國立交通大學
National Chiao Tung University

出國報告（出國類別：國際研究合作與學術交流）

# 2011 GIST-NAIST-NCTU joint symposium on advanced materials

# 2011 光州科技研究院-奈良尖端科技大學院-國立交通大學尖端材料研討會

服務機關：理學院電子物理系所、物理所、與應用化學系所
姓名職稱：莊振益教授、江孟恭同學、張文豪副教授、
廖奕翰副教授、P. Urban 助理教授
前往國家：韓國光州 光州科技研究院
出國期間：2011/11/13-11/17
報告日期：2011/11/28

## 一、 摘要（200-300 字）

本次出訪韓國光州科學技術大學之緣起，主要爲延續並拓展本院與國際知名大學間交流之既定院發展策略。本院在歷任院長的努力下，分別與日本大阪大學理學院以及日本奈良尖端科技大學，簽訂學生交換與研究交流協議書，並旋即展開實質交流活動，其中奈良尖端科技大學院爲日本政府近 20 年來資助成立的極少數幾所 (目前共有三所) 專收研究生的重點研究大學之一。近幾年來，該校不僅在研究成績上直逼幾所所謂帝國大學，其發展領域與學校性質更與本校理、工、和電機資訊學院相符，確爲極佳的合作交流夥伴。因此，本院自三年前與該校簽訂合作協議(現已擴展爲校際合作協議)後，旋即在 2009 年由應化系Masuhara講座教授出面主辦，於本校舉辦第一次NAIST-NCTU Joint International Symposium。該年除了NAIST與交大教授參與之外，更邀請了數位歐、美、印度等國之知名學者共襄盛舉。也因該次交流的成功，雙方同意以每年輪流舉辦一次研討會的型式，落實學術合作與學生交流的目標。

去年(2010 年)11 月中旬，輪回 NAIST 舉辦研討會時，該校因獲得日本政府的大力支持，邀請本院選派 10 位學生除了參加研討會之外，並進行爲期一週的實驗室的體驗，全程由日方招待(包含來回機票)。該次研討會本院除了選派 10 位碩、博士班同學參與之外，另有六位教授以自費方式帶隊參加。另因 GIST 與 NAIST 進行類似的雙邊研討會已有十年之久，故該次 GIST 方面亦有相當數量的教師學生參加。也因去年研討會與學生交流活動的空前成功，三方決定將原爲雙邊研討會，擴展爲三邊研討會，採輪流舉辦方式，今年由韓國光州科技研究院主辦，明年輪由交大主辦，餘此類推。今年本院共有五位教授與五位碩、博士生參加，其中五位由本院向國際處申請補助，五位由參加教授之國科會計畫資助。本次會議在光州科技學院的歐陽廳(Oryong Hall)(見下圖)舉行，議程安排(詳見附頁)分爲論文發表兩天，另有一天文化之旅，以活絡三方師生的互動與交流。本次會議過程較詳盡的敘述，詳見以下心得欄 Urban 教授的意見。

# 二、目次

# 三、本文

## （一）目的

本次出訪韓國光州科學技術大學之緣起，主要爲延續並拓展本院與國際知名大學間交流之既定院發展策略。本院在歷任院長的努力下，分別與日本大阪大學理學院以及日本奈良尖端科技大學，簽訂學生交換與研究交流協議書，並旋即展開實質交流活動，其中奈良尖端科技大學院爲日本政府近 20 年來資助成立的極少數幾所 (目前共有三所) 專收研究生的重點研究大學之一。近幾年來，該校不僅在研究成績上直逼幾所所謂帝國大學，其發展領域與學校性質更與本校理、工、和電機資訊學院相符，確爲極佳的合作交流夥伴。因此，本院自三年前與該校簽訂合作協議(現已擴展爲校際合作協議)後，旋即在 2009 年由應化系Masuhara講座教授出面主辦，於本校舉辦第一次NAIST-NCTU Joint International Symposium。該年除了NAIST與交大教授參與之外，更邀請了數位歐、美、印度等國之知名學者共襄盛舉。也因該次交流的成功，雙方同意以每年輪流舉辦一次研討會的型式，落實學術合作與學生交流的目標。

