



SBE16 Sydney: International High-Performance Built Environments Conference

- CONFERENCE PROGRAM -

17th - 18th November, 2016

Australian National Maritime Museum - 2 Murray St, Sydney, NSW, 2000



Gold Sponsor



UrbanGrowth NSW leads the transformation of surplus or underutilised government-owned land to create vibrant and connected urban spaces, close to public transport. As a state-owned corporation, we collaborate with government, industry and community to facilitate complex projects at different stages – from planning to place making, to deliver better outcomes for the city and its people. Our work enables much needed new housing choices, community facilities, jobs in growing centres and facilitates a globally competitive and resilient state.

Thursday, 17th November

08.30 **Registration**
Tasman Light Gallery

08.45 - 09.00 **Welcome**
Lighthouse Gallery

- Dr Lan Ding and A/Professor Francesco Fiorito - Co-Chairs of SBE16 Sydney

09.00 - 09.15 **Opening Address** *Chair: Professor Helen Lochhead*
Lighthouse Gallery

- Professor Lucy Turnbull AO - Chief of the Greater Sydney Commission and Adjunct Professor in UNSW Built Environment

09.15 - 10.45 **Plenary Session 1** *Chair: Dr Lan Ding and A/Professor Francesco Fiorito*
Lighthouse Gallery

- Professor Helen Lochhead, Dean of UNSW Faculty of Built Environment
Resilience by Design: Can an Innovative Process Deliver More?
- Scientia Professor Deo Prasad AO, CEO of CRC for Low Carbon Living
Lowering the Carbon Footprint of Buildings and Cities
- Nils Larsson, Representative of the SBE Series Partners, CIB, iSBE, UNEP-SBCI, FIDIC and Global ABC
The COP Series of Meetings, the Global Alliance for Building and Construction and Related Activities

10.45 - 11.15 **Morning Coffee Break - Terrace Room**

11.15 -
13.00

**Performance Assessment in Built Environments,
Session 1**

Lighthouse Gallery

Chair: Lester Partridge (LEHR)
Vice-chair (rapporteur): Emanuele Naboni (Royal Danish Academy of Fine Arts)

- **Michael Ambrose** - Air tightness of new Australian residential buildings (31864)
- **Sumin Kim** - Green features, symbolic values and rental premium: systematic review and meta-analysis (32933)
- **Lester Partridge** - The latest demonstrated technical innovations in Sydney CBD tall building: Case study (33151)
- **Enas Alkhateeb** - Potential of upgrading federal buildings in the United Arab Emirates to reduce energy demand (33444)
- **Ayokunle Olubunmi Olanipekun** - Motivation and owner commitment for improving the delivery performance of green building projects: A research framework (33452)
- **Zubair Syed** - Performance of earthquake-resistant RCC frame structures under blast explosions (33548)
- **Huibo Qian** - Effect of insulation ground on anti-condensation in rural residence (33596)
- **Mohamed Khallaf** - Performance-based design of tall building envelopes using competing wind load and wind flow criteria (33624)
- **Emanuele Naboni** - Thermal comfort-CFD maps for architectural interior design (33856)

Design Innovation and Collaboration, Session 1

The Theatre

Chair: Alistair Sproul (UNSW)
Vice-chair (rapporteur): Anir Kumar Upadhyay (UNSW)

- **Mohammad Mehdi Azizi** - The effects of urban block forms on the patterns of wind and natural ventilation (32053)
- **Xiaolong Zhao** - Research on Optimization and Biological Characteristics of Harbin Trees Based on Thermal Comfort in Summer (32086)
- **Janet Victoria Stia** - Bioclimatic design approach in Dayak traditional longhouse (33260)
- **Cristian Lavin** - Optimization of an external perforated screen for improved daylighting and thermal performance of an office space (33476)
- **Samin Marzban** - An evolutionary approach to single-sided ventilated façade design (33635)
- **Mitra Panahian** - Assessing potential for reduction in carbon emissions in a multi-unit of residential development in Sydney (33639)
- **Alemu Tiruneh Alemu** - Airflow and temperature modelling of sustainable buildings at the design stage can prevent unintended consequences of passive features (33647)
- **Mahsan Sadeghi** - Optimization of wind tower cooling performance; a wind tunnel study of indoor air movement and thermal comfort (33653)
- **Cong Wang** - Multi-objective optimization and parametric analysis of energy system designs for the Albano university campus in Stockholm (33684)
- **Saeed Banihashemia** - Modular coordination-based generative algorithm to optimize construction waste (40312)

