出國報告（出國類別：考察）

# 出席 2010 年製造與設計科學前沿國際會議 會議報告

服務機關：國立政治大學地政學系
姓名職稱：孫振義　助理教授
派赴國家：中國
出國期間：2010/12/10-12/14
報告日期：2011/01/10

# 國立政治大學發展國際一流大學及頂尖研究中心計畫

# 出國成果報告書（格式）

| | | | |
|---|---|---|---|
| 計畫編號[1] | | 執行單位[2] | |
| 出國人員 | 孫振義 | 出國日期 | 99 年 12 月 10 日至 99 年 12 月 14 日，共 5 日 |
| 出國地點[3] | 中國 / 2010 年製造與設計科學前沿國際會議 | 出國經費[4] | 15,000 |

本次受補助參加「控制工程與信息科學研究協會」舉辦之之「2010 年製造與設計科學前沿國際會議」，並於會中發表「台北市屋頂綠化對於周圍氣溫之熱影響」論文。本次會議共有包括台灣數十一個與會國家，現場發表共計發表了 101 餘篇論文，針對於研討會製造與設計科學主題進行廣泛性的討論。

臺灣關於屋頂綠化的研究尚屬萌芽階段，透過國際會議的參與，可以大幅提升此領域的研究深度與國際能見度，並同時可以結交國際友人，增進未來國際合作之機會。此外，本次研討會論文已經收錄於 EI 索引的國際期刊「*Applied Mechanics and Materials*」中，對於提升本校學術能見度，有相當程度的助益。

一、目的

本次受補助參加之「2010 年製造與設計科學前沿國際會議」係由「控制工程與信息科學研究協會」舉辦之製造與設計科學學術研究盛事，今年會議吸引超過 10 個國家學者參加，本次會議共有 1537 篇論文投稿，最終接受論文為 820 篇，就國際研討會而言退稿率相當高。

本人出席此國際會議的目的在於國際交流與提升本校的國際能見度，因此於會中發表「台北市屋頂綠化對於周圍氣溫之熱影響」論文，於發表中和眾多與會出席專家學者交流意見，包括來自馬來西亞的 Mohd Nizam Ab Rahman 博士、德國的 Vahed Najmeh 女士、及來自巴基斯坦的 Asghar 博士有深入性的討論，並且獲得了需多寶貴的建議，結交數位不同國家之專家學者，對於未來推動國際交流上有諾大的助益。此外，本次研討會論文已經收錄於 EI 索引的國際期刊「*Applied Mechanics and Materials*」中，對於提升本校學術能見度，有相當程度的助益。

[1] 單位出國案如有 1 案以上，計畫編號請以頂大計畫辦公室核給之單位計畫編號 + 「-XX（單位自編 2 位出國案序號）」型式爲之。如僅有 1 案，則以頂大計畫單位編號爲之即可。

[2] 執行單位係指頂大計畫單位編號對應之單位。

[3] 出國地點請寫前往之國家之大學、機關組織或會議名稱。

[4] 出國經費指的是實際核銷金額，單位以元計。

二、過程

本次會議共有包括台灣數十一個與會國家，現場發表共計發表了 101 餘篇論文，針對於研討會製造與設計科學主題進行廣泛性的討論。研討會中，各國專家學者針對各項製造範疇進行探討與解析，三位 Keynote Speaker 也針對自己的專長發表了「Direct Manufacturing of Metal Parts by Selective Laser Melting and Applications」、「Signed Extensional L-Measure Based on Signed Monotonicity」、「Development of 2D and 3D Digital image correlation method for Detecting static deformation and structural dynamic response」三場演說。

我國之都市綠化研究經多年辛勤迄今成果豐碩，本此參與國際會議交流後，與會各國學者對於我國此番研究成果多表認同，尤其是與其他各國相關研究之學者的交流意見，令本人對於這次研討會交流機會深感機會難得，這也顯現出國內學者積極參與國際會議的重要性。


圖一 本人(左一)在研討會會場與其他與會學者合影

圖二 本人於會議中發表演講實況照片(一)


圖三 本人於會議中發表演講實況照片(二)

圖四 研討會中參訪重慶大學國家重點研究中心

三、心得與建議

1. 在此行旅費拮据的窘境之下，特別要感謝「行政院國家科學委員會」提供本次出席國際會議之交通費與註冊費之補助，此舉不僅提昇國內參與國際研究議題的視野，也間接成為推廣國內優秀研究論文與國際間交流之動力。身為一位學術研究者，不但要平日積極投入研究外，更要時常與國際遠見保持互動，隨時吸收國際經驗並適時提供研究成果，具體為國際間「地球環境改善」盡一份責任與義務。
2. 台灣不斷地都市化與高溫化的情況下，導致都市環境的惡化現象日愈嚴重，顯現出「都市綠化環境」相關課題為現今我國當務之急的研究方向。我國專家學者積極參與相關研究並至國際會議進行學術交流，不但可提升「都市綠化環境」相關研究水準，更可以透過國際經驗交流加快研究目標的達成。
3. 建議未來參與國際會議的學者，可以積極與國際上相關研究領域之學者交流，目前許多大型研究課題均需要跨國的人力、財力支持，國際研討會不失為尋求跨國合作的最佳契機。
4. 本次研討會會中有許多台灣學者前往參與，希冀下屆會議中會有更多的台灣學者可以共襄盛舉，具體提昇我國在此「製造與設計科學」領域的國際能見度。

四、攜回資料名稱及內容

「2010 International Conference on Frontiers of Manufacturing and Design Science」大會手冊(附件一)

採行之建議事項：

擴大並增加獎助出國發表論文，並針對論文被納入 EI 索引之申請者提高獎助金額。

出國人簽名：孫振義　　日期：2011/01/10

連絡人：孫振義　　分機：51545

# Frontiers of Manufacturing and Design Science

**Selected, peer reviewed papers from the 2010 International Conference on Frontiers of Manufacturing and Design Science (ICFMD2010)**

Chongqing, China, December 11-12, 2010

**Edited by**

Ran Chen

Dongye Sun

**Chongqing University of Technology**

**Chongqing University**

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|  | Chongqing University of Technology |
|  | American Scientific Publishers |
|  | Inderscience Enterprises Limited |
|  | Academy Publisher |

# Preface

2010 International Conference on Frontiers of Manufacturing and Design Science (ICFMD2010) will be held in Chongqing, China during December 11-12, 2010. The aim is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Manufacturing Technology and Design.

ICFMD 2010 will be the most comprehensive Conference focused on the Frontiers of Manufacturing and Design Science. The conference will promote the development of design and manufacturing science, strengthening the international academic cooperation and communications, and exchanging research ideas.

In this conference, we had received more than 1800 submission from email and electronic submission system, which were reviewed by international experts. About 820 papers have been selected for presentation. We believe the proceedings will provide the readers a broad overview of the latest advances in the field of manufacturing and design science.

