

# **Fourth International Conference on Countermeasures to Urban Heat Island 2016**

Procedia Engineering Volume 169

Singapore  
30 May - 1 June 2016

**Editors:**

**Nyuk Hien Wong  
Steve Kardinal Jusuf**

ISBN: 978-1-5108-3500-9

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© by Elsevier B.V.  
All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact Elsevier B.V.  
at the address below.

Elsevier B.V.  
Radarweg 29  
Amsterdam 1043 NX  
The Netherlands

Phone: +31 20 485 3911  
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>PREFACE</b> .....	1
<i>Wong Nyuk Hien, Steve Kardinal Jusuf</i>	
<b>EFFECTS OF BUILT DENSITY AND URBAN MORPHOLOGY ON URBAN MICROCLIMATE - CALIBRATION OF THE MODEL ENVI-MET V4 FOR THE SUBTROPICAL SAO PAULO, BRAZIL</b> .....	2
<i>Carolina S. Gusson, Denise H. S. Duarte</i>	
<b>RESEARCH ON URBAN HEAT-ISLAND EFFECT</b> .....	11
<i>Li Yang, Feng Qian, De-Xuan Song, Ke-Jia Zheng</i>	
<b>INVESTIGATION ON ENERGY CONSUMPTION IN RURAL RESIDENTIAL BUILDINGS DURING HEATING SEASON IN SEVERE COLD AREAS IN NORTHEAST OF CHINA</b> .....	19
<i>Meng Zhen, Cheng Sun, Qi Dong</i>	
<b>CONCEPT, DESIGN AND ENERGY PERFORMANCE OF A NET ZERO-ENERGY BUILDING IN MEDITERRANEAN CLIMATE</b> .....	26
<i>Fabrizio Ascione, Nicola Bianco, Filippo De Rossi, Rosa Francesca De Masi, Giuseppe Peter Vanoli</i>	
<b>ON DESIGN OF LOW-OPERATION-COST ICE ARENAS WITH ENERGY SAVING APPROACHES</b> .....	38
<i>Zhiping Wei, Deming Liu</i>	
<b>THE STUDY OF THE EFFECTS OF BUILDING ARRANGEMENT ON MICROCLIMATE AND ENERGY DEMAND OF CBD IN NANJING, CHINA</b> .....	44
<i>Ji-Yu Deng, Nyuk Hien Wong, Xin Zheng</i>	
<b>SPATIAL-TEMPORAL ANALYSIS OF THE URBAN HEAT ISLAND OF A SUBTROPICAL CITY BY USING MOBILE MEASUREMENT</b> .....	55
<i>Lin Liu, Jing Liu, Yaoyu Lin</i>	
<b>THE URBAN SECTORIZATION OF LÚCIO COSTA'S MODERNISM AND THE EMERGENCY OF HEAT ISLANDS IN THE CAPITAL OF BRAZIL</b> .....	64
<i>Caio Frederico E Silva, Isabela Ferrari, Júlia Markiewicz</i>	
<b>URBAN HEAT ISLAND AND URBAN PLANNING IN BEIRUT</b> .....	72
<i>Noushig Kaloustian, Hassân Bitar, Youssef Diab</i>	
<b>INTEGRATION OF THERMAL COMFORT INFORMATION WITH SPATIAL MODELLING IN ERZURUM CITY CENTER</b> .....	80
<i>Sevgi Yilmaz, Ahmet Koç, Emral Mutlu, Nalan Demircioglu Yildiz</i>	
<b>URBAN MICRO-CLIMATE RESEARCH IN HIGH DENSITY CITIES: CASE STUDY IN NANJING</b> .....	88
<i>Jingjin Li, Jianguo Wang, Nyuk Hien Wong</i>	
<b>INTELLIGENT CONTROL SYSTEM INTEGRATION AND OPTIMIZATION FOR ZERO ENERGY BUILDINGS TO MITIGATE URBAN HEAT ISLAND</b> .....	100
<i>Zheng Zheng, Lixiongwan, Nyuk Hienwong</i>	
<b>STUDY ON THE CLIMATE ADAPTABILITY OF ARCHITECTURAL INTERFACE OPENING IN SUZHOU'S REGIONAL RESIDENCES</b> .....	108
<i>Tianyi Min, Tong Zhang</i>	
<b>A NEW PERFORMANCE INDICATOR TO ASSESS BUILDING AND DISTRICT COOLING STRATEGIES</b> .....	117
<i>Adrien Gros, Emmanuel Bozonnet, Christian Inard, Marjorie Musy</i>	
<b>THE ANALYSIS OF REACTIVE FACTORS BETWEEN ARCHITECTURAL ENVELOP CONDITION AND URBAN MICROCLIMATE</b> .....	125
<i>Dexuan Song, Shanshan Han</i>	
<b>STUDY ON FACADE OPENINGS DESIGN METHOD RESPONDING TO URBAN VENTILATION ISSUE IN HIGH DENSITY CITIES</b> .....	133
<i>Dan Zhu</i>	
<b>IMPACT OF URBAN MORPHOLOGY PARAMETERS ON MICROCLIMATE</b> .....	142
<i>Ruilhan Wei, Dexuan Song, Nyuk Hien Wong, Miguel Martin</i>	
<b>SUSTAINABLE ADAPTATION CLIMATE OF TRADITIONAL BUILDINGS TECHNOLOGIES IN THE HOT DRY REGIONS</b> .....	150
<i>Akram Ahmed Noman Alabsi, De Xuan Song, Wayne Hunter Garfield</i>	
<b>INDOOR THERMAL COMFORT ASSESSMENT OF INDUSTRIAL BUILDINGS IN SINGAPORE</b> .....	158
<i>N. H. Wong, E. Tan, O. Gabriela, S. K. Jusuf</i>	