Smart Built Environments, Session 1

Waterside Studio

Chair: Philip Oldfield (UNSW)
Vice-chair (rapporteur): Sara Shirowzhan (UNSW)

- **Carlos Bartesaghi Koc** - A methodological framework to assess the thermal performance of green infrastructure through airborne remote sensing (32027)
- **Mat Santamouris** - The concept of smart and NZEB buildings and the integrated design approach (32043)
- **Jonathan Fox** - The effect of building facades on outdoor microclimate – dependence model development using terrestrial thermography and multivariate analysis (32787)
- **Mat Santamouris** - Aerial survey and in-situ measurements of materials and vegetation in the urban fabric (33527)
- **Venugopalan S. G. Raghavan** - Determination of optimal parameters for wind driven rain CFD simulation for building design in the tropics (33687)
- **Mahboobeh Karima (TBC)** - Interactive building environments: A case study university building in UAE (33958)
- **Hawra Askari (TBC)** - Smart vs. sustainable: A case study government building in Dubai, UAE (34011)
- **Md Asrul Nasid Masrom** - A preliminary exploration of the barriers of sustainable refurbishment for commercial building projects in Malaysia (37971)
- **Balaji Mohan** - Development of chemical reaction kinetics of VOC ozonation (38181)
- **Yingyi Zhang** - Using parametric modelling in form-based code (FBC) design for high-dense cities (32584)

13.00 -
14.00

Lunch - Terrace Room

Poster Exhibition - Tasman Light Gallery

14.00 -
15.00

Plenary Session 2

Lighthouse Gallery

- Mr Man-Kit Leung, Director of Hong Kong Green Building Council
Design for Energy Efficient High-Rise Residential Buildings in Warm-Humid Climate
- Professor Mat Santamouris, Anita Lawrence Chair in High Performance Architecture, UNSW
Cooling of Buildings - Past Present Future

Chair: Professor Bruce Judd

15.00 -
15.30

Afternoon Tea Break - Terrace Room

15.30 -
17.30

Performance Assessment in Built Environments, Session 2 - Integrated Sustainability Assessment

Lighthouse Gallery

Chair: Thomas Wiedmann (UNSW)

Vice-chair (rapporteur): Robert Crawford (University of Melbourne)

- **Monique Fouche** - Towards an integrated approach for evaluating both the life cycle environmental and financial performance of a building: A review (33236)
- **Toktam Bashirzadeh Tabrizi** - The impact of different insulation options on the life cycle energy demands of a hypothetical residential building (33326)
- **Jianqiang Yang** - Integrated sustainability assessment and renewal of old industrial areas: A case study on Changzhou (33573)
- **Parisa Pakzad** - Developing key sustainability indicators for assessing green infrastructure performance (33583)
- **Robert H Crawford** - Towards an automated approach for compiling hybrid life cycle inventories (33611)
- **Maryam Khoshbakht** - Cost-benefit prediction of green buildings: SWOT analysis of research methods and recent applications (33621)
- **Soo Huey Teh** - Replacement scenarios for construction materials based on economy-wide hybrid LCA (33630)
- **Julie R Jupp** - 4D BIM for environmental planning and management (33648)
- **Fatima Afzal** - An investigation of corporate approaches to sustainability in the construction industry (33910)
- **Man Yu** - The carbon footprint of Australia's construction sector (34621)

Sustainability Policy and Governance

The Theatre

Chair: Kevin Yee (NSW Department of Planning & Environment)

Vice-chair (rapporteur): Edgar Liu (UNSW)