We would like to thank the conference chairs, organization staff, and the members of International Technological Committees for their hard work. Thanks are also given to Trans Tech Publications.

We look forward to seeing all of you next year at the ICFMD2011.

December, 2010

Ran Chen

Chongqing University of Technology, China

Conference Chairman

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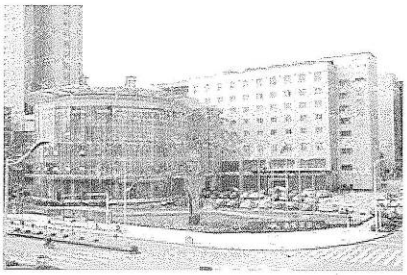
# Conference Location

## YIAN HOTEL

http://www.cqyian.com.cn/

Hotel address: NO.188, Huangshan Street, Beibu New District, ChongQing

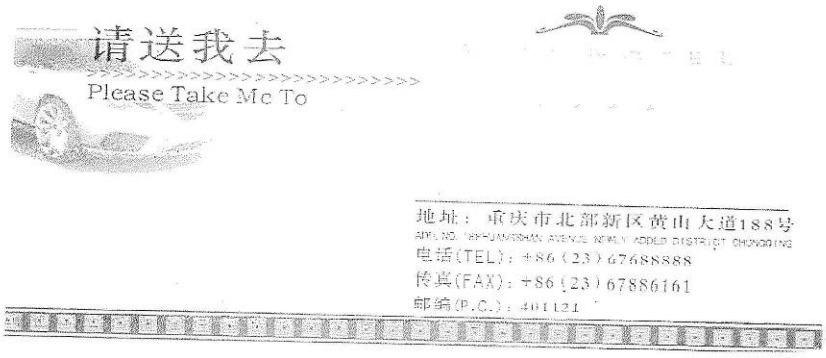



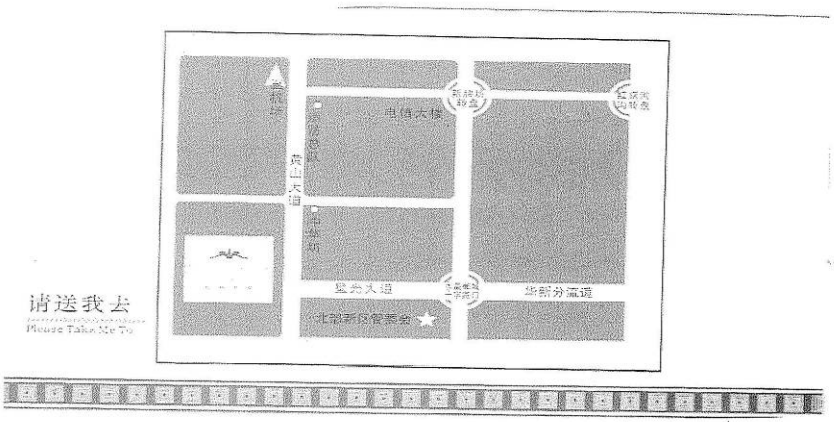
## How to reach YiAn Hotel ChongQing

**One way : By TAX：19km, 30minutes ride**

For non-Chinese Attendees,you can tell the driver:

"Please take me to Yian Hotel Chongqing (重庆逸安酒店)"






You can show it to the taxi drivers and they will take you to the hotel.

## An other way: From Railway Station

If you get off From Chonqging North Station, By TAX:6km, 10 min ride.
If you get off from Chongqing Caiyuanba Station,By TAX:11 km, 20 min ride.

# Introduction of Control Engineering and Information Science Research Association (CEIS)

The **Control Engineering and Information Science Research Association (CEIS)** is a non-profit organization devoted to the improvement of control engineering and information science. **CEIS** also provides a forum for engineers and scientists in academia, university and industry to present their latest research findings in any aspects of control engineering and information science. These goals are accomplished through various activities, conferences, and publications. Established in 2009, **CEIS** organizes multidisciplinary conferences for academics and professionals, mainly in the fields of science, engineering, and education. **CEIS** holds conferences and courses in both industrialized and developing nations.

All papers in **CEIS** conference proceedings will be published by the well known press, such as IEEE, Trans Tech Publications, Academic Press, Springer, ASME, World Scientific Press, American Scientific Publishers, Inderscience Enterprises Limited, Atlantis Press and SPIE, and will be submitted to the major indexing (EI, ISTP, SCI) services for indexing.

Welcome the universities, Institutes and Scholars to contact us about the collaboration on the sponsorship of the conferences.

控制工程与信息科学研究协会\国际前沿科技协会致力于国际学术交流，2011 年会议合作计划已经全面启动，欢迎各高校、科研院所及知名学者与我们共同举办 SCI/EI/ISTP 检索的高级别学术会议，推进国际学术交流。愿意合作会议高校和个人请联系

**Chongqing Branch**
**Dr Chen hkceis@gmail.com; +86 13668073270; +86 023-60609355**

●2010 International Conference on Frontiers of Manufacturing and Design Science (ICFMD2010) www.icfmd2010.com

●2011 International Conference on Intelligent Computing and Information Science(ICICIS 2011) http://www.hk-ceis.com/icicis2011/

●2011 International Conference on Mechatronics and Intelligent Materials (MIM2011) http://www.mim2011.org/

●2011 International Conference on Frontiers of Manufacturing Science and Measuring Technology (ICFMM2011) http://www.icfmm.org/

●2011 International Conference in Electrics, Communication and Automatic Control (ECAC 2011) http://www.ecac2011.org/

●2011 International Conference on Frontiers of Mechanical Science and Technology (ICFMST 2011) http://www.icfmst.org/

●2011 International Conference on Frontier of Nanoscience and Technology (ICFNST 2011) http://www.icfnst.org/

●2011 International Conference on Advanced in Control Engineering and Information Science (CEIS 2011) http://www.hk-ceis.com/ceis2011/

●2011 International Conference on Frontier of Automatic, Control Engineering and Information Science (ICFACI 2011)

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Applied Mechanics and Materials. Volumes 44-47
p:1933-1937.

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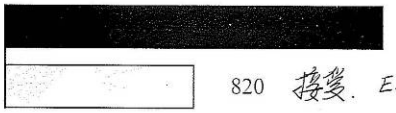
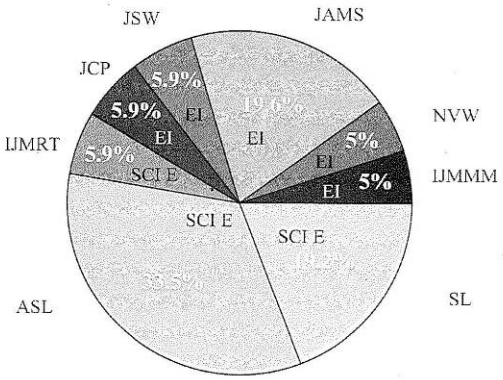
# About the Journal of ICFMD 2010

2011. Jan.

## Applied Mechanics and Materials




## Special Issues for the High-level Journals




| Journal | Index | Amount | Date |
|---|---|---|---|
| Noise and Vibration Worldwide （NVW） | EI | 13 | Published |
| International Journal of Machining and Machinability of Materials （IJMMM） | EI | 15 | 2011.5 |
| Journal of Advanced Manufacturing Systems（JAMS） | EI | 40 | 2011.6 |
| International Journal of Materials and Product Technology（IJMRT） | SCI/EI | 12 | 2011.6 |
| journal of computer（JCP） | EI | 15 | 2011.8 |
| journal of software（JSW） | EI | 15 | 2011.8 |
| Advanced Science Letters（ASL） | SCI | 88 | 2011.4 |
| Sensor letters （SL） | SCI/EI | 49 | 2011.10 |

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46.