<b>AN URBAN FORM EXPERIMENT ON URBAN HEAT ISLAND EFFECT IN HIGH DENSITY AREA.....</b>	166
<i>Youpei Hu, Marcus White, Wowo Ding</i>	
<b>RESEARCH ON CHARACTERISTIC ANALYSIS OF URBAN HEAT ISLAND IN MULTI-SCALES AND URBAN PLANNING STRATEGIES.....</b>	175
<i>Yishan Xu, Dian Zhou, Zhe Li</i>	
<b>A GREEN INFRASTRUCTURE TYPOLOGY MATRIX TO SUPPORT URBAN MICROCLIMATE STUDIES.....</b>	183
<i>Carlos Bartesaghi Koc, Paul Osmond, Alan Peters</i>	
<b>EXPERIMENTAL STUDY ON THE INFLUENCE OF URBAN WATER BODY ON THERMAL ENVIRONMENT AT OUTDOOR SCALE MODEL.....</b>	191
<i>Nedyomukti Imam Syafii, Masayuki Ichinose, Nyuk Hien Wong, Eiko Kumakura, Steve Kardinal Jusuf, Kohei Chigusa</i>	
<b>QUANTITATIVE ANALYSIS OF FACTORS CONTRIBUTING TO URBAN HEAT ISLAND EFFECT IN CITIES OF LATIN-AMERICAN PACIFIC COAST.....</b>	199
<i>Massimo Palme, Andrea Lobato, Claudio Carrasco</i>	
<b>THERMAL COMFORT CONDITIONS IN OUTDOOR URBAN SPACES: HOT DRY CLIMATE - GHARDAIA- ALGERIA.....</b>	207
<i>Islam Boukhelkhal, Pr. Fatiha Bourbia</i>	
<b>LOCAL CLIMATIC ZONING AND URBAN HEAT ISLAND IN BEIRUT.....</b>	216
<i>Noushig Kaloustian, Benjamin Bechtel</i>	
<b>EFFECT OF URBANIZATION ON THE URBAN HEAT ISLAND IN FUKUOKA-KITAKYUSHU METROPOLITAN AREA, JAPAN.....</b>	224
<i>Yoichi Kawamoto</i>	
<b>SCALE STUDY OF TRADITIONAL SHOPHOUSE STREET IN SOUTH OF CHINA BASED ON OUTDOOR THERMAL COMFORT.....</b>	232
<i>Shi Yin, Yiqiang Xiao</i>	
<b>DISCUSSION ON THE APPLICABILITY OF URBAN MORPHOLOGY INDEX SYSTEM FOR BLOCK NATURAL VENTILATION RESEARCH.....</b>	240
<i>Yuelang Gan, Hong Chen</i>	
<b>RESEARCH ON THE PLANNING METHODS OF MITIGATING SUMMER URBAN HEAT ISLAND EFFECTS AMONG BASIN CITIES—A CASE STUDY AT XI'AN, CHINA.....</b>	248
<i>Duo Xu, Dian Zhou</i>	
<b>COMPUTATIONAL STUDY ON THE INFLUENCE OF DIFFERENT OPENING POSITION ON WIND-INDUCED NATURAL VENTILATION IN URBAN BUILDING OF CUBICAL ARRAY.....</b>	256
<i>N. F. M. Kasim, S. A. Zaki, M. S. M. Ali, N. Ikegaya, A. A. Razak</i>	
<b>COUPLED NATURAL VENTILATION MODELING FOR CONTEXTUAL PARAMETRIC DESIGN DECISION SUPPORT.....</b>	264
<i>Chao Ding, Khee Poh Lam, Nyuk Hien Wong</i>	
<b>MANAGING THE SCALABILITY OF VISUAL EXPLORATION USING GAME ENGINES TO ANALYSE UHI SCENARIOS.....</b>	272
<i>Bernhard Klein</i>	
<b>COMPUTER SIMULATION OF THREE MESOCLIMATIC URBAN THE FEDERAL DISTRICT OF BRAZIL.....</b>	280
<i>Caio F. E Silva, Dante A. Uwai, Paulo A. Ribeiro, Isabella F. C. De Oliveira</i>	
<b>A NUMERICAL ANALYSIS OF WIND FLOW WITHIN AND ABOVE IDEALISED MODIFIED TERRACED HOUSE CANYON IN MALAYSIA.....</b>	289
<i>Mohamad Nor Hafidz Arif Razali, Sheikh Ahmad Zaki, Mohamed Sukri Mat Ali, Norio Arai</i>	
<b>IMPACT OF THREE-DIMENSIONAL GREENING OF BUILDINGS IN COLD REGIONS IN CHINA ON URBAN COOLING EFFECT.....</b>	297
<i>Yan-Qiu Cui, Hai-Chao Zheng</i>	
<b>ANALYZING THE IMPACT OF DRIVING BEHAVIOR AT TRAFFIC LIGHTS ON URBAN HEAT.....</b>	303
<i>Michael Wagner, Vaisagh Viswanathan</i>	
<b>URBAN GEOMETRY AND ENVIRONMENTAL URBAN POLICY DEVELOPMENT.....</b>	308
<i>Yupeng Wang, Hashem Akbari, Bo Chen</i>	
<b>ASSESSMENT OF HEATWAVE IMPACTS.....</b>	316
<i>Gertrud Hatvani-Kovacs, Martin Belusko, John Pockett, John Boland</i>	
<b>URBANIZATION AND THE USE OF CLIMATE KNOWLEDGE IN ERZURUM, TURKEY.....</b>	324
<i>Dogan Dursun, Merve Yavas</i>	