- **Wei Xiao** - Fully exploring traditional Chinese culture and promoting organic development of green city (32203)
- **Edgar Liu** - Carbon reduction programs and lower income households in Australian cities (32733)
- **Sumin Kim** - Tenants' decision to or not to lease green & non-green buildings: A conceptual framework (32853)
- **Melissa James** - Retrofit or behaviour change? Which has the biggest impact on energy consumption in low income households? (32943)
- **Larissa Strömberg** - Verified climate declarations for evaluation of contractors' design (33327)
- **Abbas Elmualim** - CSR and sustainability in FM: Evolving practices and integrating index (33415)
- **Kai Chen Goh** - Barriers and drivers of Malaysian BIPV application: Perspective of developers (33457)
- **Pao-Hsiung Chiu** - CFD methodology development for Singapore green mark building application (33636)
- **Shaila Divakarla** - Supply Chain Risk to Reward: Responsible Procurement and the Role of Ecolabels (33826)
- **Wiktorija Glad** - Everyday governance of domestic energy systems (33892)
- **AbdulLateef Olanrewaju** - Analysis of Homeowners' Behaviours in Housing Maintenance (37206)

Industry, Government and University Collaboration - Education for Sustainable Built Environments

Waterside Studio

Chair: Mark Smith (Transport for NSW)

Vice-chair (rapporteur): Jules Moloney (Deakin University)

- **Jun Ma** - Mapping for the future: Business intelligence tool to map regional housing stock (31905)
- **Tayyab Ahmad** - The effects of high-rise residential construction on sustainability of housing systems (32582)
- **Mark C Smith** - Industry, government & academia - A relationship paradigm fit for the future of transport infrastructure assets (33279)
- **Cielo Roldan** - Greening rail infrastructure for carbon benefits (33280)
- **Mike Burbridge** - If living labs are the answer - what's the question? A review of the literature (33460)
- **Usha Iyer-Raniga** - Challenges in aligning the architecture profession in Indonesia for climate change and sustainability (33592)
- **Jules Moloney** - Serious games for integral sustainable design: level 1 (33662)
- **Parinee Srisuwan** - Field investigation on indoor thermal environment of a high-rise condominium in hot-humid climate of Bangkok, Thailand (33675)
- **Margaret M Gollagher, Jenny Campbell** - Collaboration achieves effective waste management design at Brookfield Place Perth, Western Australia. (33817)
- **Tomi Winfree** - Learning for low carbon living: The potential of mobile learning applications for built environment trades and professionals in Australia (37191)

18.30 -
19.00

Dinner Canapé

19.00 -
22.00

Conference Dinner

Novotel Sydney on Darling Harbour
100 Murray St, Pyrmont NSW 2009

08.30 - Plenary Session 3
09.30

Chair: Professor Alan Peters

Lighthouse Gallery

- Professor Peter Newton, Swinburne University, Fellow of the Academy of Social Sciences in Australia
Innovation for a Sustainable Low Carbon Built Environment Transition
- Professor Dennis Else, Executive Director of Multiplex
Carbon Value Engineering - Making VE a Noble Pursuit!

09.30 - Performance Assessment in Built Environments, Session 3
11.00

Lighthouse Gallery

Chair: Paul Bannister (*Innovation & Sustainability at Energy Action*)
Vice-chair (rapporteur): Sara Wilkinson (UTS)

- **Tamaraukuro Amasuomo** - Development of a Building Performance Assessment and Design Tool for Residential Buildings in Nigeria. (32048)
- **Sara Wilkinson** - Evaluating the thermal performance of retrofitted lightweight green roofs and walls in Sydney and Rio de Janeiro. (32176)
- **Pattaranan Takkanon** - UHI and Thermal Performance of Office Buildings in Bangkok (33576)
- **Yen-Yi Li** - The Study on the Evaluation of Thermal Insulation Efficiency with Typical Plant Species of Roof Greenery in Kaohsiung (32606)
- **Paul Bannister** - Load resilience in high performance buildings (33622)
- **David M Whaley** - Cost benefit analysis of simulated thermal energy improvements made to existing older South Australian houses (33659)
- **Haiqiang Liu** - Evaluation on the energy consumption and thermal performance in different residential building types during mid-season in hot summer and cold-winter zone in China (33685)
- **Alistair B Sproul** - Admittance/Fourier series revisited: understanding periodic heat flows (33739)