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# Conference Schedule

| December 10,2010 | |
|---|---|
| **Time** | **Activity** |
| 10: 00-18: 00 | Registration |

| Morning, December 11,2010 | |
|---|---|
| **Time** | **Activity** |
| 09:00 — 09:25 | Open Ceremony |
| 09:25 — 10:00 | Keynote Speech 1 |
| 10:00 — 10:20 | Coffee Break |
| 10:20 — 10:50 | Keynote Speech 2 |
| 10:50 — 11:20 | Keynote Speech 3 |
| 11:20 — 11:45 | Photo |
| 12:00 — 13:30 | Buffet Lunch |

**Afternoon, December 11,2010**

| | |
|---|---|
| 14:00 — 15:30 | Oral Session 1,2,3 |
| 15:30 — 15:50 | Coffee Break |
| 15:50 — 17:30 | Oral Session 1,2,3 |
| 18:00 — 19:00 | Buffet Lunch |

| Morning, December 12,2010 | |
|---|---|
| **Time** | **Activity** |
| 09:00 — 10:20 | Oral Session 1,2,3 |
| 10:20 — 10:45 | Coffee Break |
| 10:45 — 11:45 | Oral Session 1,2,3 |
| 12:00 — 13:30 | Buffet Lunch |

**Afternoon, December 12,2010**

| | |
|---|---|
| 14:00 — 15:30 | Oral Session 1,2,3 |
| 15:30 — 15:50 | Coffee Break |
| 15:50 — 17:30 | Oral Session 1,2,3 |
| 18:00 — 19:00 | Welcome Banquet |

| December 13,2010 | |
|---|---|
| **Time** | **Activity** |
| 8:30 — 16:00 | One-day tour in Chongqing |

## Keynote Speaker 1 : Yang Yongqiang 杨永强

Dr. Yang Yongqiang, Professor of Material Processing and Mechatronic Engineering, got Doctor degree of Engineering in April 1993, Master degree of Materials Science and Engineering in June 1987 and Bachelor degree of Materials Science and Engineering in July1982, Tianjin University , Tianjin, China. From July 1987 to July 1996, he had been worked as lecture and associate professor in turn in laser lab, department of mechanical engineering, Tianjin Industry University. From August 1996, he has been working in South China University of Technology (SCUT) as professor. He is the head of institute of welding science and technology and director of Innovation Engineering Center, which is a jointed research enterprise by SCUT and ISQ (from Portugal), President of Welding Association of Guangdong Province, and head of South China Laser Welding Center.

His main research interests include Laser Processing and Rapid prototyping of selective laser melting.

He had been completed more than 20 projects including the projects from Fund of state and Guangdong province, industry and Eureka international cooperation. 116 papers have been published, including international journals 《Thin Solid Films》、《Applied Surface Science》、《Surface Coatings and Technology》, 《Chinese Optic letters》, etc. He has applied more than 30 patents, and 15 authorized. He got more achievements in selective laser melting rapid prototyping for direct manufacturing of

metal parts, laser material processing and laser welding, especially in industrial applications, such as the direct manufacturing of metal surgery guides, lingual brackets, mould and die, and complex parts with inner structures.

Tel：+86 20 87111036；13825041868

Email: meyqyang@scut.edu.cn

**Title of presentation**:

**Direct Manufacturing of Metal Parts by Selective Laser Melting and Applications**

## Keynote Speaker 2 Hsiang-Chuan Liu 劉湘川

Hsiang-Chuan Liu received the Ph.D. degree in Statistics from National Taiwan University, Taiwan. He is a professor at the Department of Bioinformatics and Medical Informatics and Department of Psychology, Asia University, Taiwan since August 2001, and a professor at the Graduate Institute of Acupuncture Science, China Medical University, and also an honored professor at the Graduate Institute of Educational Measurement and Statistics, National Taichung University, Taiwan. He was the President of National Taichung University, Taiwan from 1993 to 2000. Dr. Liu is a member of IEEE since 2007, and is the editor-in-chief of Psychological Testing (ISSN 1609-4905) (TSSCI Journal). He has funded research and published articles in the areas of Biostatistics, Bioinformatics, Fuzzy measure Theory, Measurement and statistics, and E-Learning.

**Title of presentation**:

**Signed Extensional L- Measure Based on Signed Monotonicity**

## Keynote Speaker 3： Wen-Pei Sung 宋文沛

Professor Wen-Pei Sung, Ph.D., P.E.

**Current Position:**

●Professor, Department of Landscape Architecture

●Dean, Integrated Research Center for Green Living Techniques

●Member of Committee, Public Construction Commission,

Executive Yuan, Taiwan

●Investigator, National Science Council, Executive Yuan, Taiwan

●Chair Professor, Zaozhuang University, Shandong, China

●Member of Academic Committee, "The Chinese Landscape Architecture Graduate

Design Exhibition", Peking University, China

●Professional Engineer of Structural Engineering, Taiwan

**Academic Background:**

●Ph. D., Department of Civil Engineering, National Chung Hsing University, Taiwan.

●The Honorary Doctorate of Manufacturing Technologies, The Yorker International

University, Italy

**Professional Qualifications:**

●Certification of Professional Engineer of Structural Engineering, Taiwan

**Experience:**

•Professor and Dean, College of Humanities and Social Science, National Chin-Yi University of Technology

•Professor and Department Head, Department of Landscape Design and Management,

National Chin-Yi University of Technology

•Special Assistant of the President, National Chin-Yi University of Technology

•Professor, Department of Landscape Design and Management, National Chin-Yi Institute of Technology

•Associate Professor, Department of Landscape Design and Management, National Chin-Yi Institute of Technology

•Specialist, Professional consultancy service for environmental landscape of Government of Taichung County, Taiwan

•Specially Researcher, Section of research and development, Da-Yang Construction Techniques Consultant, Ltd.

•Special Assistant of the President, National Chin-Yi Institute of Technology and Commence

Photo

•Lecture, General Education Center, National Chin-Yi Institute of Technology and Commence

•Lecture and Section Chief, Section of General Affairs, Evening school, National Chin-Yi Institute of Technology and Commence.

•Structural Engineer, Department of Structural Engineering, Sinotech Engineering

Consultant, Ltd.

