

My recent visit of higher education institutions in the UK

(July 13-21, 2010)

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[August 3, 2010]

This article first appeared in EECS NCKU

Visit of Higher Education Institutions in the UK - Part 1 :

1. Taiwan-UK Research Collaboration Forum and Higher Education Funding in the UK
2. Imperial College London
3. King's College London
4. University College London (UCL)

Dear Colleagues and Friends:

Since the inception of Oxford University, United Kingdom has had more than eight hundred years of experiences in the development of higher education. Numerous historically famous scientists, writers and politicians have been educated by universities in the UK.

In 1991, I spent six months as a visiting scholar in the Cavendish Laboratories at University of Cambridge, which is jointly called "Oxbridge" with Oxford University, and exposed myself to world leading research environments. During those six months, I got the chance to work hand-in-hand with pioneering scientists from around the world and enjoyed inspiration from transformative and interruptive research undertaken in the university. Nineteen years later, I had the second chance for an extended visit of the higher education in the UK. On July 13-21, 2010, I joined a delegation from seven top universities in Taiwan led by President Lee of National Taiwan University and Director General Chang of International Affairs, National Science Council and spent ten days visiting Royal Society, Research Councils UK, Higher Education Funding Council for England, and seven top universities in the UK.

It was midst of July, the week of summer graduation for many universities in the UK. High level administrators in universities were busy with many graduation ceremonies they had to attend. We were fortunate to have the



Shown in the photo taken after the Taiwan-UK Forum are (from left to right) Dean of College of Electrical Engineering and Computer Science, Professor Tzeng, NCKU, President Steve Smith of UUK, and Dean of R&D Professor Chern, NTU.

assistance by staff of the National Science Council, Taiwan, Office of R&D, National Taiwan University, British Council Taipei, Taipei Representatives in London, and Universities UK to arrange for a formal visit of these institutions.

The main missions of the Taiwan delegation were (i) to understand the national level and university level higher education organizations, and their assessment strategies and funding structures, and (ii) to visit with enthusiastic, friendly and influential academic administrators and scholars in UK's top universities. Our goal is to effectively promote Taiwan-UK collaboration on all fronts, especially in high impact research.

By appointment of President Lai, I joined the delegation in representation of NCKU, visited these higher education institutions and met with nearly one hundred high level administrators, distinguished scholars as well as students from Taiwan who were studying in the UK.

UK is historically a highly internationalized country based on its global colonial history. In modern economy, it still plays a pivotal role in international financing and trading. Regarding the internationalization of academics, I was most impressed by a report I read when I visited Research Councils UK, which stated that more than half of publications in the UK were involved in foreign coauthors and those publications with foreign coauthors on average created 50% higher impact in terms of citations. This is further confirmed by very comfortable hospitality we experienced and the eagerness of our hosting delegations in pursuing collaboration with researchers in Taiwan.

Before we concluded the ten-day visit, a Taiwan-UK Forum was held in London. High level academic representatives from nearly twenty research intensive universities, besides those ten institutions we visited, attended the Forum. The Forum was jointly hosted by President of Universities UK, an alliance of 133 universities in the UK and President of National Taiwan University, the leader of the alliance of eleven top universities in Taiwan.

Participants of the Forum listened to keynote speeches about research programs and opportunities of collaboration in Taiwan and the UK. Each delegate from Taiwan also introduced the uniqueness and strengths of the university he/ she represented in Taiwan. A subsequent session of active discussion and exchange of experiences in international collaboration facilitated the brainstorming among Forum participants and Taiwan delegates in creative ideas of promoting collaboration.

During the ten-day intensive dialogues with our hosting delegations, participants of the Taiwan-UK Forum, and Taiwanese students who studied in the UK, a lot has been learned about academic research, education, and involvements of universities in society and economy in the UK. The degree awarding educational system in the UK is quite different from that in Taiwan. From what I learned from discussion with students from Taiwan who were currently studying in the UK, too much emphasis in grade points as the major means of assessing student performance hinders the imagination and creativity of students in Taiwan and their potential for transformative and interruptive research accomplishments.

The college education in the UK emphasizes mainly on specialties students choose. Usually, it takes only three years for a student to earn a Bachelor's degree. During this period of time, students take mainly courses relevant to their specialties. Master degrees and Ph.D. degrees usually take one year and three to three and half years to complete, respectively. Master degree is not required for a person to earn a Ph.D. degree. Students can study towards Ph.D. degrees directly after completing their Bachelor's degrees.

During the period of working on a Ph.D. degree, there is usually no credit hour requirement for course taking. Examinations are optional depending on individual Ph.D. programs and often decided by student advisors. In

disciplines related to science and engineering, usually, the Ph.D. education is divided into two stages i.e. MPhil and Ph.D. stages. The MPhil stage is similar to the Master Degree program and takes about one year and half to complete. During this first stage, students usually have to submit two or more reports and pass some oral examinations as required by each individual department. If a student passes this stage, he/she will become a formal Ph.D. student. If a student fails this stage, he/she might be offered a Master Degree or a certificate for equivalent courses.

UK's pre-college education is very diversified with an aim at holistic education. Report submission is more emphasized than written examinations. This allows the freedom for students to explore their real interest. Only those who wish to and need to receive higher education will compete to get admission to universities of their choices. The competition in entering top universities is very tough.

Students in the UK take 13 years of education before college compared to 12 years of education in Taiwan. In other words, the college freshman year in Taiwan is actually spent in the last year of pre-college "high school".

The pre-college education system in the UK gives college students with extensive cultivation in humanity before they enter universities. University education provides them with room for unlimited imagination and creativity, which often were inspired through interactions with people in different disciplines.

For a country with a population about 2.5 times that of Taiwan, there are less universities in the UK (about 130) than what we have in Taiwan (about 160). Only few universities in the UK are private. Almost all universities receive most of their resources (typically 60% or more) from the government funding agencies. A basic fund based on the number of enrolled students plus a highly competitive block fund based on nonlinear merit and subject based weighting factors for each researcher received from the government by each university. Highly competitive research grants for individual projects from within the UK and the European Union Framework Programs play an important role in the freedom of creative academic research.

For example, a researcher who is assessed to be "world leading" in research receives a weighting factor of "seven." A researcher who is assessed to have missed the basic national standards receives a weighting factor of "zero." Therefore, top ten percent of the universities receive the majority of the competitive block fund. Despite the fact that universities rely heavily on government funds, every university in the UK is autonomous financially and academically. UK is one example for scholars in Taiwan to learn when discussing about autonomous universities.

Global challenges, internationalization, interdisciplinary research, student employability, interactions with and technology transfer to industries are among emphases often stated in pride by universities we visited. Every university has its proud historical accomplishments and renowned figures as well as unique world leading on-going research projects.

In the following eight reports, I have tried to summarize information I collected, impression I received, as well as miscellaneous issues I observed during my visit. I also included contact information for people I met. They all are eager to pursue collaboration with outstanding researchers in Taiwan.

I hope that these reports can help team up people of common interest in Taiwan and in the UK to pursue collaborative research and education. If there is anything that I can help further in this regard, please feel free to let me know. You are very welcome to contact directly our hosting delegations in the UK as well as university representatives from all over the UK whom we met in the Taiwan-UK Forum.