## （二）過程

去年(2010 年)11 月中旬，輪回 NAIST 舉辦研討會時，該校因獲得日本政府的大力支持，邀請本院選派 10 位學生除了參加研討會之外，並進行爲期一週的實驗室的體驗，全程由日方招待(包含來回機票)。該次研討會本院除了選派 10 位碩、博士班同學參與之外，另有六位教授以自費方式帶隊參加。另因 GIST 與 NAIST 進行類似的雙邊研討會已有十年之久，故該次 GIST 方面亦有相當數量的教師學生參加。也因去年研討會與學生交流活動的空前成功，三方決定將原爲雙邊研討會，擴展爲三邊研討會，採輪流舉辦方式，今年由韓國光州科技研究院主辦，明年輪由交大主辦，餘此類推。

## （三）心得及建議

在研討會接近尾聲時，光州科技大學材料科學學院亦安排了近 2 小時的實驗室參訪活動，詳細介紹了該院的主要設施，以及教授的研究項目。與會同仁對該

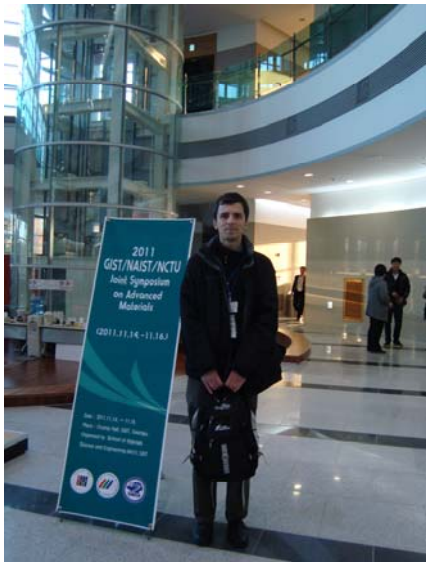
校的設施，尤其是教學空間的完善規劃均留下深刻的印象。在該校不到 1,500 位學生與近 150 位教師的規模下，校地即有近 80 公頃，每一學院均有充裕的研究空間，確實讓我們感到非常羨慕。另外值得一提的是，該校雖然規模不大，創校歷史不到 20 年，卻擁有世界上最先進的超高功率雷射的研究中心（見下圖），進行類似自由電子雷射的研究。事實上，該中心負責的教授，Prof. Noh，與電物系梁耕三教授非常熟稔，應可加強雙方的合作。

This year's GIST/NAIST/NCTU Joint Symposium took place in Gwangju (South Korea). The participation of the faculty members and students from the NCTU in this meeting is very important for maintaining close relationship with the sister institutes in Korea (GIST) and Japan (NAIST). During two days of the scientific programme, we took part in a number of plenary sessions, which were dominated by presentations of research by faculty members from the three institutes. The talks were accompanied by discussions in the lecture hall, as well as informal interactions during the breaks and meals. An important part of the symposium was the poster sessions. All the students presented posters outlining their graduate research work. The poster sessions were well attended, and the young scientists had an opportunity to exercise their communication skills while talking to the scientists from three countries. For the students, it was a chance to improve their ability to present their work in English language in a concise way. All the posters were evaluated by an international jury composed of several faculty members (including three members of the NCTU delegation). One student from NCTU won a poster award. Both plenary and poster sessions had interdisciplinary character. The topics presented included materials science, solid-state physics, electronics, biochemistry, analytical chemistry, and others. This created very good atmosphere for creative exchange of ideas between the attending faculty members and students. The scientific sessions were followed by a social programme, which gave all of us an opportunity to involve in close interactions with our colleagues from the partner institutes. The Korean organisers planned an excursion to Jeonju, a tourist town in South Korea, which was full of tourist and cultural activities. Overall, the conference has expanded the relationship between the NCTU, GIST and NAIST, and laid the ground for future scientific collaborations.