•Research Assistant, Department of Civil Engineering, North Carolina State University, U.S.A.

•Teaching Assistant, Department of Civil and Hydraulic Engineering, Chung Yuan Christian University

**Research Interests:**

Techniques of Structural Control, Numerical Analysis, Integrated Research for Green Living Techniques, Construction Management

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wps@ncut.edu.tw

**Phone:**

+886-4-2392-4505 Ext. 8370 (Research Center)

+886-4-2392-4505 Ext. 8112 (Research Office)

**Fax:**

+886-4-2393-0737

**Title of presentation: Developement of 2D and 3D Digital Image Correlation Method for Detecting Static Deformation and Structural Dynamic Response**

## SESSION CHAIR 分会场主席(three)

### Session chair 1　Wang Zhenpo 王震坡

Dr. Wang Zhenpo, born in 1976, is currently an associate professor in the School of Mechanical Engineering at Beijing Institute of Technology, and is the Assistant Director of National Engineering Laboratory for Electric Vehicles and serves concurrently as office administrator. He received the B.S. degree in vehicle engineering from Tongji University in 2000, and the Ph.D degree in vehicle engineering from Beijing Institute of Technology in 2005. He dedicates for a long time to battery electric vehicle integration technology, power battery in pack application, key technology development and engineering application, etc. He is also in charge of 4 important projects in three influential programs, which are respectively "863 Energy-economy and New Energy Vehicle Program during 11$^{th}$ Five-year Plan", "Beijing Scientific Planning Program" and "Beijing Olympic EV Bus Program". He proposes the evaluation system of energy consumption in battery electric vehicles for the first time globally and invents the power battery module package system, which is implemented effectively in Beijing Olympic EV buses. Till now, he has received the one second prize of National Prize for Progress in Science and Technology and one first prize of Ministry of Education Prize for progress in Science and Technology. He has published more than 30 papers in the relevant academic core journals, among which 20 are indexed by EI. He has also applied more than 10 patents for invention.

**Title of presentation：Manufacturing and Design of Electric Vehicle**

### Session chair 2.　Ma Hsiu-Lan　馬秀蘭

**Hsiu-Lan Ma** received her B. S. in Mathematics from National Taiwan Normal University, Taipei, Taiwan in 1983, as well as M. S. and Ph. D. degrees in Mathematics, University of Northern Colorado, Greeley, Colorado, USA in 1991 and 1994. respectively. Since 1996, she has been with the Department of Business Administration, Ling Tung University, where she is currently a Professor. Her current interests include Grey Theory, Fuzzy Algorithm, Mathematics Education, reasoning, Problem solving, Educational Measurement, and Web-based Learning, etc.

**Title of presentation: Analyzing the Test of Problem Solving Abilities by Using GM(0,N)**

### Session chair 3　Guo Yecai　郭业才

Guo yecai received the Ph.D. degree in Northwestern Polytechnical University, xi'an, China, in 2003. And now he is a professor and tutor of Ph.D. student in Nanjing University of Information Science and Technology, Nanjing, China. His research interests lies in signal processing, system simulation and higher order spectrum analysis, meteorology information technology and security.

Gong xiuli received bachelor's degree from the Anhui University of Science and Technology(AUST), Huainan, China, in 2008 and is the student of master's degree of AUST from 2008 to 2010. Now her research interests is signal processing.

**Title of presentation : Wavelet Vector Machines Blind Equalization Algorithm Based on Variable Segmentation Error Function.**

## Oral_1:

**No.4 Room, Time: 14:00-17:30，Dec 11**

**Session chair 1　Wang Zhenpo**

| ID | Paper Title | Author |
|---|---|---|
| 810 | Manufacturing and Design of Electric Vehicle | Wang Zhenpo |
| 673 | Thermal Analysis of Concentrated Photovoltaic System | Haitao Zhang |
| E330 | Evaluation of Green Technology Innovation Capacity of Automobile Manufacture Industry | Qiaoling Xu |
| 465 | The Force and Wear of Carbide Mill in Milling Glass | Zhi Wei |
| 636 | Calculating Urban Storm Intensity Formula Using Genetic Algorithm | Tao Shang |
| 1132 | Design of Remote Controller using Code Matching and Frequency Hopping Technology | Gengsheng Zheng |
| | 15:30　Coffee Break | |
| 1126 | Road Surface Identification Approach Based on Vehicle Dynamic Parameters | Bo Wang |
| 659 | Process Planning and Tool Design of Magnetorehological Jet Finishing | Haobo Cheng |
| 410 | Modeling and Simulation for Dual- Drive Transmission System of TBM Based on Bond Graph | Xinhong Su |
| 590 | A New Numerical Approach for Adhesive Contacts of Real Engineering Surfaces | Yuqi Zheng |
| 517 | Multi-lookup Table based Regenerative Braking Strategy of Plug-in Hybrid Electric Vehicle | Qingsheng SHI |
| 1003 | Predictions of Mechanical Properties of Single Crystal Copper Nanorod with Multiscale Simulation Method | Xinglei Hu |
| 528 | Serial Communication and Temperature Monitoring of MSMA Actuator Based on DS18B20 | Yongqing Wen |
| 450 | Design of a new non-contact torque sensor for rotating stepped shaft by monitoring magnetic field. | Gang Shi |

## Oral_2:

**No.5 Room, Time: 14:00-17:30，Dec 11**

**Session chair 2.　Ma Hsiu-Lan**

| ID | Paper Title | Author |
|---|---|---|
| 954 | Analyzing the Test of Problem Solving Abilities by Using GM(0,N) | Hsiu-Lan Ma |
| 293 | Study on the Drawing and Trimming Springback Characteristics of Cylinder Shallow Shell of Tailor Welded Blanks | Jang Yinfang |
| 1028 | The Characterization and Flow Behavior of 316L Stainless Steel Feedstock for Micro Metal Injection Molding (μMIM) | Haw Pei Li |
| 333 | Parameters Influences During Biodiesel Production | KRALJDAVORIN |
| 339 | Evaluating mechanical properties of cement materials by depth-sensing indentation method | Xiufang Wang |
| 935 | Choquet Integral with Respect to High Order Extensional L- Measure | Der-Bang Wu |
| | 15:30　Coffee Break | |
| 1138 | Two dynamic propagation problems of symmetrical mode III crack | Nian-chun Lü |
| 273 | Nonlinear behavior in current mode research of Z-source DC/DC converter | Yan Chen |
| 664 | Multi-Objective Optimization Design of the Helical Gear Transmission Based on Coalition Cooperative Game Theory | Meng Rui |
| 315 | Molecular Simulation on Modification of Structure and Thermodynamic Properties of Montmorillonite | Wei Dai |
| 772 | Estimation of Doppler Parameter for Formation-Flying Satellite SAR System | Zhulin Zong |
| 569 | Solid State Synthesis and Characterization of Spintronics Material $Cd_{0.55}$ $Hg_{0.45}$ Te | KhanAsghar.Hafiz Muhammad Noor ul Huda |
| 183 | The Effect of Zirconium Incorporation on the Brønsted Acidity of Zeolite: A DFT Study | Hailu Zhang |