Design Innovation and Collaboration, Session 2

The Theatre

Chair: Michael Ambrose (CSIRO)
Vice-chair (rapporteur): Melissa James (CSIRO)

- **Nigel Howard** - Environmental Assessment & Rating – Have we Lost the Plot? (31451)
- **Aaron Davis** - Co-creating urban environments to engage citizens in a low-carbon future (33307)
- **William Craft** - Development of a regenerative design model for building retrofits (33551)
- **Jiandong Ran** - Effect of building roof insulation measures on indoor cooling and energy saving in rural areas in areasin Chongqing (33589)
- **Malay Dave** - Performance and perception in prefab housing: An exploratory industry survey on sustainability and affordability (33618)
- **Ke Xiong** - Energy-saving renovation of Bayu traditional residence—Taking Anju Town of Chongqing as the example (33668)
- **Shabnam Yazdani Mehr** - Adding more by using less: Adaptive reuse of woolstores (38940)
- **Armando Coppola** - Nanomaterials and smart nanodevices for modular dry constructions: the project "Easy House" (41489)

Built Environment Resilience, Session 1

Waterside Studio

Chair: Chris Derksema (City of Sydney)
Vice-chair (rapporteur): Samantha J Hall (UNSW)

- **Chris Derksema** (Invited talk)
- **Adriana Sanchez** - Are some forms of resilience more sustainable than others? (31315)
- **S.M. Karim** - Co-benefits of low carbon policies in the built environment: An investigation into the adoption of co-benefits by Australian local government (31999)
- **Cristopher Kim** - The effect of social capital on co-production: towards community-oriented development in post-disaster recovery (33623)
- **Samantha J Hall** - Evidence based practice for the built environment: Can systematic reviews close the research - practice gap? (33672)
- **Keiko Hirota** - A Study of Urban Green Park for Low-carbon Built Environmental Design and Satoyama Ecosystem Management (33711)

Smart Built Environments, Session 2

Yots Café

Chair: Julie Jupp (UTS)
Vice-chair (rapporteur): Thomas M. Lawrence (University of Georgia)

- **Mat Santamouris** - Development of net zero energy settlements using advanced energy technologies (31900)
- **Thomas M. Lawrence** - Data flow requirements for integrating smart buildings and a smart grid through model predictive control (32051)
- **AHM Mehabub Anwar** - Examining the effects of transport policy on modal shift from private car to public bus (32111)
- **Sarbeswar Praharaj** - Innovative civic engagement and digital urban infrastructure: Lessons from 100 Smart Cities Mission in India (32758)
- **Nobuyuki Sunaga** - Solar town Fuchu- plan and performance (32916)
- **Elias Naber** - From the building level energy performance assessment to the national level: How are uncertainties handled in building stock models (33554)
- **Sara Shirowzhan** - Building classification from Lidar data for spatio-temporal assessment of 3D urban developments (33878)
- **Shinji Yamamura** - Assessment of urban energy performance through integration of BIM and GIS for smart city planning (33886)

11.00 -
11.30

Morning Coffee Break - Terrace Room

11.30 -
13.00

Performance Assessment in Built Environments, Session 4

Lighthouse Gallery

Chair: Brian Ashe (Australian Government Department of Industry, Innovation & Science)
Vice-chair (rapporteur): Dennis Lee (NSW Office of Environment & Heritage)

- **Caroline Residovic** - The new NABERS indoor environment tool - The next frontier for Australian buildings (32208)
- **Dennis Lee** - Life cycle cost comparison of high NABERS performing commercial buildings (32340)
- **Brian Ashe** - Enabling innovation in building sustainability: Australia's national construction code (32931)
- **Anir Kumar Upadhyay** - Post-occupancy energy consumption of BASIX affected dwellings in the Sydney metropolitan area (33281)
- **Marini Samaratunga** - Modelling and analysis of post occupancy behaviour in residential buildings to inform BASIX sustainability assessments in NSW (33422)
- **Krishna Munsami** - The role of post occupation evaluation in achieving high performance buildings through diagnostics (33590)
- **Jin Woo** - A post-occupancy evaluation of a modular multi-residential development in Melbourne, Australia (33651)
- **Federico Tartarini** - Indoor environment and perceptions of occupants in nursing homes: a field study (33663)