Sincerely,

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Design & Layout : Ivan Tarn, The Banyan Editorial Office

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Taiwan-UK Research Collaboration Forum and Higher Education Funding in the UK: Visit by Taiwan Top Universities Delegation

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This article first appeared in EECS NCKU

Hosting Delegations:

(A) Research Council UK (Swindon) – July 13

1. Ms. Sarah Verth, Policy Manager, International, RCUK (sarah.verth@rcuk.ac.uk, www.rcuk.ac.uk)
2. Mr. Tim Willis, Head of International Relations Unit, Biotechnology and Biological Sciences Research Council (tim.willis@bbsrc.ac.uk)
3. Ms. Pippa Craggs, International Policy Manager, Arts and Humanity Research Council (p.craggs@ahrc.ac.uk)
4. Dr. Peter Fletcher, Assistant Director, International and Strategic Partnerships, Science and Technology Facilities Council (peter.fletcher@stfc.ac.uk)

(B) Higher Education Funding Council for England (HEFCE at Universities UK Office, London) – July 15

1. Cliff Hancock, International Relationships Manager of HEFCE

(C) The Royal Society (at UUK Office) – July 15

1. Phil Hurst, Publications Department, Royal Society
2. Dr. Hans Hagen, Senior Manager, Grants, the Royal Society (hans.hagen@royalsociety.org)

(D) Dinner hosted by Universities UK, Prince's Room at the British Medical Association, Tavistock Square, London – July 20

1. Dr. Nicola Dandridge – Chief Executive of Universities UK (nicola.dandridge@universitiesuk.ac.uk)
2. Special Guests:
 - (i) Steve O'Leary, Director of International Services Business, UK Trade & Investment (steve.oleary@ukti.gsi.gov.uk)
 - (ii) Christine Skinner, Account Director of Programmes and Projects, British Council (christine.skinner@britishcouncil.org)
 - (iii) Christine Bateman, Senior Advisor PMI & Education Marketing, British Council

(E) UK-Taiwan Research Collaboration Forum (UUK, London), The Prince's Room

at British Medical Association, London – July 21 (A partial list of participants, with whom I exchanged business cards.)

1. Prof Steve Smith, President, Universities UK (ceooffice@universitiesuk.ac.uk)
2. Mr. Chris Hale, Deputy Director of Policy, Universities UK (chris.hale@universitiesuk.ac.uk)

3. Ms. Elizabeth Farnell, Communications Officer, UK HE International Unit (elizabeth.farnell@international.ac.uk)
4. Ms. Callista Punch, Manager/Policy Advisor, UK HE Europe Unit and International Unit (callista.punch@europeunit.ac.uk)
5. Ms. Elizabeth Farnell, Communications Officer, UK HE International Unit (elizabeth.farnell@international.ac.uk)
6. Mr. Christian Yeomans Policy Analysis & Public Affairs Officer, UK HE Europe Unit (christian.yeomans@europeunit.ac.uk)
7. Mr. Ching-An Chuang, Assistant Director, Taipei Representative Office in the United Kingdom Science and Technology Division (stdtro@btconnect.com)
8. Mr. Hsin-Yuan Lai, Director Programme, British Council in Taipei (hsinyuan.lai@britishcouncil.org.tw)
9. Ms. Dawn Chen, Assistant Director Education Promotion, British Council in Taipei (dawn.chen@britishcouncil.org.tw)
10. Dr. Julia Brown, Director of Business & Marketing, Life and Health Sciences, Aston University (j.brown@aston.ac.uk)
11. Professor Jeremy P. Bradshaw, Director of Postgraduates and International Affairs, College of Medicine and Veterinary Medicine, The University of Edinburgh (j.bradshaw@ed.ac.uk , www.ed.ac.uk/.../home)
12. Professor David P. Hornby, Head of Department of Molecular Biology & Biotechnology, The University of Sheffield (d.hornby@sheffield.ac.uk)
13. Professor Stephen Williamson, Deputy Vice-Chancellor (Research & Innovation) University of Surrey (steve.williamson@surrey.ac.uk)
14. Professor Mike Holmes, Head of the Graduate School, Faculty of Science and Technology, University of Central Lancashire (mcholmes@uclan.ac.uk)
15. Professor Dinos Arcoumanis, Deputy Vice-Chancellor (Research and International), City University London (arcoumanis@city.ac.uk, www.city.ac.uk)
16. Ms. Victoria Shaw, Senior International Liaison Officer, University of Sussex (v.a.shaw@sussex.ac.uk)
17. Professor Roy W. Chantrell of Condensed Matter Physics, The University of York (rc502@york.ac.uk)
18. Professor Dougl Tallack, Professor of American Studies, Pro-Vice-Chancellor and Head of College of Arts, Humanities and Law, University of Leicester (prof.d.tallack@le.ac.uk)
19. Professor Andrew Atherton, Pro Vice Chancellor, University of Lincoln (aatherton@lincoln.ac.uk)
20. Dr. Brendan Barker, Head of International Development, University of Dundee (b.g.barker@dundee.ac.uk)
21. Professor Alan Harvey, Director, Strathclyde Institute for Drug Research, University of Strathclyde (sidr@strath.ac.uk)
22. Professor Chris Marlin, Pro-Vice-Chancellor International, Sussex University (chris.marlin@sussex.ac.uk)
23. Professor Carsten Maple, Professor of Applicable Computing, Head of Computer Science and Technology, Faculty of Creative Arts, Technologies and Science, University of Bedfordshire (carsten.maple@beds.ac.uk)
24. Professor Nigel South, Pro-Vice Chancellor (Academic and Regional Development), University of Essex (south@essex.ac.uk)
25. Professor Sue Kilcoyne, Associate Dean for Research & Innovation, Faculty of Science, Engineering & Environment, The University of Salford (s.h.kilcoyne@salford.ac.uk)
26. Dr. I-Ling Kuo, Senior Lecture of Tourism Management, London Metropolitan Business School (i.kuo@londonmet.ac.uk)
27. Dr. Linton Winder, Research & Knowledge Transfer Manager, University of Exeter (l.winder@exeter.ac.uk)
28. Professor Zheng-Xiao Guo, Professor of Materials Chemistry, Pro-Provost (China, Hong Kong and Macau), FCO/BIS Focal Point in Nano & Materials Science (UK-China), University College London (z.x.guo@ucl.ac)

uk, www.ucl.ac.uk/global/china)

Taiwan Delegation:

1. Prof. Si-Chen Lee, President of NTU (sclee@cc.ee.ntu.edu.tw)
2. Prof. Ching-Ray Chang, Director General, Department of International Cooperation, National Science Council, Taiwan (crchang@nsc.gov.tw)
3. Ms. Cheng-Tung Tao, Program Director, Department of International Cooperation, NSC (cttao@nsc.gov.tw)
4. Prof. Ji-Wang Chern, Dean of R&D, NTU (jwchern@ntu.edu.tw)
5. Prof. Chao-Tsen Chen, Group Leader of Strategic Planning, Office of R&D, NTU (chenct@ntu.edu.tw)
6. Prof. Yonhua Tzeng, Dean of College of Electrical Engineering and Computer Science, National Cheng Kung University (tzengyo@mail.ncku.edu.tw, tzengyo@gmail.com)
7. Prof. Yeng-Horng Perng, Vice President, National Taiwan University of Science and Technology (vpresident@mail.ntust.edu.tw)
8. Prof. Chen-Yi Lee, Dean of R&D, NCTU (cylee@faculty.nctu.edu.tw)
9. Prof. Tsun-Yee Chiu, Dean of R&D, National Chang Gung University (dtychiu@mail.cgu.edu.tw)
10. Prof. Yen-Hsyang Chu, Dean of R&D, NCU (yhchu@jupiter.ss.ncu.edu.tw)
11. Prof. Chuan-Mu Chen, Dean of R&D, NCHU (chchen1@dragon.nchu.edu.tw)

Internationalization is one of main themes for developing global top universities in Taiwan. Towards this common goal, a delegation of R&D leaders from top universities in Taiwan was led by President Lee of National Taiwan University to visit founding agencies (Research Councils UK and Higher Education Funding Council for England), Royal Society, Universities UK, and seven universities in UK: University of Bath, King's College London, Imperial College London, University College London, University of Glasgow, University of Edinburgh, and University of Southampton. Please refer to separate reports for the visit of each of seven universities.