## Oral_3:

**No.6 Room, Time: 14:00-17:30, Dec 11**

**Session chair 3 Guo Yecai**

| ID | Paper Title | Author |
|---|---|---|
| 471 | Wavelet Vector Machines Blind Equalization Algorithm Based on Variable Segmentation Error Function | Yecai Guo |
| 468 | Nonlinear Numerical Simulation of Iced Conductor Galloping | Zidong Hu |
| E150 | Risk Analysis of the Production Line Type Design based on the Lean Production | Anjiang Cai |
| 940 | Microstructures and mechanical properties of hot-rolled Mg-Zr-Ca alloys for biomedical applications | Ying-Long Zhou |
| 482 | Management of Knowledge Base of Expert System for Fault Diagnosis of Rotating Machinery | He Qing |
| 537 | Impacting Analysis on the Coupler and Buffer of a Subway Vehicle for the Shunting Operations | Pingman Zhang |
| | 15:30 Coffee Break | |
| E1290 | A Study on the Performance of Drinking Fountain Using CO2 Heat Pump under Different System Pressures | Yu-Lieh Wu |
| 309 | State Feedback Control to Track a Moving Object for a Non-holonomic Mobile Robot | Yancui Hui |
| 502 | Delaunay Triangulation-based Hazard Area Avoidance for Spacecraft safe landing | Simiao Fei |
| 1083 | Suppression of Maglev Track-Induced Self-Excited Vibration Using an Adaptive Cancellation Algorithm | Danfeng Zhou |
| 1044 | Higher eigenmodes vibration cantilever's resonance frequency and cantilever spring constant | Qi Hou |
| 616/617/620 | Green Manufacturing: a Lever-wedge Self-locking Force Amplifying Clamping Device Driven by Linear Motor | Qiang Song |
| 869 | Objective Evaluation of Seam Pucker Using Complex Wavelet and Fractal Dimension of Textural Image | Wanqing Song |

## Oral_1:

**No.4 Room, Time: 9:00-11:50, Dec 12**

**Session chair 1 Wang Zhenpo**

| ID | Paper Title | Author |
|---|---|---|
| Keynote | Material on green campus | Mohd Nizam Ab Rahman |
| 335 | Preparation and Friction Feature of TiAl-based Wear-resisting Self-lubricating Composite | Haoran Geng |
| E1200 | A new formal method of anticorrosion design | Pengfei Zhao |
| 939 | Study on wire breakage in WEDM by 3D technology | Yong Xu |
| 182 | Energy-Saving Design for Hydraulic Cylinder Reciprocating Seal Based on QFD | QingqingZhang |
| 816 | Profile Error Synthetic Analysis of One-Side Milling of the Inner Engaged Globoidal Cam | Zihua Hu |
| | 10:20 Coffee Break | |
| 652 | Micro CO2 Sensor Based on Li2CO3, Pt \| Li3PO4 \| Pt, Li2TiO3-TiO2 Structure | Junqiang Ren |
| 284 | Technique of Heating Process of Stainless Steel | Fangmin Quan |
| ASL-E0727-5 | Ant colony algorithm with magnetic attractor and its application | Zhanwei Du |
| 744 | Application of Multivariable Grey Prediction | Junjie Han |
| 671 | Kinematics and Strength Analysis on Variable Propeller Pitch Mechanism of a Wind Turbine Generators | Kun Jia |

## Oral_2:

**No.5 Room, Time: 9:00-11:50, Dec 12**

**Session chair 2. Ma Hsiu-Lan**

| ID | Paper Title | Author |
|---|---|---|
| E1225 | The Thermal Influence of Green Roofs on Air Temperature in Taipei City | Chen-Yi Sun |
| 1038 | The Effects of Young's Modulus of Materials on the Rolling Resistance Characteristics of Ball bearing | HU Rui |
| 27 | Experiment and Simulation of Influence of Welding Parameters on Temperature in Friction Stir Welding | Lei Wang |
| 626 | Stress Calculation of Fillet Rolled Crankshaft in Bending Fatigue Tests | Ke Bao |
| 1145 | Comparison of Motion Planning Methods in Vision based Mobile Robot Navigation | SALLEHUDDIN MOHAMED |

| | | |
|---|---|---|
| | | HARIS |
| | 10:20 Coffee Break | |
| 375 | Model Analysis of Micro-feed Tool Holder Based on Finite Element Simulation | Jie Mei |
| 391 | Study on Banded Structure in Low Carbon Vessel Plate for Nuclear Power | Zhifeng Luo |
| E139 | Evaluating the Effectiveness of Applying Phenolic Resin as Thermal Barrier in Buildings During Summer and Winter | Ting-Yu Chen, |
| E1306 | Digital Imagine Correlation (DIC) Method for Detecting Crack Development in Construction Materials Subject to loading | Youguang Zhao |
| E1300 | Global Radiation for Solar Architecture Design of Taiwan | W.S. Ou |

## Oral_3:

No.6 Room, Time: 9:00-11:50, Dec 12

**Session chair 2. Guo Yecai**

| ID | Paper Title | Author |
|---|---|---|
| 316 | Design and Integrated Simulation of the Electro-hydraulic Servo System based on AMESim and Matlab | Xiang Xu |
| 497 | Research on Product Development Resource Allocation Modeling Based on Hierarchical Colored Petri Net | Liping Yang |
| 878 | Analysis of Bridge-type Nano-positioning Stage | Zhengfeng He |
| 377 | Inverse Classification Problem of Quantitative Attributes | Aiguo Li |
| 52 | A Novel Fusion Method for Multi-focus Images | F. L. Chang |
| | 10:20 Coffee Break | |
| 370 | Speed Prediction of ESPCP System Based on Neural Network | Xuan Luo |
| 244 | Stiffness Matching and Ride Comfort Optimization of Heavy Vehicle's Suspension Based on ADAMS | Hui Pang |
| 405 | An Equilibrium Principle on the AON Network for Single-Machine Scheduling Problem with Time Lags | Chunyue Yu |
| 1039 | An Efficient Hierarchical Clustering Algorithm and its application for Image Retrieval | Wangming Xu |
| 773 | Simulation of electrolytic cleaning for cold rolled strip | Xiaofang Jia |