# 四、附錄


2011GIST-NAIST-NCTU Joint Symposium venue (Oryong Hall)


本人在光州科技研究院歐陽廳內留影




Prof. Urban at the site of GNN joint symposium

壁報論文發表時，會場一瞥。


Prof. Noh 負責的超高功率快速雷射研究中心鳥瞰圖

附頁為本次研討會的行程與議程供參考。

2011 GIST NAIST NCTU Joint Symposium on Advanced Materials

November 14~21, 2011 / Oryong Hall, GIST, Gwangju, KOREA

**Dear Faculty and students,**

I am very pleased to welcome faculty and students from NAIST and NCTU at GIST campus. GIST-NAIST-NCTU joint symposium has been very instrumental in networking faculty and students of three participating schools. It became a decade long tradition and we are expecting further collaboration in future based on the network developed through this symposium.
Again, welcome all of participants!

Beong Ki Cho, Dean,
School of Material Science and Engineering

## Program committee

### Organizing Chair

| | | |
|---|---|---|
| Dean | Beong Ki Cho | GIST |

### International organizing committee

| | | |
|---|---|---|
| Assoc. Professor | Byoung Hun Lee | GIST |
| Asst. Professo | Heung Cho Ko | GIST |
| Asst. Professor | Myung-Han Yoon | GIST |
| Professor | Yukiharu Uraoka | NAIST |
| Assoc. Professor | Takashi Matsuo | NAIST |
| Asst. Professor | Takashi Nishida | NAIST |
| Professor | Jenh-Yih Juang | NCTU (Physics) |
| Professor | Jiunn-Yuan Lin | NCTU (Physics) |
| Assoc. Professor | Weng-Hao Chang | NCTU (Physics) |
| Assoc. Professor | Ian Liau | NCTU (Chemistry) |
| Asst. Professor | Pawel Lukasz Urban | NCTU (Chemistry) |

## Organized by

**GIST** School of Material Science and Engineering, Gwangju Institute of Science and Technology, Korea
**NAIST** Graduate School of Materials Science, Nara Institute of Science and Technology, Japan
**NCTU** College of Science, National Chiao Tung Universitsy, Taiwan

## Supported by

Center for Advanced Materials Research and Education (BK21) GIST
Foundation for NAIST

## Schedule

| Date | Time | |
|---|---|---|
| **13(Sun.)** | 14:20<br>15:30<br><br><br>16:40<br><br>17:50 | NAIST(19) arrival at Gwangju airport,<br>( shuttle is arranged to pick up NAIST members)<br>Check-in: Student - GIST Dormitory(10), Faculty - GIST Int'l Hall(2), Int'l Collaboration Bldg.(4)<br>Dinner at a GIST restaurant or around the GIST by yourself<br><br>NCTU(10) arrival at Incheon airport.<br>Take more than 4 hours to Gwangju by express bus.<br>(will arrive at 22:00 in Gwangju bus terminal, shuttle is arranged to pick up NCTU members, Dinner at airport by yourself.) |
| **14(Mon.)** | | 1st day of symposium |
| | 8:00<br>8:30~9:00<br>9:00~9:15<br>9:15~12:00<br>13:00~14:00<br><br><br>14:00~17:15<br>17:15~18:00<br>18:00~20:00 | Breakfast at GIST student cafeteria 1F<br>Registration<br>Opening remark<br>Session 1<br>Lunch (Faculty – at Oryong Hall, Students : Lunch at student cafeteria 2F)<br>Put up your posters on board<br>Session 2<br>Poster presentation Ⅰ (No. P1~P10)<br>"Welcome Reception" at the Oryong Hall Restaurant |
| **15(Tue.)** | | 2st day of symposium |
| | 8:00<br>9:00~12:00<br>13:00~14:00<br><br>13:30-14:00<br>14:00~15:30<br>15:30~16:40<br><br><br><br>16:40~17:30<br>17:30 - | Breakfast at GIST student cafeteria 1F<br>Session 3<br>Lunch (Faculty – at Oryong Hall, Students : Lunch at student cafeteria 2F)<br>Organizing committee Meeting<br>Poster presentationⅡ (No. P11~P30)<br>Lab. tour (School of MSE)<br>1. Biomacromolecular Engineering Lab.(Prof. Tae GY)<br>2. Nanophotonic semiconductor Lab.(Prof. Park SJ)<br><br>Closing & Award ceremony<br>Free time |
| **16(Wed.)** | | Excursion |
| | 8:00<br>9:00<br><br>10:30~12:00<br>12:00~13:30<br>13:30~15:30<br><br>16:00<br>18:00 | Breakfast at GIST student cafeteria 1F<br>Departure (Meet at front of Internatinal hall (Faculty accom.))<br>- Jeonju Hanok Village<br>- Lunch<br>- Activities of Hanji<br>http://tour-eng.jeonju.go.kr/index.sko<br>Arrival at GIST<br>Dinner at a restaurant in GIST by yourself<br><br>**Departure - NAIST Group Ⅰ(2) 16(wed.) 13:00** |