The missions of this visit are multifaceted. Detailed understanding of strengths, strategies and funding mechanisms for higher education in the UK is essential to success promotion of Taiwan-UK collaboration. Identifying current and future project coordinators for the 7th European Union Framework Program and providing assistance in matching researchers in Taiwan and UK for such projects is one of the most effective ways for the participation of Taiwan scholars in the EU NCP projects. NSC's Dragon Gate Project wishes to select top universities for sponsoring faculty, postdoctoral fellows, and doctoral students in Taiwan to spend one to two years in conducting research hand-in-hand with renowned scientists in the UK. The delegation makes an effort to visit with enthusiastic and friendly top university administrators, funding officers, and influential scholars in the UK to help provide researchers in Taiwan with channels of effective communication for further pursuit of collaborative research and education. By the appointment of President Michael Lai of NCKU, I enjoyed the honor of representing NCKU as a member of the Taiwan delegation and visited the higher education institutions and organizations in the UK.

The highest governmental authority for the higher education in the UK is the Department for Business, Innovation and Skills (BIS). Funding for higher education in the UK follows a "dual support system" which is similar to what we have in Taiwan. Research Councils UK fund individual projects and part of postgraduate students while Higher Education Funding Councils fund research infrastructure and salaries, etc. Unlike NSC in Taiwan, there are seven independently operated Research Councils in the UK, collectively known as RCUK. RCUK manages about 21% of the total higher



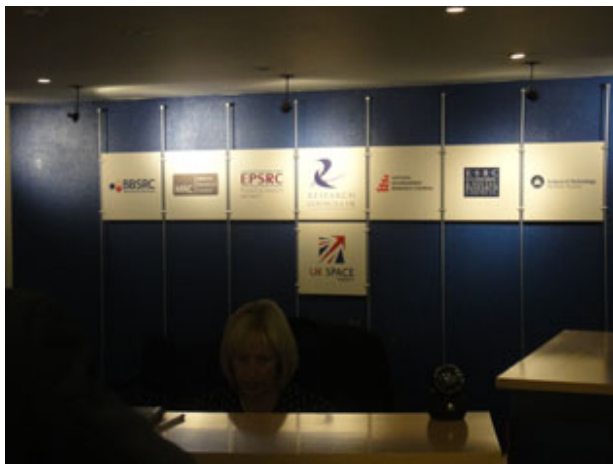
education research funds in UK. They are non-governmental public bodies for each of the following disciplines: Arts and Humanities Research Council (AHRC), Biotechnology and Biological Sciences Research Council (BBSRC),

Engineering and Physical Sciences Research Council (EPSRC), Economic and Social Research Council (ESRC), Medical Research Council (MRC), Natural Environment Research Council (NERC), and Science and Technology Facilities Council (STFC). The non-governmental nature of the RCUK ensures the bottom-up process in academic freedom and the pursuit of creative research by scholars in the UK.



Itinerary of Taiwan delegation in the UK.

Funding decision follows a bottom up process. This made it difficult for RCUK to set aside money for funding international collaboration with specific countries like Taiwan. Nevertheless, according statistics, about 50% of publications by UK researchers involved foreign co-authors. UK publications with foreign authors resulted in impact of, on average, 50% higher than those without foreign co-authors.



Headquarters of Research Councils UK.

NSC has previously signed MOUs with BBSRC, EPSRC, and AHRC. During his introduction of BBSRC, Dr. Tim Willis emphasized that besides universities, BBSRC also had six world class Research Institutes where researchers in Taiwan can find excellent collaborators. These Institutes are (i) Institute of Food Research; (ii) Institute for Animal Health; (iii) Rothamsted Research – on sustainable plant-based agriculture and the environment; (iv) John Innes Center – Research and training in plants and microbial science (world number one in citations); (v) Babraham Institute – supporting biomedical, biotechnological and pharmaceutical sector; and (vi) The Genome Analysis Centre – Bioinformatics.

When the Dragon Gate project was introduced by Director General Chang of NSC, our hosts were a little surprised why we would send our top talents to research labs of UK instead of keeping them for Taiwan's own needs. We were also informed that the Dragon Gate project could be easily implemented because Brazil had already had an agreement with the UK to send 40 doctoral students for research in the UK. Apparently, outstanding researchers are welcome by UK research institutes and we should explore all opportunities to send our motivated faculty, researchers, and doctoral students to the best research institutes to work with top scientists and scholars in the UK. It is our wish that they will return to Taiwan after one or two years with new knowledge and skills as well as culture of higher education relevant to the well demonstrated high-quality and productive research in the UK.

Apparently, the importance and benefits of international collaboration is well recognized and implemented by UK researchers. On the Taiwan side, MOUs are required in Taiwan in order for government to set aside reserved funds for promoting collaborative research with specific countries. According officers of RCUK, they do not have spare funds to set aside for sponsoring collaborative research projects with a specific country. International collaboration is highly encouraged in the UK. However, funding of international collaboration is totally merits based and usually is attached as part of an awarded research grant selected based on peer review. My suggestion for NSC, Taiwan and Research Councils UK to sign MOUs even without reserved funds on the UK side should remove the final technical barrier against promoting collaborative research projects among Taiwan and UK researchers.

Higher Education Funding Councils for England (HEFCE), Scottish Higher Education Funding Council (SHEFC), Higher Education Funding Council for Wales (HEFCW), and Northern Ireland Higher Education Funding Council

(NIHEFC) are four Councils which provide the majority of funds for higher education in the UK. Medical and dental schools receive fund allocation from HEFC for teaching and research and National Health Service (NHS) for hospital and clinical facilities.

The Total sources of research income of 5,484M in UK (from Higher Education Funding Council for England, EFCE 2009) include, in the decreasing order by money amount, the following: (i) HE funding bodies 1,762M; (ii) Research Councils 1,358M; (iii) UK charities through open competitive processes 708M; (iv) UK central government/local health and hospital authorities 639M; (v) Other grants and contracts 603M; (vi) UK industry 296M; and (vii) UK charities (other) 118M.