## Oral_1:

No.4 Room, Time: 14:00-17:30, Dec 12

**Session chair 1 Wang Zhenpo**

| ID | Paper Title | Author |
|---|---|---|
| 459 | Product and Vendor Development Programme in Encouraging Supply Chain Management: A Case Study | Wan Hasrulnizzam Wan Mahmood |
| 524 | Electromagnetic Interference's Effect on the Performance of Electro-Hydraulic Control System | Kai Zhang |
| 931 | Cooperation research on zero-sum game | Li Rui |
| 85 | Study on the Credit Classification of Practicing Qualification Personnel in Construction Market Based on PNN | Zhiqing Fan |
| 300 | Construction of the Optimal Milling Parameters Database for Radar Key Parts | XU Feng |
| 242 | A Hybrid Method for the Computation of Robot Manipulator Workspace | Yi Cao |
| 648 | High Velocity Compaction of 316L Stainless Powder | Chaojie Li |
| | 15:30 Coffee Break | |
| 720 | Green Design Based on the Concept of Ecological Holism | Ying Zhan |
| 458 | Improving Production Line Performance: A Case Study | Wan Hasrulnizzam Wan Mahmood |
| 1118 | Establishing 3D mandible FEA model via clinical CT images | Wenzheng Wu |
| 685 | Porous Silicon Immunosensor for Label-free Detection of SpaA | Tao Jiang |
| E1299 | Mechanism of whisker growth on pure Sn coating of Cu leads in the high temperature/humidity storage tests | Jinsong Zhang |
| 541 | Force Closure Analysis for an Underactuated Robot Gripper | Qinghua Qin |

| | | |
|---|---|---|
| 597 | | Vahed Najmeh |

## Oral_2:

No.5 Room, Time: 14:00-17:30, Dec 12

**Session chair 2. Ma Hsiu-Lan**

| ID | Paper Title | Author |
|---|---|---|
| 790 | Simulation Analysis on Transmission Function of Parallel Indexing Cam Mechanism Based on Adams | Haodong Zhao |
| E1304 | Hardware-in-loop Simulation on Hydrostatic Journal Support Pose | Guihua Han |
| 16 | Research On Design Method Of Demand-Driven Product Configuration | Yaping Wang |
| 1018 | Development of Numerical Method for Prediction of Maneuvering Performance of Marine Vehicle | Lei Yue |
| 1091 | The Numerical Simulation of 2D Sloshing Tank | Songqiang Gao |
| | 15:30 Coffee Break | |
| 1099 | Influence of Porous Media Property on Stirling Engine Performance | Fengjian Jiang |
| 1054 | Numerical Simulation of MEMS Stirling Cooler | Wen Song |
| 868 | Improve the Free-piston Stirling Engine Design with High Order Analysis Method | Chen Lin |
| 1098 | Numerical study of cavitation on hydrofoils | Jing Hu |

## Oral_3:

No.6 Room, Time: 14:00-17:30, Dec 12

**Session chair 3 Guo Yecai**

| ID | Paper Title | Author |
|---|---|---|
| 999 | Development of Tool Electrode High Frequency Vibration Assisted Micro-hole EDM Machine for Industry Environment | Minggang Xu |
| 751 | Portability of WSN Sensor Driver Using Abstraction Layer and FSM | Song Yin |
| 964 | Sintering Optimization of Micro Metal Injection Molding with Multiple Performance Characteristics using Grey Relational Grade | Mohd Halim Irwanlbrahim |
| 387 | Classifier Fusion based on Inner-cluster Class Distribution | Deqiang Han |
| 369SL-E0813-1 | Using Wireless Sensor Network on Real-Time Remote Monitoring of theLoad Cell for Landslide Lecture topic wireless sensor netwok | HungYao-Ming |
| | 15:30 Coffee Break | |
| 910 | Numerical Analysis of Exfoliation Corroded Holed Aluminum Plates Repaired with Adhesively Bonded Composite Patches | Ding Zhang |
| 624 | Possible Mechanism of Electrical Treeing and Breakdown for Polyimide Nanocomposite Film Used in Inverter-Fed Moto | Yi Cui |
| 1127 | Research on Meshing of Face Gear Drive under Errors of Alignment and Machining | Hui Guo |

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附件二 發表文章

# The Thermal Influence of Green Roofs on Air Temperature in Taipei City

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**Keywords:** heat island effect, green roofs, and thermal environment

**Abstract.** During the last decade, a large amount of research has been published in Taiwan on the reduction of the urban heat island effect for different strategies. The most important strategy for reducing ambient temperature and mitigating the heat island effect is to encourage citizens to build green roofs on their buildings. For analyzing the effect of a green roof on the thermal environment, this paper collects temperature and humidity data from two building roofs that have different greening levels and tries to analyze the thermal influence of a green roof on air temperature in Taipei City. The results of this research can give citizens an idea what kind of thermal environment they can benefit from; moreover, it also can provide useful data to governments for calculating the environmental benefit if they carry out a green roof policy.

## Introduction

Taipei is the biggest metropolis of Taiwan, which has a population around 5,000,000 with a very concentrated living density. The high concentration of buildings in the city has resulted in many environmental issues, such as air pollution, traffic jams, urban warming, and the urban heat island effect. To potentially address these problems, several studies have indicated that green roofs can be used to mitigate some problems associated with storm water runoff, the urban heat island effect, wildlife habitats, along with air quality and energy consumption (Liu and Baskaran, 2003; Wong et al., 2003; Takebayashi and Moriyama, 2007). In recent years, motivated by ecological concerns, the government has promoted people to build sustainable architecture, to mitigate a building's negative impact on the urban environment, and to create harmony between human and inhabitants who live in urban areas. Therefore, making more green roofs in the city could be the best ecological solution, which can improve air quality, mitigate the heat island effect, beautify the environment, and simultaneously make the city more sustainable.

Although green roofs can cool the ambient air through consuming the solar heat that is gained from transpiration and photosynthesis, some quantitative data on its thermal benefits are desirable for exploring the thermal impacts of green roofs in the Taipei metropolitan area. The objective of this study is to find answers for the reduction of air temperature by examining two types of green roofs at four different levels of height.

## Method

### 1. Study area

Two study areas are located in Taipei City. Site A is the roof of an international company with an abundance of vegetation on it; and Site B is the roof of an elementary school building with a large area of grass on top. Both sites have a green roof covering, but with different vegetation (Fig. 1 and Fig. 2).

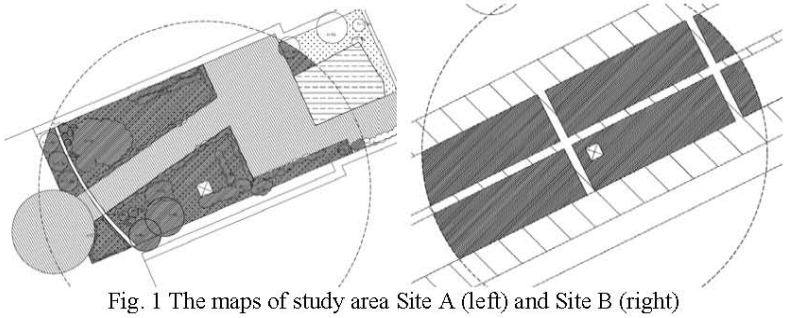

Fig. 1 The maps of study area Site A (left) and Site B (right)

Fig. 2 Pictures of study area Site A (left) and Site B (right)

## 2. Measurements

The temperature measurers were installed at four different levels of height (0.5, 2.5, 4.5, and 6.5 meter height) both on green roof (G) Site A and Site B to monitor and compare the temperature influenced by vegetation on the roof (Fig. 3). The comparators were also installed on non-green roofs (NG) near Site A and Site B to collate data for making comparative analyses.