| | | |
|---|---|---|
| **17(Thu.)<br>~21(Mon.)** | Lab. Experience and leave | |
| | 8:00 | Breakfast at GIST student cafeteia 1F<br>**Lab. Experience Program - NAIST 10 Students – Bldg. SMSE**<br><br>**Departure**<br>17(Thu.) NAIST Group Ⅱ(6), NCTU Group Ⅰ(7), Check-out and<br>Departure<br>18(Fri.) NAIST Group Ⅲ(1), NCTU Group Ⅱ(3) Check-out and Departure<br>21(Mon.) NAIST Group Ⅳ(10) Check-out and Departure |

## Technical Program

| Time | Speaker | . | Title |
|---|---|---|---|
| 08:30~09:00 | Registration | | |
| 09:00~09:15 | Opening remark | | Greetings, program introduction |
| 09:15~09:45 | **Hiroshi Daimon** | **NAIST** | Microanalysis of atomic and electronic structure by new photoelectron emission microscope |
| 09:45~10:15 | **Pawel L. Urban** | **NCTU** | Microscale and nanoscale tools for single-cell analysis |
| 10:15~10:30 | Break | | |
| 10:30~11:00 | **Hironari Kamikubo** | **NAIST** | Phisicochemical properties of low barrier hydrogen bonds involved in proteins |
| 11:00~11:30 | **Jenh-Yih Juang** | **NCTU** | Enhanced free exciton emission in crystalline ultrathin ZnO films grown on Si-nanowires by atomic layer deposition |
| 11:30~12:00 | **Heung Cho Ko** | **GIST** | Transfer Printing Method Using Single Crystal Silicon for Flexible Electronics |
| 12:00~14:00 | Lunch Student cafeteria 2F | | |
| 14:00~14:30 | **Yukiharu Uraoka** | **NAIST** | New Functional Device Fabricated using Bio Nano Process |
| 14:30~15:00 | **Myung-Han Yoon** | **GIST** | Soft Electronics Based on Molecular Semiconductors and Ultrathin Dielectrics |
| 15:00~15:30 | **Jiunn-Yuan Lin** | **NCTU** | Optical detection on the Dirac cone states in topological insulators |
| 15:30~15:45 | Break | | |
| 15:45~16:15 | **Jiyoung Jo** | **GIST** | Electromechanical properties of ferroelectric oxide heterostructures |
| 16:15~16:45 | **Wen-Hao Chang** | **NCTU** | Cavity Quantum Electrodynamics of Semiconductor Quantum Dots for Quantum Photonics Applications |
| 16:45~17:15 | **Moon Ho Ham** | **GIST** | Photoelectrochemical complexes for solar energy conversion that chemically and autonomously regenerate |
| 17:15~18:00 | Poster session Ⅰ | Oryong Hall Lobby (No. P1~P10) | |
| 18:00~20:00 | Reception | Oryong Hall Restaurant | |
| 09:00~09:30 | **Takashi Nishida** | **NAIST** | Fabrication of PbTiO3 and Pt self-organized nanocrystal array structures for high density ferroelectric memories |
| 09:30~10:00 | **Hyunsang Hwang** | **GIST** | Electrical and Reliability Characteristics of ReRAM for Cross-point Memory Applications |
| 10:00~10:30 | **Takashi Matsuo** | **NAIST** | Regulation/Modification of Biomolecule Functions and Bioreactions by Synthetic Compounds |
| 10:30~10:50 | Break | | |
| 10:50~11:20 | **Ian Liau** | **NCTU** | Quantum-dot Based Sensors for Selective and Absolute Quantification of Endogenous Hypochlorous Acid |
| 11:20~11:50 | **Takuya Nakashima** | **NAIST** | Functionalization of Semiconductor Nanocrystals Based on Surface Chemistry, Bandgap Engineering and Composite formation |
| 11:50~14:00 | Lunch | Student cafeteria 2F // Faculty meeting | |
| 14:00~15:30 | Poseter session Ⅱ | Oryong Hall Lobby (No. P11~P30) | |
| 15:30~16:40 | Lab Tour<br>1. Prof.GY Tae, 2. Prof.SJ Park | | School of MSE Lab. Tour for Students / Make two groups, with each group to visit a lab |
| | Faculty / Poster review meeting | | |
| 16:40~17:30 | Closing ceramony | Oryong Hall Restaurant | |