The funding allocation of 7,476M by HEFCE in 2008-2009 academic year includes, in the decreasing order by money amount : (i) Teaching 4,632M; (ii) Research 1,460M; (iii) Earmarked capital funding 902M; (iv) Special funding 337M; (v) Business and community engagement (Higher Education Innovation Fund) 120M; and (vi) Additional funding for very high cost and vulnerable science subjects 25M.

Besides funds for basic operation based on the number of students, block research funds for flexible uses by universities is provided by HEFCE based on weighted merits in different subjects. The weighting factor for every research active teacher and researcher based on their quality of evaluation by an independent research assessment exercise is multiplied with the weighting factor for the subject of the teacher and researchers to become the individual weighted teacher or researcher. The total weighted number of teachers and researchers of a university is based on to receive the merits based block fund. The subject based weighting factors include (i) High-cost laboratory and clinical subjects (x1.6); (ii) Intermediate cost subjects (x1.3); and (iii) Others (x1.0).

The research assessment exercise weighting factors include (i) Category 4: World leading (weighting factor: x7) (ii) Category 3: Internationally excellent (x3); (iii) Category 2: International standard (x1); (iv) Category 2: National standard (x0); and (v) Category 1: Below National standard (x0). The fund distribution is, therefore, highly non-uniform. Top few universities conducting highest quality research receive the majority of the block funds. Those universities without high performance research active researchers receive nothing from this distribution. This is, to some extent, similar to the MOE's "Top University Project" in Taiwan with a much larger differential funding levels between the best university and the average universities.

Funded in 1660, the Royal Society is the oldest independent scientific academy which celebrates its 350th anniversary in 2010. The Society's work is supported by 1400 Fellows and Foreign Members. Each year 44 new Fellows are elected. Royal Society invests 43M received from Government (Parliamentary Grant in Aid) and 8M from private sources in FY 08/09 through 19 grant making schemes. Around 1500 awards were made in FY08/09 including 150 fellowships.

The Society offers various grants including the Mobility Grants for bilateral projects with cost-share agreement with NSC, Taiwan to offer 5 co-funded awards per year. It also offers Early Career Fellowship, known as Newton International Fellowships, to attract the best first time post-doctoral researchers to the UK for 2 years. Further information about funding of the Society can be found at www.royalsociety.org/funding. The person of contact about grants of Royal Society is Dr. Hans Hagen (hans.hagen@royalsociety.org.uk , +44-(0)202-7451-2551).



Royal Society publishes seven journals including the publication of the world's first scientific journal

"Philosophical Transactions" in 1665. Philosophical Transactions published historically significant articles such as (i) Light and colors by Newton in 1672; (ii) Flying a kite in an electrical storm by Franklin in 1752; (iii) First electric battery by Volta in 1800; (iv) Electromagnetism by Maxwell in 1865; (v) Structure of DNA by Watson and Clark in 1954; (vi) Black holes by Hawking in 1970; and (vii) Biodiversity by May in 1994. The average rejection rate for its journals is about 75%. So far, only about 5% of its published articles are authored by Asian.

Universities UK (UUK) is the representative body for the executive leadership of UK universities currently having 133 member universities and about 100 staff members in its three offices led by the Chief Executive, Dr. Nicola Dandridge. Although practically all universities in the UK are public universities and only few are private, universities in the UK are all autonomous institutions. The university alliance, Universities UK, does not have any regulatory power to impose changes to its member universities. The mission of UUK is to be the essential voice and the best support for a vibrant, successful and diverse university sector, to influence and create policies for higher education, and to provide an environment where the interest of the higher education can flourish.

Professor Steve Smith is the current President of Universities UK (UUK). He has been Vice-Chancellor and Chief Executive of the University of Exeter since October 2002. Dr. Nicola Dandridge serves as the Chief Executive. Dr. Chris Hale is Deputy Director of Policy at Universities UK (UUK). His responsibilities include developing and promoting policies on research assessment and funding, EU research, research ethics and governance, research careers and training, and issues relating to scholarly communications.

Universities in UK typically have a much lower student to teacher ratio and a higher staff to teacher ratio compared to those in Taiwan. UK has nearly 3 times of the population of Taiwan while funding less universities (about 130) than that in Taiwan (about 160). At the same time, the annual budget for higher education in the UK is much higher than that of Taiwan. The higher education investment per student in the UK is many times that in Taiwan. For a typical teacher who has taught for 10 years, the annual salary is about 60K (between 50K and 100K depending on performance). Teachers of different disciplines get the same treatment in their salaries while teachers of the same discipline get a wide range of salaries depending on individual performance.

After the visit of seven universities in UK, Chief Executive Nicola Dandridge of Universities UK (www.universitiesuk.ac.uk) hosted a dinner banquet in the London British Medical Association near the Hotel Russell, where we stayed, for the Taiwan delegation and a number of guests from around UK. Guests whom I met in the dinner included Professor David Hornby, Head of Department of Molecular Biology & Biotechnology, The University of Sheffield (d.hornby@sheffield.ac.uk, www.sheffield.ac.uk/mbb), Dr. Julia Brown, Director of Business & Marketing, Life and Health Sciences, Aston University (j.y.brown@aston.ac.uk), Ms. Christine Skinner, Account Director, British Council (Christine.skinner@britishcouncil.org), Mr. Steve O'Leary, Director International Services Business (steve.oleary@ukti.gsi.gov.uk), and Professor Zheng-Xiao Guo, Professor of Materials Chemistry, Pro-Provost (China, Hong Kong and Macau), FCO/BIS Focal Point in Nano & Materials Science (UK-China) of UCL (z.x.guo@ucl.ac.uk, www.ucl.ac.uk/global/china).

Professor Jeremy P. Bradshaw, Director of Postgraduates and International Affairs, College of Medicine and Veterinary Medicine, The University of Edinburgh (j.bradshaw@ed.ac.uk) and Ms. Callista Punch, Manager, The UK Higher Education International and Europe Unit, Universities UK (callista.punch@europeunit.ac.uk) also attended the banquet. After the banquet, Professor David Hornby of University of Sheffield showed the typical British hospitality and invited us to a bar in the Hotel Russell for beers and an informal chat. Prof. Hornby came to London for signing a collaborative MOU pre-arranged with NCHU, Taiwan. Through the informal chat, we learned many more details,

which were not even touched in meetings during our visits of universities and organizations about both teaching and research for higher education in the UK. Dean of R&D of NCHU will arrange for a future visit of Professor Hornby to Taiwan to explore further collaboration with universities of common interest in Taiwan.

Higher education in the UK appears to be more time-efficient than most of other countries. Undergraduate programs are typically of three years long although four-year programs also exist. Master degrees can be completed in one year while top talent students can complete their doctoral program in three years even without a Master degree. Advanced degrees are offered as either research degrees without course taking requirements or taught degrees which requires passing of certain courses and credit hours. Understanding the degree requirements, the educational system, and higher education strategies in the UK is essential to Taiwan-UK collaboration.



Chief Executive Nicola Dandridge of Universities UK (standing) gave a welcome remark in a banquet hosted by UUK.



Director General Chang of NSC, Dean Yonhua Tzeng of NCKU, Professor David Hornby of University of Sheffield, Dean Chen of R&D of NCHU, and VP Perng of NTUST (from left to right) met to brainstorm about higher education in Hotel Russell, London.