Design Innovation and Collaboration, Session 3

The Theatre

Chair: Steve Burroughs (SBE Australian Board Member)
Vice-chair (rapporteur): Daniel Sang-Hoon Lee (Royal Danish Academy of Fine Arts)

- **Timothy Greenaway** - Assessment of potential energy and greenhouse gas savings in the commercial building sector by using solar energy for air-conditioning purposes (32334)
- **Eunike Kristi Julistiono** - Structural pattern's granularity variation to optimize a vertical structure (32812)
- **Yu Liu** - A preliminary study on the climate adaptive design of green rural houses in west China (32928)
- **Daniel Sang-Hoon Lee** - Exploring the relationship between structurally defined geometrical parameters of reinforced concrete beams and the thermal comfort on indoor environment (33145)
- **Sepani Senaratne** - Recycled concrete in structural applications for sustainable construction practices in Australia (33221)
- **Emanuele Naboni** - The use of facade mockups in in LCA based architectural design (33859)
- **Manish Kewalramani** - Engineered cementitious composites for modern civil engineering structures in hot arid coastal climatic conditions (38865)

Built Environment Resilience, Session 2

Waterside Studio

Chair: Paul Osmond (UNSW)
Vice-chair (rapporteur): Indrika Rajapaksha (University of Moratuwa)

- **Mat Santamouris** - Thermal comfort conditions at the platforms of the Athens Metro (31962)
- **Paul Osmond** - A suitable thermal stress index for the elderly in summer tropical climates (32239)
- **Ehsan Sharifi** - Heat resilience in public space and its applications in healthy and low carbon cities (33423)
- **Ehsan Sharifi** - Spatial and activity preferences during heat stress conditions in Adelaide: towards increased adaptation capacity of the built environment (33432)
- **Porntip Ruengtam** - Factor analysis of built environment design and management of residential communities for enhancing the wellbeing of elderly people (33495)
- **Indrika Rajapaksha** - Effect of spatial ambience on thermal adaptation in tropics: Case of free running shared spaces in coastal hotels of Sri Lanka (33743)
- **Rubing Han** - Study passive evaporative cooling technique on the water-retaining roof brick (33848)
- **Sayanthan Ramakrishnan** - A comparative study on the effectiveness of passive and free cooling application methods of phase change materials for energy efficient retrofitting in residential buildings (33914)

High Performance Materials and Emerging Technologies, Session 1

Yots Café

Chair: Gabriele Masera (Polytechnic University of Milan)
Vice-chair (rapporteur): Ingrid Paoletti (Polytechnic University of Milan)

- **Sara Wilkinson** - Exploring the feasibility of algae building technology in NSW (32077)
- **John Dadzie** - Relationship between sustainable technology and building age: evidence from Australia (32155)
- **Gabriele Masera** - Development of a super-insulating, aerogel-based textile wallpaper for the indoor energy retrofit of existing residential buildings (33344)
- **Ingrid Paoletti** - Mass customization with additive manufacturing: New perspectives for multi performative building component in architecture (33430)
- **Gabriele Masera** - Prefabrication as large-scale efficient strategy for the energy retrofit of the housing stock: an Italian case study (33632)
- **Sayanthan Mr Ramakrishnan** - Thermal energy storage enhancement of lightweight cement mortars with the application of phase change materials (33755)
- **Eleftheria Touloupaki** - Energy performance optimization as a generative design tool for nearly zero energy buildings (35480)
- **Jitka Hroudova** - The possibilities of modification of crop-based insulation materials applicable in civil engineering in low-energy and passive houses (35836)

