chair: Olli Seppänen and Noriko Umemiya

- **Joe L. Leyten, Arjen K. Raue and Stanley R. Kurvers**
  - **09:00** Robust Design for high workers’ performance and low absenteeism – An alternative approach
- **Hom B. Rijal, Toshiaki Omori, Michael A. Humphreys and J. Fergus Nicol**
  - **09:15** A field-comparison of thermal comfort with floor heating systems and air conditioning systems in Japanese homes
- **J. Verhaar, M. Veselý, S. Kik and W. Zeiler**
  - **09:30** Personal heating: energy use and effectiveness
- **Noriko Umemiya and Tomohiro Taniguchi**
  - **09:45** Cross-Correlations among daily variations of Thermal Control Use, Thermal Sensation, Clothing Insulation and Outdoor Temperature during Cooling Season in Japan
- **Eusébio Z. E. Conceição, Maria Manuela J. R. Lúcio and Hazim B. Awbi**
  - **10:00** Improvement of comfort conditions using confluent jets ventilation located near the floor level in an experimental chamber
- **Nelly Adriana Martinez**
  - **10:15** Solving the Black Box: Inverse Approach for Ideal Building Dynamic Behaviour Using Multi-Objective Optimization with Energyplus
- **Adrian Pitts**
  - **10:30** Prevalence and Evaluation of Bioclimatic Design Techniques used to achieve Low Energy Comfort in Architectural Design Proposals
11:30 - 13:00
SESSION 8: The interaction between people and buildings
Invited Chairs: Pierre Lombard and Michael Adebamowo

- Ryozo Ooka, Rongling Li, Togo Yoshidomi and Bjarne W. Olesen
  10:35 Field evaluation of the performance of a radiant heating/cooling ceiling panel system

- Stephanie Gauthier and David Shipworth
  10:40 The gap between what is said and what is done: a method for distinguishing reported and observed responses to cold thermal discomfort

- Shen Wei, Xiaoxin Wang, Rory Jones and Pieter de Wilde
  10:45 Using building performance simulation to save residential space heating energy: A pilot
  Discussion

- Ryozo Ooka, Rongling Li, Togo Yoshidomi and Bjarne W. Olesen
  10:50 COFFEE BREAK

SESSION 8: The interaction between people and buildings

- Christopher J. Whitman and Neil Turnbull

- Jared Langevin, Jin Wen, and Patrick L. Gurian

- T. Adekunle and M. Nikolopoulou
  12:00 Post-occupancy and indoor monitoring surveys to investigate the potential of summertime overheating in UK prefabricated timber houses

- Daniel J. Ryan
  12:15 Triumph in the Tropics? Surveying the thermal environment of the Queensland house 1905-1926

- Lyrian Daniel, Terence Williamson, Veronica Soebarto and Dong Chen
  12:30 A Study of Thermal Mavericks in Australia

- Akinwolemiwa Feyikemi and Gwilliam Julie
  12:45 The Effect of Climate and Culture on Housing among Low Income Groups in Lagos, Nigeria
  Discussion

- Lyrian Daniel, Terence Williamson, Veronica Soebarto and Dong Chen
  12:50 LUNCH

CLOSING SESSION
Invited Chair: Fergus Nicol

- Harimi Djamila, Chi Chu Ming and Sivakumar Kumaresan
  Exploring the Dynamic Aspect of Natural Air flow on Occupants Thermal Perception and Comfort

- Patricia R C Drach and Henrique Drach
  Mobile Meteorological Survey Station: Applying Measurement Tools on a bike to create the Meteobike

- Alaa Sarhan, Bakr Gomaa, Mohamed Elcharkawi
  Daylight quality in healthcare architecture - Developing a framework

- Tri Harso Karyono, Sani Heryanto and Ida Faridah
  Thermal comfort study of university students in Jakarta, Indonesia

- Tokie Laotan-Brown
  African Green Design Solutions as Vernacular Bioclimatic Architecture

PAPERS appearing in the proceedings but authors unable to present

- Guoying Hou
  Cardiff University
- Trevor Keeling
  University of Reading
- Maria Rita Kessler
  Oxford Brookes University
- Maria Kolokotroni
  Brunel University
- Alkis Kotopoules
  University of Kent
- Juan J. Lafuente
  London Metropolitan University
- Matthew Lipson
  Energy Technologies Institute
- Anna Mavrogianni
  University College London
- Azadeh Montazani
  Coventry University
- Jonida Murataj
  London Metropolitan University
- Fergus Nicol
  London Metropolitan University
- Marialena Nikolopoulou
  University of Kent
- Adrian Pitts
  University of Huddersfield
- Gary Raw
  UCL Energy Institute
- Susan Roaf
  Heriot-Watt University
- Darren Robinson
  The University of Nottingham
- Sally Salome
  Shahzad University of Edinburgh
- Seyed Sameni
  Coventry University
- Robbie Smith
  Heriot-Watt University
- Fionn Stevenson
  University of Sheffield
- Despoina Teli
  University of Southampton
- Gloria Vargas Palma
  University of Sheffield
- Shen Wei
  Plymouth University
Haiping Liu and Dexuan Song
Effects of vegetation on thermal comfort in Shanghai high-density residential developments

Weiwei Liu, Pawel Wargocki, Jing Xiong
Occupant time period of thermal adaption to change of outdoor air temperature in naturally ventilated buildings

Theodora Neroutsou
Lifecycle Costing of Low Energy Housing Refurbishment: A case study of a 7 year retrofit in Chester Road, London

Astrid Roetzel
Considerations for occupant behaviour modelling in early design stages

Masanori Shukuya
Exergetic Review on Thermal Performance of Window Systems

Mansoureh Tahbaz
Outdoor thermal condition and people's exposure time - A case study of cold climate

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