On July 21, the last day of stay by the Taiwan delegation in the UK, a Taiwan-UK Forum was hosted jointly by Universities UK and the Taiwan delegation in an effort to conclude with an executable action plan for realizing Taiwan-UK collaboration. The Forum was jointly chaired by President of UKK, Prof. Smith, and President of NTU, Prof. Lee. Executive leaders from more than twenty research-intensive universities participated in this Forum.

After opening remarks made by President Smith of UUK and President Lee of NTU, keynote speeches were delivered by UUK's Deputy Director of Policy Dr. Hale and Director General Chang of NSC, Taiwan. An open discussion and Q&A session followed for exchange of information and ideas among participants. Delegates of Taiwan's top universities introduced the strengths and main themes of research in each university and invited participants for collaboration. The open discussion session concluded with recommendations (1) to resolve double jeopardy issue regarding funding of Taiwan-UK collaborative projects and (2) to hold research workshops for promoting joint research projects and exchange of scholars, post-docs and students.



Taiwan-UK Forum held in London, UK on July 21, 2010.

A round-table discussion among representatives of Taiwan top universities and forum participants from universities around UK was carried out to allow participants of UK universities to discuss face to face with Taiwan delegation and share with each other their experiences in international collaboration and possible actions to be followed up after the visit. The Forum concluded with exchange of gifts between Taiwan delegation and UUK.



President Lee of NTU Chaired a session for Taiwan delegates who introduced main research themes and strengths of top universities.



Shown in the photo taken after the Taiwan-UK Forum are (from left to right) Dean of College of Electrical Engineering and Computer Science, Professor Tzeng, NCKU, President Steve Smith of UUK, and Dean of R&D Professor Chern, NTU.

Financial sponsorship by National Science Council, Taiwan and British Council Taipei is appreciated. This is a very fruitful and enjoyable visit of higher education in the UK, which would not be possible without very effective coordination among staffs of National Science Council Taiwan, Taipei Representative Office in the UK, British Council Taipei, and the Universities UK.



Shown in the photo are (from left to right) Ms. Chen of British Council Taipei, Ms. Tao of NSC, and Mr. Lai of British Council Taipei who helped arrange for the visit along with other staff and accompanied the Taiwan delegation to UK.

Design & Layout : Ivan Tarn, The Banyan Editorial Office

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Imperial College London: Visit of Taiwan Top University R&D Delegation

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[July 14, 2010]

This article first appeared in EECS NCKU

Hosting Delegation:

1. Professor Mary Ritter, Pro Rector (International Affairs)
2. Professor Tim Green, Professor of Power Engineering, Department of Electrical and Electronic Engineering, Faculty of Engineering
3. Professor Sir Brian Hoskins, Director, Grantham Institute (b.hoskins@imperial.ac.uk)
4. Professor Elaine Holmes, Professor of Chemical Biology and Head of Biomolecular Medicine, Department of Surgery and Cancer, Faculty of Medicine.
5. Dr. Rob Fenton, Research Development Director, Institute of Biomedical Engineering (r.fenton@imperial.ac.uk, www.imperial.ac.uk/biomedeng)
6. Dr. Margaret Christie, Contracts Administrator (Europe), Research Office (m.christie@imperial.ac.uk)
7. Mrs. Lynne Cox, Director of Central Research Office (l.cox@imperial.ac.uk)
8. Ms. Angela Lin, East Asia Manager, International Office (shan.lin@imperial.ac.uk, www.imperial.ac.uk/international)

Taiwan Delegation:

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2. Prof. Ching-Ray Chang, Director General, Department of International Cooperation, National Science Council, Taiwan (crchang@nsc.gov.tw)
3. Ms. Cheng-Tung Tao, Program Director, Department of International Cooperation, NSC (cttao@nsc.gov.tw)
4. Prof. Ji-Wang Chern, Dean of R&D, NTU (jwchern@ntu.edu.tw)
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7. Prof. Yeng-Horng Perng, Vice President, National Taiwan University of Science and Technology (vpresident@mail.ntust.edu.tw)
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9. Prof. Yen-Hsyang Chu, Dean of R&D, NCU (yhchu@jupiter.ss.ncu.edu.tw)
10. Prof. Chuan-Mu Chen, Dean of R&D, NCHU (chchen1@dragon.nchu.edu.tw)

Taiwan top university R&D delegation led by President Si-Chen Lee of National Taiwan University visited Imperial College of London (ICL: www.imperial.ac.uk) on July 14, 2010. Imperial College London ranks the 3rd in Europe

and the 5th in the world according to Times Higher Education World Ranking. It ranks 4th in Europe and 26th in the world according to Shanghai Jiao Tong University Top 500 World Universities in 2009.

ICL was founded in 1907 as a constituent college of the University of London by merger of City and Guilds College, Royal College of Science, and Royal School of Mines, which were formed in 1851-1890 in realization of Prince Albert's vision for the pursuance of science and learning following the Great Exhibition in 1851. In 1988-2000, ICL merged with four London Medical Schools: St. Mary's Hospital Medical School, National Heart & Lung Institute, Charing Cross/Westminster & Royal Postgraduate Medical Schools, and Kennedy Institute to build up its strength in medicine. Imperial has been awarding its own degrees since 2007 when it left the University of London and became an independent university. Imperial College London created the UK's first Academic Health Science Centre through partnership with Imperial College Healthcare NHS Trust. The Center was recognized by the government in 2009. The University focuses on applying knowledge of science, engineering, medicine and business across industry, commerce and healthcare. It has currently seven London campuses and one campus at Silwood Park, Ascot in South East England.

It has over 3,000 academic and research staff members, which include 67 Fellows of the Royal Society, 69 Fellows of the Royal Academy, and 78 Fellows of the Academy of Medical Sciences. ICL's distinguished past or present faculty members include 14 Nobel laureates, 2 Fields Medalists, and 4 Crafoord Prize winners. ICL has 13,000 students including 8,500 undergraduates, 2,200 taught postgraduates and 2,500 research postgraduates. ICL is a very much internationalized university. Among full time students 48% are non-UK nationals. Non-UK nationals also account for 35 of its staff. It has 3,100 support staff, 2,000 honorary staff, and 1,000 academic visitors and visiting researchers. The Staff to Student ratio is 1:10.9 which is the second best in UK. ICL offers over 300 students annually the Undergraduate Research Opportunities (UROP), which provides students the chance to explore the world of research with hands-on experience in one of the College's outstanding research teams.

In the 2009 Times Higher Education world university rankings, ICL received the top score of 100 points along with Harvard, Yale, Oxford, and Cambridge as the most popular institutions in the world for employers to recruit from. 93.3% of those with ICL undergraduate degree found graduate-level jobs – the highest in the UK. The average starting salary with ICL undergraduate degree is 28,116, which is the highest in UK.

ICL's 2008 Research Assessment Exercise (RAE) had the highest percentage of staff rated internationally leading or internationally excellent among all multi-faculty universities in UK. Compared to King's College London we visited during this trip to UK, ICL is a close competitor while having complementary strengths. KCL is strong in clinical medicine and humanities while ICL has strong programs in engineering, natural sciences, medical research, and business.



Modern buildings with cheerful and colorful glass exterior in the one hundred and three years old Imperial College London.