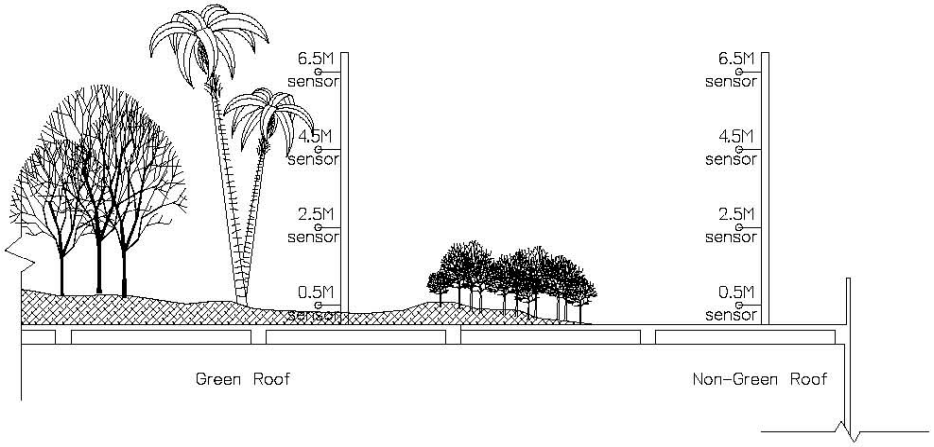


Fig. 3 The instrument settings on the Green Roofs and the Non-Green Roofs in this study for comparative analyses.

### 3. Data analysis

In this research, the green coverage ratio of Site A and Site B are 24.42% and 35.05% by calculating the greening area within a radius of 10 meters. This study not only made comparative analyses of the data of four different level of height at two different study sites for figuring out the thermal benefit of green roofs; but it also tried to analyze the relationship between the green coverage ratio and air temperature at both sites.

## Results

### 1. The temperature difference between Greening areas and Non-Greening areas

The objective of this study was to find answers for the reduction of air temperatures at four different levels of height on two types of green roofs. To do this, we calculated the difference of temperature between the greening area and the non-greening area at both sites. The results showed that the thermal benefit of the greening of Site A and Site B were 0.438 and 0.202 in winter (Table 1), 0.527 and 0.436 in spring (Table 2), and 0.669 and 1.708 in summer (Table 3). The results also verified that the greening roofs could decrease the ambient air temperature around 0.320 in winter, 0.482 in spring, and 1.189 in summer. The thermal influence of green roofs on air temperature will be more significant when the weather becomes hot.

Table 1 The temperature difference (degree C) between the greening area and the non-greening area at a height of 0.5 meters at two study sites during the winter.

| Date | 29 Dec. 2009 | 10 Jan. 2010 | 10 Feb. 2010 | Average |
|---|---|---|---|---|
| Site A | -0.363 | -0.472 | -0.477 | -0.438 |
| Site B | -0.169 | -0.148 | -0.288 | -0.202 |
| Average | -0.266 | -0.310 | -0.382 | -0.320 |

Table 2 The temperature difference (degree C) between the greening area and the non-greening area at a height of 0.5 meters at two study sites during the spring.

| Date | 26 Apr. 2010 | 5 May. 2010 | 16 May. 2010 | Average |
|---|---|---|---|---|
| Site A | -0.541 | -0.820 | -0.221 | -0.527 |
| Site B | -0.355 | -0.589 | -0.364 | -0.436 |
| Average | -0.448 | -0.705 | -0.293 | -0.482 |

Table 3 The temperature difference (degree C) between the greening area and the non-greening area at a height of 0.5 meters at two study sites during the summer.

| Date | 30 Jul. 2010 | 3 Aug. 2010 | 10 Aug. 2010 | Average |
|---|---|---|---|---|
| Site A | -0.664 | -0.677 | -0.665 | -0.669 |
| Site B | -0.993 | -2.100 | -2.032 | -1.708 |
| Average | -0.829 | -1.389 | -1.349 | -1.189 |

### 2. The temperature difference at four different levels of height

By analyzing the data of the two study sites, this research demonstrated that the vegetation of a green roof could influence ambient air temperature at a height of 0.5 and 2.5 meters above the rooftop (Table 4 and Table 5). The results also indicated that the green roof decreased air temperature more significantly both at Site A and Site B at the height of 0.5 and 2.5 meters during the summer due to abundant transpiration.

Table 4 The temperature difference (degree C) between the greening area and the non-greening area at four different levels of height at Site A on every measuring date. (*: n/a data)

| Date | Height | 0.5m | 2.5m | 4.5m | 6.5m |
|---|---|---|---|---|---|
| 2009/12/29 | Greening area | 15.709 | 15.787 | 15.939 | 15.951 |
| | Non-Greening Area | 16.073 | 15.912 | 16.083 | 15.930 |
| | Temp. Difference | -0.363 | -0.125 | -0.145 | 0.022 |
| 2010/01/20 | Greening area | 18.527 | 18.671 | 18.848 | 18.822 |
| | Non-Greening Area | 18.999 | 18.869 | 18.986 | 18.791 |
| | Temp. Difference | -0.472 | -0.198 | -0.138 | 0.031 |
| 2010/02/20 | Greening area | 23.449 | 23.515 | 23.613 | 23.621 |
| | Non-Greening Area | 23.926 | 23.714 | 23.738 | 23.519 |
| | Temp. Difference | -0.477 | -0.199 | -0.124 | 0.102 |
| 2010/04/26 | Greening area | 23.291 | 23.009 | 23.019 | 22.868 |
| | Non-Greening Area | 23.833 | 23.538 | 23.351 | 22.997 |
| | Temp. Difference | -0.541 | -0.529 | -0.332 | -0.129 |
| 2010/05/05 | Greening area | 28.375 | 28.000 | 27.940 | * |
| | Non-Greening Area | 29.196 | 28.808 | 28.503 | * |
| | Temp. Difference | -0.820 | -0.808 | -0.563 | * |
| 2010/05/16 | Greening area | 25.874 | 25.436 | 25.362 | * |
| | Non-Greening Area | 26.096 | 25.752 | 25.532 | * |
| | Temp. Difference | -0.221 | -0.316 | -0.170 | * |
| 2010/07/30 | Greening area | 29.391 | 29.283 | 29.363 | 29.293 |
| | Non-Greening Area | 30.055 | 29.980 | 29.778 | 29.520 |
| | Temp. Difference | -0.664 | -0.697 | -0.415 | -0.227 |
| 2010/08/03 | Greening area | 33.171 | 32.578 | 32.432 | 32.136 |
| | Non-Greening Area | 33.849 | 33.397 | 32.991 | 32.460 |
| | Temp. Difference | -0.677 | -0.819 | -0.559 | -0.324 |
| 2010/08/10 | Greening area | 32.457 | 32.005 | 31.905 | 31.666 |
| | Non-Greening Area | 33.122 | 32.700 | 32.354 | 31.886 |
| | Temp. Difference | -0.665 | -0.695 | -0.448 | -0.220 |