## Poster Presentation

| No. | Name | Univ. | Presentation Title | Lab. |
|---|---|---|---|---|
| P-1 | **Yohan Suh** | GIST | An efficient electron transport layer using electrospun TiO2 nanowires for inverted polymer solar cells | Nanomaterials for Energy Conversion Lab. |
| P-2 | **Wei-Cheng Kuo** | NCTU | Controlled resistance switching in multiferroic bismuth manganite films | Solid State Physics Lab. |
| P-3 | **Hiroshi Shibaguchi** | NAIST | Circularly Polarized Luminescent Supramolecules; its Structure and Chiroptical Amplification / Inversion | Green Nanosystem Lab. |
| P-4 | **Hyun A Cho** | GIST | Arrays of printable silicon micro/nanostructures suspended configurations by polymer pedestals | Flexible Electronics Laboratory |
| P-5 | **Akira Fujii** | NAIST | Creation of Functional Biomolecules with Switchable Function. | Supramolecular Science Lab. |
| P-6 | **Po-Han Chan** | NCTU | Functional gold nanocluster-based sensing approaches for bacteria | Analytical Chemistry |
| P-7 | **Kwang Ho Lee** | GIST | Printed Au electrodes based OTFT device using micro contact printing on adhesion layer | Advanced Lithography for Integrated System Lab. |
| P-8 | **Makito Haruta** | NAIST | Development of a CMOS-based implantable imaging device for wide-area brain imaging. | Photonic Device Science Lab. |
| P-9 | **Gi-cheol Son** | GIST | Fabrication of amorphous zinc-tin-oxide thin-film transistors by sol-gel solution process | Bio-Electronics Materials Lab. |
| P-10 | **Takahiro Doe** | NAIST | Downsizing to Quantum Dots Range of Zinc Sulfide Particles Using Electro Spray Pyrolysis Route | Information Device Science Lab. |
| P-11 | **Hongkyu Kang** | GIST | High-Efficiency Polymer Solar Cells Using Composites of Metal Oxide and Metal Carbonate as Cathode-Independent Electron Transport Layers | Organic Semiconductors& Photonics Lab. |
| P-12 | **Yoshihiro Tsunemi** | NAIST | Fabrication of metal coated micro VCSELs | Ultrafast Photonics Lab. |
| P-13 | **Meng Gong Jiang** | NCTU | Hole Dynamics in Overdoped Cuprates | Condensed Matter Physics |
| P-14 | **Makoto Taguchi** | NAIST | Optically Active Polyfluorenes : Achiral Solvent Induced Chiroptical Inversion Effects | Advanced Polymer Science Lab. |
| P-15 | **Takanobu Moriuchi** | NAIST | Cerasome as a Nano-Carrier for Gene Delivery to Hippocampal Neurons | Biomimetic Materials Science Lab. |
| P-16 | **Han Na Lee** | GIST | Injectable hydrogels for accommodative lens refilling | Biomacro Molecular Engineering Lab. |
| P-17 | **Akinori Shigemasa** | NAIST | Femtosecond Laser Ablation in Plant Cell Analyzed by Confocal Laser Scanning Microscopy | Green Bio-Nano Lab. |