Imperial College of London has a high profile alumnus from Taiwan. Professor Winston Wong, the Taiwanese founding Director of Grace Semiconductor Manufacturing Corporation, a son of the founder, late Mr. Wong, of Formosa Plastic, and an alumnus of Imperial College, London, made a generous donation of 2M in 2010 to found

the Winston Wong Centre for Bio-Inspired Technology (www.imperial.ac.uk/.../bioinspired). The Center is inventing, developing and demonstrating devices by mimicking living systems to create innovative and advanced technologies and is part of the College's Institute of Biomedical Engineering of which Dr. Wong is a Visiting Professor.

Professor Wong was inspired by Professor Toumazou's research and chose to endow the Centre in recognition of his innovative approach to developing silicon based technology for personalized healthcare. The Center's aim is to provide low cost and disposable solutions to diagnosis and personalized healthcare devices which can be applied at the point of care, often outside the clinic or hospital. Professor Wong graduated from Imperial College in 1971 with a degree in Physics, and later, in 1976 with a PhD. In 2007 he was awarded the degree of DSc at Imperial College, and honour bestowed by HM The Queen. In the entrance hall of ICL, it displays an exploration vehicle, on which both national flag of UK and that of Taiwan, ROC are clearly printed in celebration of the contributions by Dr. Winston Wong in promoting international sponsorship and collaboration between Taiwan, ROC and UK.



A vehicle which is displayed in ICL in honor of Dr. Winston Wong's sponsorship.

Ms. Angela Lin, East Asia Manager of the International Office guided the delegation to a meeting room for briefings on ICL's strengths and opportunities of collaboration. An overview of ICL was first presented by Pro-Rector (International Affairs) Professor Mary Ritter. Professor Tim Green introduced to the Taiwan delegation about R&D in Department of Electrical and Electronic Engineering. Professor Elaine Holmes talked about R&D in bio-molecular medicine. Professor Sir Brian Hoskins' introduction of the Grantham Institute of Climate Change. Professor Rob Denton gave the Taiwan delegation an overview of the Institute of Biomedical Engineering and then offered us a guided tour of the laboratories where researchers were carrying out research in medical devices.



Pro-Rector (International Affairs) Professor Mary Ritter



Professor Tim Green introduced R&D of the Department of Electrical and Electronic Engineering.





Professor Sir Brian Hoskins of the Grantham Institute of Climate Change.



Professor Rob Denton of Institute of Biomedical Engineering.

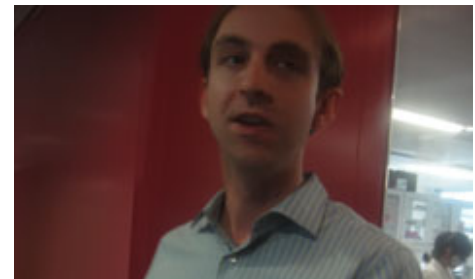
Imperial College London had its mission stated as follows: Imperial College embodies & delivers world-class scholarship, education and research in science, engineering, and medicine, with particular regard to their application in industry, commerce and healthcare. It fosters interdisciplinary working internally and collaborates widely externally. The mission is well reflected in many interdisciplinary workings at ICL such as (i) Global Challenge Institutes, which brings together expertise from across Imperial to tackle some of world's greatest problems, and to influence international policy; (ii) Energy Futures Lab; (iii) Grantham Institute for Climate Change; (iv) Institute for Security Science and Technology; (v) Institute for Global Health and Innovation.

The innovating and enterprise culture of Imperial was proven to be very profitable, making ICL one of the most successful universities in the world in terms of tech transfer income. It established equity holdings in spin-out companies and manages commercial agreements and license agreements. ICL's "Imperial Innovations" became the first majority university-owned technology transfer company to float in the UK. The company generated 5.3M in profit in last financial year and has a market value of 230M. A spin-out obesity drug company was sold to US-based Wyeth Pharmaceuticals in Dec 2008 for up to 100M payable to all shareholders. This could bring in up to 22M (3.2M received) to Imperial Innovations for its shares plus additional royalties upon completion of milestones. A significant proportion of this income will flow back to College under the revenue share agreement.

The Electrical and Electronic Engineering Department has 40 faculty members, 60 research associates, 150 PhD students and 90 MS students besides the undergraduate program. It focuses on (i) circuit and systems, for example, smart health-care and low-power analog systems; (ii) security such as network security; (iii) digital economy such as next generation internet; (iv) intelligent autonomous systems such as robotics; (v) sensors and actuators; (vi) electrical energy network such as smart grid simulation facility; (vii) robust & reliable systems; and (viii) 3-D Electrical MEMS. The Department has at least two on-going EU FP-7 grants.

The Biomedical Engineering platform at ICL is based on enabling microelectronics and bio-inspired technology to develop new solutions and added value to semiconductor. Research involves a strong combination of integrated miniature sensing with biologically inspired, intelligent processing, leveraging on state-of-the-art semiconductor technology. Electronics are designed to work with biological processes while remaining small and consuming tiny amount of electricity. In order to cope with the huge problems of ageing populations and surges in chronic ailments, a more portable, precise and personal way to deliver health care will resort to user-friendly devices such as personal digital assistants and mobile phones. Electrical and Electronic Engineering Department is closely collaborating with the Institute of Biomedical Engineering.

ICL has been studying inner ear implants (cochlear. Vestibular prosthesis), vision processing towards retinal implants, digital plaster (cardiac monitor), SAW devices (implantable blood pressure monitor for chronic uses), silicon pancreas (towards closed-loop insulin regulation, and DNA electronics (point of care genetic testing), etc. For the silicon pancreas system, bio-inspired metabolic technology is under trial in a



therapeutic domain, diabetes treatment, where analogue semiconductor chips have been configured to mimic the function of pancreatic beta cells that usually regulate insulin. A glucose sensor is measuring blood sugar whilst the semiconductors are gathering data and determines the insulin dispensed by an insulin pump. The whole system continuously monitors blood sugar and secretes the amount of insulin required at any time to keep them in balance.

Another example of medical device project is the Prediction of Drug Response (SNP-Dr) Project. Semiconductors are used to detect single-nucleotide polymorphisms (SNPs), the small mutations in the genome that distinguish one person from another, for early detection of disease. Some of these SNPs are also medically significant in determining whether someone can metabolize a particular drug. Professor Christofer Toumazou, Winston Wong Chair in Biomedical Circuits, Institute of Biomedical Engineering has been collaborating with Dr. Wong on various projects related to bioengineering.



A researcher showing a hand-held genetic testing device based on DNA electronics.

Prof. Elaine Holmes highlighted examples of pioneering biomolecular medicine. In the Surgical & Cancer @ Imperial Program led by Professor Jeremy K. Nicholson, Integrated Surgical Metabonomics was studied. Solid state NMR is used in Sir Mary's Hospital to analyze the metabolites in biopsies to reveal whether cells in the sample are healthy and relay that information back to the operating theatre within minutes. Nature news reported a story about surgeons getting real-time tissue profiling in December 2009. Prof. Jonathan Swann conducted social environment and biomarkers of aging study (SEBAS) in Taiwan. The study collected self-reports of physical, psychological, and social well-being, plus extensive clinical data based on medical examinations and laboratory analysis. Urine samples were collected from Taiwanese cohort. NMR was applied to analyze the urine. Impact of ageing on the metabolic profile of males and females Taiwanese was compared. Effect of ethnicity between Hakka and Mainlanders was also compared. Gender difference in the impact of stress on the metabolic profile was studied.