<b>CLIMATE-ADAPTIVE URBAN OPEN SPACE DESIGN STRATEGY IN WORKPLACE FOR COMFORT AND HEALTH-CASE IN HONG KONG AND SINGAPORE.....</b>	<b>332</b>
<i>Fei Xue, Stephen Siu Yu Lau</i>	
<b>STUDY ON THE APPLICATION OF VENTILATION CORRIDOR PLANNING IN URBAN NEW AREA --A CASE STUDY OF XIXIAN NEW AREA.....</b>	<b>340</b>
<i>Na Su, Dian Zhou, Xiaotao Jiang</i>	
<b>COOL AND GREEN ROOFS FOR STORAGE BUILDINGS IN VARIOUS CLIMATES.....</b>	<b>350</b>
<i>Maria Kolokotroni, Christopher Wines, Roaa M. A. Babiker, Bruno H. Da Silva</i>	
<b>MORPHOLOGY PARAMETERS QUANTITATIVE RESEARCH OF MULTI-STOREY OFFICE BUILDING DESIGN IN HARBIN, CHINA .....</b>	<b>359</b>
<i>Cheng Sun, Ran Zhang, Meng Zhen</i>	
<b>STUDY ON THE GREEN DESIGN STRATEGIES OF “NEO-VERNACULAR ARCHITECTURE” .....</b>	<b>367</b>
<i>Ying Wang, Xiaofeng Li, Yuelang Gan</i>	
<b>ENERGY PERFORMANCE OF COOL-COLORS AND ROOFING COATINGS IN REDUCING THE FREE SOLAR GAINS DURING THE HEATING SEASON: RESULTS OF AN IN-FIELD INVESTIGATION.....</b>	<b>375</b>
<i>Fabrizio Ascione, Nicola Bianco, Rosa Francesca De Masi, Mattheos Santamouris, Giuseppe Peter Vanoli</i>	
<b>NUMERICAL ANALYSIS OF THE EFFECTS OF WINDOWS WITH HEAT RAY RETRO-REFLECTIVE FILM ON THE OUTDOOR THERMAL ENVIRONMENT WITHIN A TWO-DIMENSIONAL SQUARE CAVITY-TYPE STREET CANYON .....</b>	<b>384</b>
<i>Shinji Yoshida, Saori Yumino, Taiki Uchida, Akashi Mochida</i>	
<b>LIFE CYCLE ANALYSIS OF COOL ROOF IN TROPICAL AREAS.....</b>	<b>392</b>
<i>Zhijun Zhang, Shanshan Tong, Haibo Yu</i>	
<b>DEVELOPMENT OF A SOLAR-REFLECTIVE CERAMIC TILE READY FOR INDUSTRIALIZATION.....</b>	<b>400</b>
<i>Chiara Ferrari, Alberto Muscio, Cristina Siligardi</i>	
<b>CLIMATE-SENSITIVE PAVEMENT MODELLING FOR PEDESTRIAN WAYS .....</b>	<b>408</b>
<i>Hasan Yilmaz, Sevgi Yilmaz, Merve Yavas, Emral Mutlu, Ahmet Koç</i>	
<b>FORM FINDING OF PV ROOF TOP USING PARAMETRIC STUDY .....</b>	<b>416</b>
<i>Religiana Hendarti, Firza Utama Sjarifudin</i>	
<b>STUDY ON THE OUTDOOR THERMAL COMFORT THRESHOLD OF LINGNAN GARDEN IN SUMMER.....</b>	<b>422</b>
<i>Sihan Xue, Yiqiang Xiao</i>	
<b>Author Index</b>	