Table 5 The temperature difference (degree C) between the greening area and the non-greening area at four different levels of height at Site B on every measuring date.

| Date | Height | 0.5m | 2.5m | 4.5m | 6.5m |
|---|---|---|---|---|---|
| 2009/12/29 | Greening area | 15.640 | 15.601 | 15.672 | 15.644 |
| | Non-Greening Area | 15.809 | 15.816 | 15.702 | 15.640 |
| | Temp. Difference | -0.169 | -0.215 | -0.029 | 0.004 |
| 2010/01/20 | Greening area | 19.121 | 18.960 | 18.951 | 18.896 |
| | Non-Greening Area | 19.269 | 19.205 | 19.029 | 18.967 |
| | Temp. Difference | -0.148 | -0.245 | -0.079 | -0.071 |
| 2010/02/20 | Greening area | 23.314 | 23.186 | 23.173 | 23.146 |
| | Non-Greening Area | 23.602 | 23.537 | 23.224 | 23.136 |
| | Temp. Difference | -0.288 | -0.350 | -0.050 | 0.010 |
| 2010/04/26 | Greening area | 23.095 | 22.894 | 22.945 | 22.860 |
| | Non-Greening Area | 23.450 | 23.472 | 23.155 | 22.931 |
| | Temp. Difference | -0.355 | -0.577 | -0.209 | -0.071 |
| 2010/05/05 | Greening area | 27.611 | 27.442 | 27.514 | 27.407 |
| | Non-Greening Area | 28.200 | 28.233 | 27.831 | 27.593 |
| | Temp. Difference | -0.589 | -0.790 | -0.317 | -0.185 |
| 2010/05/16 | Greening area | 25.392 | 25.175 | 25.194 | 25.098 |
| | Non-Greening Area | 25.756 | 25.748 | 25.413 | 25.206 |
| | Temp. Difference | -0.364 | -0.573 | -0.219 | -0.108 |
| 2010/07/30 | Greening area | 28.888 | 29.275 | 29.354 | 29.192 |
| | Non-Greening Area | 29.881 | 30.014 | 29.539 | 29.415 |
| | Temp. Difference | -0.993 | -0.739 | -0.186 | -0.224 |
| 2010/08/03 | Greening area | 31.532 | 32.527 | 32.633 | 32.524 |

| | | | | | |
|---|---|---|---|---|---|
| | Non-Greening Area | 33.631 | 33.595 | 32.997 | 32.742 |
| | Temp. Difference | -2.100 | -1.069 | -0.364 | -0.218 |
| 2010/08/10 | Greening area | 30.390 | 31.421 | 31.551 | 31.451 |
| | Non-Greening Area | 32.423 | 32.418 | 31.867 | 31.645 |
| | Temp. Difference | -2.032 | -0.997 | -0.316 | -0.194 |

## Conclusions

In this study, the thermal impact of green roofs in Taipei City was investigated through field measurement. From this quantitative research, it has been shown that there is an important potential for lowering urban temperatures when a building's roof is covered with vegetation. The average thermal benefits of the two green roof study sites are 0.320 during the winter, 0.482 during the spring and 1.189 during the summer respectively. It can be concluded that planting vegetation on the rooftop could not only beautify the environment but also decrease the temperature in urban areas.

Regarding the results of this study, we indicated that green roofs have a significant influence on cooling ambient air at the height of 0.5 and 2.5 meters and the quality and quantity of a greening roof played a significant role in lowering temperature in relation with the green coverage ratio. Therefore, if governments intend to use green roofs to mitigate the urban heat island effect, making a policy to stipulate the use of rooftop vegetation for every single building roof would be a very wise and efficient policy.

## Acknowledgements

The support of National Science Council, Republic of China (project NSC 98-2221-E-004-011, NSC 98-2218-E-004-001 and NSC 99-2221-E-004 -006), Delta Electronics Foundation and Wu-Sing Elementary School are gratefully acknowledged.

## Reference

[1] K.Y. Liu and B. Baskaran, 2003, "Thermal performance of green roofs through field evaluation" Proceedings for the first North American green roof infrastructure conference, awards, and trade show, Chicago, IL, May 29 – 30, 2003, 1 – 10.

[2] N.H. Wong, Y. Chen, C.L. Ong and A. Sia: Building and Environment Vol. 38 (2003), p. 261–70

[3] L. Kosareo and R. Ries: Building and Environment Vol. 42 (2006), p. 2606–2613

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# The Thermal Influence of Green Roofs on Air Temperature in Taipei City

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**Keywords:** heat island effect, green roofs, and thermal environment

**Abstract.** During the last decade, a large amount of research has been published in Taiwan on the reduction of the urban heat island effect for different strategies. The most important strategy for reducing ambient temperature and mitigating the heat island effect is to encourage citizens to build green roofs on their buildings. For analyzing the effect of a green roof on the thermal environment, this paper collects temperature and humidity data from two building roofs that have different greening levels and tries to analyze the thermal influence of a green roof on air temperature in Taipei City. The results of this research can give citizens an idea what kind of thermal environment they can benefit from; moreover, it also can provide useful data to governments for calculating the environmental benefit if they carry out a green roof policy.

## Introduction

Taipei is the biggest metropolis of Taiwan, which has a population around 5,000,000 with a very concentrated living density. The high concentration of buildings in the city has resulted in many environmental issues, such as air pollution, traffic jams, urban warming, and the urban heat island effect. To potentially address these problems, several studies have indicated that green roofs can be used to mitigate some problems associated with storm water runoff, the urban heat island effect, wildlife habitats, along with air quality and energy consumption (Liu and Baskaran, 2003; Wong et al., 2003; Takebayashi and Moriyama, 2007). In recent years, motivated by ecological concerns, the government has promoted people to build sustainable architecture, to mitigate a building's negative impact on the urban environment, and to create harmony between human and inhabitants who live in urban areas. Therefore, making more green roofs in the city could be the best ecological solution, which can improve air quality, mitigate the heat island effect, beautify the environment, and simultaneously make the city more sustainable.

Although green roofs can cool the ambient air through consuming the solar heat that is gained from transpiration and photosynthesis, some quantitative data on its thermal benefits are desirable for exploring the thermal impacts of green roofs in the Taipei metropolitan area. The objective of this study is to find answers for the reduction of air temperature by examining two types of green roofs at four different levels of height.

## Method

### 1. Study area

Two study areas are located in Taipei City. Site A is the roof of an international company with an abundance of vegetation on it; and Site B is the roof of an elementary school building with a large area of grass on top. Both sites have a green roof covering, but with different vegetation (Fig. 1 and Fig. 2).