The Grantham Institute for Climate Change is led by Professor Sir Brian Hoskins with initial funding of 12.8M over 10 years from Grantham Foundation based on Imperial's strengths. Research themes include Earth System Science (Ocean dynamics and climate change, extreme and risks, earth observation), Vulnerable Ecosystems and Human Wellbeing (Impacts on biodiversity, ecosystems & ecosystem services, Changing Water Cycle, Integrated land management), Sustainable Futures (Mitigation pathways to 2050, Potential for short-term emissions reduction, Zero carbon production, Smart Energy Future with zero-carbon electricity).

Mrs. Lynne Cox introduced ICL's very successful accomplishments and strategies in winning contracts from the EU Framework program. A team of five full-time staff members play the roles in studying call-for-proposals and pre-contractual aspects of FP-7, and manage FP-7 contractual negotiations and agreements. It ranks the 5th in Europe in the participation in EU Framework 6 projects and has won 260 awarded contracts, and ranks the 4th in Europe in the participation in EU Framework 7 projects. It would be helpful for Taiwan delegation to identify ICL's coordinators for their EU FP-7 projects, and with the assistance by ICL research officers, match Taiwanese outstanding research teams with ICL led EU FP-7 projects. This effort should be able to help link Taiwanese researchers with those of ICL for successful participation in EU FP-7 projects.

The strengths of Imperial College London stated above match well with the core capabilities of top universities in Taiwan including NCKU. Further discussion between researchers of common interest in specific subjects on both sides should be arranged through thematic research workshops to team up Taiwan researchers with those of ICL.

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King's College London :

Visit by Taiwan Top University R&D Delegation

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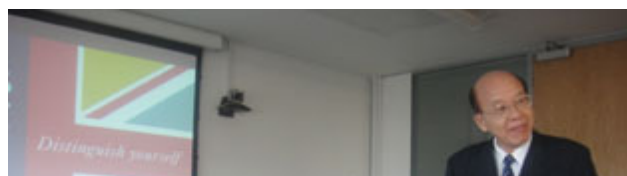
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11. Prof. Chuan-Mu Chen, Dean of R&D, NCHU (chchen1@dragon.nchu.edu.tw)

Taiwan top university R&D delegation led by
President Lee of NTU visited King's College London



in the morning on July 14, 2010 and was received by Principal Richard H. Trainor and delegates of KCL. Among KCL's delegates, Vice Principal Keith Hoggart was a foreign reviewer for the top university project in Taiwan and had visited NTU and NCKU. Our meeting with a familiar host during the visit of KCL made the discussion and interactions among delegates of both sides more vibrant while in a relaxed and friendly mode.



From left to right are Principal Richard H. Trainor, Vice Principal Keith Hoggart and President Sci-Chen Lee of NTU.

King's College London is the fourth oldest and one of the most prestigious universities in England. It was founded by King George IV and the Duke of

Wellington in 1829 and was one of two founding colleges of the University of London in 1836. While remaining part of the University of London, King's College has enjoyed financial and academic autonomy since 1994 and started to award its own degrees since 2008.

In King's 180 years of history, a number of greatest innovators were produced. They are, for example, Sir Charles Wheatstone, pioneer of current electricity and wireless telegraphy; James Clerk Maxwell, Einstein's predecessor in electromagnetism and relativity; Florence Nightingale, who founded the world's first professional school of nursing; and Lord Lister, who established antiseptic surgery and is known as "the father of modern medicine".

Nine people who taught or studied at King's and its associated institutions have been awarded the Nobel Prize: most recently, Professor Sir James Black OM, inventor of beta blockers and anti-ulcer drugs, and Professor Maurice Wilkins, who, with Rosalind Franklin and other King's colleagues, played a major part in the discovery of the structure of DNA. Many famous writers were educated at King's such as Romantic poet John Keats, novelist Thomas Hardy, William S. Gilbert of Gilbert and Sullivan fame, Virginia Woolf, Somerset Maugham and Arthur C. Clarke.

King's has 23,000 students, of which about 60% are female (8,600 are graduate students) and 5,500 employees. King's has an overall annual income of over 485 M including the research income of 135M. King's College London ranks 23rd in the world by the 2009 Times Higher Education World University Rankings and 65th by the Shanghai Jiao Tong University World University Rankings. Its global strengths are Clinical Medicine and Pharmacy (MED) ranking worldwide the 30th, life sciences and biomedicine worldwide 37th, social sciences worldwide 45th, and Arts and humanities worldwide 40th. Between 2005 and 2008, about 20% of the Department of Health's total spending in universities was awarded to King's scientists.

Among universities in UK, UCL's strengths include the following: Politics: UK 2nd, Food Science: UK 2nd, Law: UK 4th, Dentistry: UK 5th, Nursing: UK 5th, Business: UK 8th, Pharmacology & Pharmacy: UK 17th, Medicine: UK 18th, Communications & Media Studies: UK 21st, Linguistics: UK 24th, Geography & Environment: UK 28th, Computer Science: UK 33rd, English: UK 33rd, and Biosciences: UK 34th.

King's emphasizes on "translation" of health research into patient and economic benefit but maintaining strong science base. King's has invested heavily in translational research infrastructure, in early and late phase clinical trial capacity, and in recruitment and retention of the best translational and clinical scientists. UCL, Imperial and King's together account for 31% by value of all new Medical Research Council (MRC) awards in 2009/10 (UCL and King's alone 23%).



KCL's translational medical research support.

Besides health related research, humanity and science accounts for a little more than 50% of the total students. King's engineering program is small in scope compared to health and humanity. Its physical sciences and engineering students amount to about 9% of the total number of students.

KCL considers the number of doctoral students per academic faculty as one of indices for quality assessment. How many doctoral students each academic faculty member can instruct depends on the funding level, research capacity, and reputation of each individual faculty member. KCL does not set the total number of doctoral students each department is

allowed to admit. However, there is a common sense (rule) that considers six doctoral students as the maximum number of doctoral students each academic faculty member can effectively advise. There are some exceptions to this rule, though.

Apparently, KCL has some of its strengths and weakness in complement with those of NCKU. The strong electrical engineering and computer science and the general engineering disciplines, when combined with the strong health program in KCL will be excellent for collaborative research in medical devices, instruments, and systems. Professor Simon Howell, Director of Research Development, and I will discuss further on this potential subject of complementary collaborative research subject between NCKU and KCL.

With so many great innovators having been produced at KCL, it will be very inspiring for NCKU faculty and students to spend one semester or two studying or conducting research at KCL. Bilateral student exchange will be explored. Through successful interactions, it is hoped that Taiwanese researchers can find collaborators in KCL to carry out their own joint projects or participate in future FP-7 projects led by KCL's project coordinators.

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Professor Simon Howell, Director of Research Development, showing the research power ranking among top universities in UK with KCL being the 2nd, only next to University College of London (UCL).