13.00 -
14.00

Lunch - Terrace Room
Poster Exhibition - Tasman Light Gallery

<p>14.00 - 15.30</p> <p>Performance Assessment in Built Environments, Session 5</p> <p>Lighthouse Gallery</p> <p><i>Chair: Brett Pollard (HASSELL)</i> <i>Vice-chair (rapporteur): Marina Neophytou (University of Cyprus)</i></p> <ul style="list-style-type: none"> • Wei Xiao - Green Darning City, Taking the tenth China (Wuhan) international garden EXPO Design as examples (32200) • Claudio Aurelio Diaz - Influence of rainfall on the thermal and energy performance of a low rise building in diverse locations of the hot humid tropics (33566) • Jane Loveday - A technique for quantifying the reduction of solar radiation due to cloud and tree cover (33570) • Margaret Kam - Towards zero carbon in a hot and humid subtropical climate (33726) • Yupeng Wang - Simulation study of urban residential development and urban climate change in Xi'an, China (33912) • Marina Neophytou - "How can a multi-scale analysis guide smart urban energy demand management? An example from London City Westminster Borough" (34297) • Marina Neophytou - The pollutant removal capacity of an urban street canyon and its link to the breathability and exchange velocity (34298) 	<p>Design Innovation and Collaboration, Session 4</p> <p>The Theatre</p> <p><i>Chair: Jim Plume (UNSW)</i> <i>Vice-chair (rapporteur): David Marchant (Woods Bagot)</i></p> <ul style="list-style-type: none"> • David Marchant - Including stakeholder intent in precinct information models (32557) • Tayyab Ahmad - BIM-based iterative tool for sustainable building design: a conceptual framework (32598) • W.K. Chow (TBC) - An expert system for firefighting guidelines in supertall buildings (32600) • Grit Ngowtanasuwan - Casual Model of BIM Adoption in Thai Architectural and Engineering Design Industry (33494) • James Redwood - The proliferation of ICT and digital technologies systems and their influence on the dynamic capabilities of construction firms (33456) • Giuseppina Uva - Modelling framework for sustainable co-management of multipurpose exhibition systems: the "Fiera del Levante" case (33916) • Jim Plume - Proposal for an open data model schema for precinct-scale information management (37977) 	<p>Built Environment Resilience, Session 3</p> <p>Waterside Studio</p> <p><i>Chair: Fabio Fatiguso (Polytechnic University of Bari)</i> <i>Vice-chair (rapporteur): Mark Dewsbury (University of Tasmania)</i></p> <ul style="list-style-type: none"> • Mat Santamouris - Transformation through renovation: An energy efficient retrofit of an apartment building in Athens (31985) • Siti Akhtar Mahayuddi - Assessment of building typology and construction method of traditional longhouse (33346) • Fabio Fatiguso - Resilience of historic built environments: inherent qualities and potential strategies (33496) • Steve Burroughs - Development of a tool for assessing commercial building resilience (33677) • Jason E Bretherton - Christchurch's high performance rebuild (33688) • Gabriele Masera - Identification of technological and installation-related parameters for a multi-criteria approach to building retrofit (33689) • Mark Dewsbury - Temperate climates, warmer houses and built fabric challenges (33872) 	<p>High Performance Materials and Emerging Technologies, Session 2</p> <p>Yots Café</p> <p><i>Chair: Gianluca Ranzi (University of Sydney)</i> <i>Vice-chair (rapporteur): Samad Sepasgozar (UNSW)</i></p> <ul style="list-style-type: none"> • Yunpeng Wu - Effect of thermal conductivity of lightweight cement composite on heat transfer through panels exposed to a sun simulator (33419) • Rudy Djamaluddin - Relationship model of the moment capacity of GFRP sheet strengthened RC beams to the duration of sea water exposure (33540) • Nagaraj HB - Compressed Stabilized Earth Blocks Using Iron Mine Spoil Waste - An Explorative Study (33578) • Jacques Remy Minane - Upgraded mineral sand fraction from municipal solid waste incineration (MSWI) bottom ash: an alternative solution for the substitution of natural aggregates in concrete applications (33693) • Khalegh Barati - Optimal driving pattern of on-road construction equipment for emissions reduction (33722) • Karel Dvořák - The improvement of the pozzolanic properties of recycled glass during the production of blended Portland cements (35834) • Samad Sepasgozar - A scanner technology acceptance model for construction projects (36616)
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15.30 - 16.30

Closing Ceremony and Best Paper Awards - Lighthouse Gallery

16.30 - 17.00

Drinks and Afternoon Tea - Terrace Room