| No. | Name | Univ. | Presentation Title | Lab. |
|---|---|---|---|---|
| P-18 | **Min-Kyu Kyeong** | GIST | Investigating biocompatibility of conducting polymers doped with heparin | Bio-Electronics Materials Lab. |
| P-19 | **Hitoshi Mizuno** | NAIST | Laser Oscillation from Low Dimensional Crystals of Thiophene/Phenylene Co-Oligomers | Quantum Materials Science Lab. |
| P-20 | **Po-Han Li** | NCTU | Glutathione-bound Gold Nanoclusters for Fluorimetric Detection of Phosphate-containing Metabolites | Analytical chemistry |
| P-21 | **Seong Min Ha** | GIST | Metallic Nanowire supported Cobalt Oxide Anode for Enhanced Stability of Lithium-Ion Batteries | Nanomaterials for Energy Conversion Lab. |
| P-22 | **Naoyuki Maejima** | NAIST | Local electronic state analysis of the post-nitridized oxide film on SiC(0001) surface | Surface and Materials Science Lab. |
| P-23 | **Eun Jeong Paek** | GIST | Novel Pressure Sensitive Touch Sensor using Metal/Piezoelectric/graphene stack | Exploratory Hybrid Electronic Device Lab. |
| P-24 | **Shin Uegaki** | NAIST | Magnetic scattering profiles of Fe layers in the double periodic epitaxial Fe/Au multilayer measured by resonant X-ray magnetic scattering in the applied field of [100] and [110] directions | Nanostructure Magnetism Lab. |
| P-25 | **Wei-Ting Hsu** | NCTU | Manipulating the Emission Properties of InAs/GaAs Quantum Dots by a GaAsSb Capping Layer | Soild State Quantum Phtonics Lab. |
| P-26 | **Hyunjune Hwang** | GIST | Modulation of Graphene Conductance using Ferroelectric Polarization | Exploratory Hybrid Electronic Device Lab. |
| P-27 | **Hye-min Shin** | GIST | Presentation Title : Sergeant and soldiers effects: Helix-Inducing placement of α-chiral aromatic residues in peptoid sequence | Bio-Electronics Materials Lab. |
| P-28 | **Emi Sugimura** | NAIST | Spatially Resolved Electroluminescence Imaging for Detecting Shunt Sources in Crystalline Silicon Solar Cells | Microelectronic Device Science Lab. |
| P-29 | **Yonghun Kim** | GIST | Study on Time Domain Reflectometry (TDR) for a characterization of leaky Al2O3 MIM capacitor | Exploratory Hybrid Electronic Device Lab. |
| P-30 | **Shuhei Katsuta** | NAIST | Synthesis and Properties of Pentacene, Tetracene and Anthracene Bisimides | Green Material Lab. |

## Lab. Tour

GIST SMSE Lab Tour Program is prepared for the NAIST, NCTU students on Nov.15th (Tue.)
The students will start Lab Tour devided in two group after Poster presentation 2.

**Group1 : Poster No. P1 ~ P14 (9 person)**

1. 15:40~16:00 : Biomacromolecular Engineering Lab. (Prof. Tae Giyoong)
2. 16:05~16:25 : Nanophotonic semiconductor Lab. (Prof. Park Seong-ju)

**Group2 : Poster No. P15 ~ P30 (9 person)**

1. 15:40~16:00 : Nanophotonic semiconductor Lab. (Prof. Park Seong-ju)
2. 16:05~16:25 : Biomacromolecular Engineering Lab. (Prof. Tae Giyoong)