University College London (UCL) : Visit by Taiwan Top University R&D Delegation

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3. **Professor Michael Worton**, UCL Vice-Provost (Academic and International), <http://www.ucl.ac.uk/global/worton/>, & Fielden Professor of French Language and Literature, <http://www.ucl.ac.uk/vice-provost/worton/>
4. **Professor Mike Wilson**, UCL Pro-Provost (Europe), <http://www.ucl.ac.uk/global/europe/>, & Professor of Microbiology, Eastman Dental Institute, and Honorary Principal Bacteriologist, Eastman Dental Hospital, http://www.eastman.ucl.ac.uk/research/staff/michael_wilson/, m.wilson@eastman.ucl.ac.uk
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The Taiwan delegation arrived at University College London, located at the heart of London, around 2pm on July 15, 2010 and was greeted at the front gate by Miss Zorbas of UCL International Office and a professional photographer. On behalf of President Michael Lai of NCKU, I joined the Taiwan delegation as a member and participate in all aspects of the visits in UK. Both Miss Zorbas and the photographer accompanied us during the whole visit to provide needed assistance and recording of a series of meetings and activities. It is highly appreciated that UCL administrators considered our visit to be very important and did all they could to make our brief visit very enjoyable and informative.



The front gate of the main campus of UCL.



The Wolfson Institute for Biomedical Research, UCL Medical School.

UCL is the third oldest universities in UK after Oxford University and Cambridge University. UCL was founded in 1826 by a non-religious founder as a radically different university from Oxford University and Cambridge University which at that time admitted only students with strictly religion requirements and those who were related church members. UCL was the first to open up English higher education to people of all beliefs and social backgrounds. That radical tradition remains alive and helps made the proud global reputation which UCL enjoys today. Oxford University, Cambridge University, and University College London formed the Golden Triangle of UK.

Currently, UCL has about 23,000 students, of similar number to that of NCKU. However, UCL has 2000 faculty members, 2000 research staff members and 4000 administrative staff members. The ratios of faculty number and the staff number to student number are both much higher than those of universities in Taiwan. UCL has fifty departments in eight faculties.

UCL was ranked the **4th in the world** in the recent Times Higher Education-QS rankings and the 11th based on the Shanghai Jiao Tong University ranking. Twenty one Nobel laureates, including Charles Kao who was awarded the 2009 Nobel Prize for physics with two other scientists for their work on optical fiber communication, have come from the UCL community. Nobel laureate, Francis Crick, who was among four scientists to discover the DNA structure, earned his B.Sc degree in physics from UCL at the age of 21. The radical tradition UCL inherits from its founder helped lead UCL with a global reach and global vision making it “London’s Global University”. About 34% of UCL students come from nearly 140 countries outside the UK around the globe. UCL’s research also reaches the farthest corners of the globe; from the conservation of antiquities in Iraq to the transformation of engineering research in Kazakhstan.

Among the top ranking strengths of UCL among universities in UK, UCL stands as follows: Art and Design: UK 1; English: UK 2; Medicine: UK 4; Economics: UK 4; Music: UK 4; Architecture: 4; Psychology: UK 5; Linguistics: UK 5; Geography & Environment: UK 5; Law: UK 5; Biosciences: UK 8; Computer Science: UK 12;

Pharmacology & Pharmacy: UK 13; Town Country Planning: UK 14; Politics: UK 17; Business: UK 29. In terms of world ranking, the strengths are for Clinical Medicine and Pharmacy (MED): World 10; Life and Agriculture Sciences (LIFE): World 18; Physics: World 51-77; Economics/Business: World 51-75; Life Sciences and Biomedicine: World 22; Social Sciences: World 28; and Arts and Humanities: World 25.

The formal meeting visit began with brief welcoming remarks by President and Provost of UCL, **Professor Malcolm Grant**. **President S.C. Lee** of the Taiwan delegation introduced our delegation and explained our mission of the UK visit. A series of presentations were then given by **Professor David Price**, UCL Vice-Provost (Research), **Professor Michael Worton**, UCL Vice-Provost (Academic and International), and **Professor Mike Wilson**, UCL Pro-Provost (Europe).

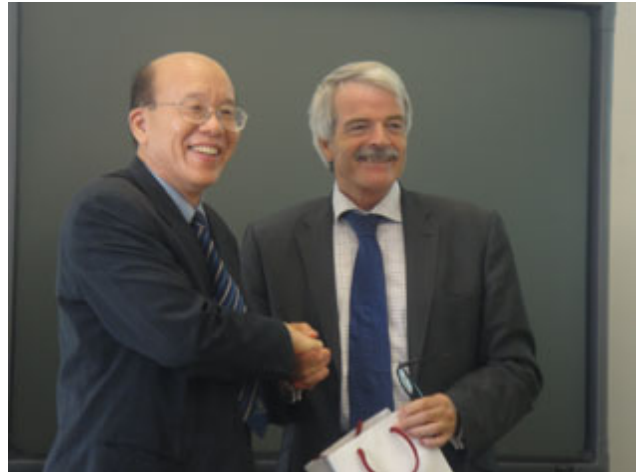
Professor David Price, UCL Vice-Provost (Research) explained the need for “big ideas” for key university strategies. Professor Price emphasized the vision of UCL in solving global problems which face us today by working together right across the university on “grand challenges” in global health, sustainable cities, intercultural interaction, and human wellbeing. UCL believes in undertaking fundamental research and in applying it.

Professor Michael Worton, UCL Vice-Provost (Academic and International) emphasized on “institutional changes”, “people”, “market”, and “geographical context”. The world we face has changed us as educator, changed our students as learners, changed our relationship with stakeholders in business and industry into equal partners. Internet contents have made young people think and learn in a very different way these days. Knowledge economy has evolved into innovation economy.

As far as “people” is concerned, attention is paid to mobility of students, expectations of students, expectations of employers, and different staff makeup. Under the situation with rapid expansion and globalization of higher education and advanced training, it becomes important to find out how best to manage and mediate the challenges. It also becomes necessary to build up international reputation to hold a global brand for advantageous competition among institutions for foreign students.

We also need to decide on both partner institutions and partner countries. UCL has chosen a new focus on China and India as well as emerging economies such as Brazil and Russia. With 34% students being foreign students, the strategies and approaches adopted by UCL apparently are successful and can be learned by us.

Professor Mike Wilson, UCL Pro-Provost (Europe) has been a coordinator for EU FP programmes for many years. He pointed out that UCL grant income from EC Framework Programmes amounted to 170M in 2009. He also introduced various opportunities within EU FP-7 program. Professor Wilson is a Professor of Microbiology in Eastman Dental Institute and a Honorary Principal



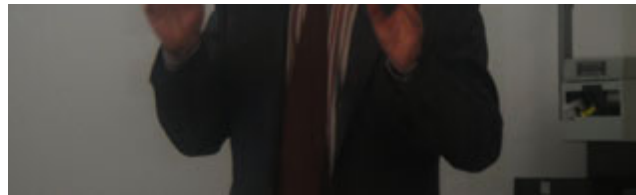
President Lee of NTU (left) and President Grant of UCL exchanged gifts after delivering opening remarks for the meeting.



Bacteriologist in Eastman Dental Hospital.

Professor Wilson welcomes researchers in Taiwan to explore possibilities in collaborating with his research team. Researchers in Taiwan should look up his expertise and interest and communicate with him for possible collaboration. In the meanwhile, the EU NCP

office will invite him to Taiwan for workshop to disseminate his knowledge and experiences in EC research programs.



Professor Mike Wilson is making a presentation for Taiwan delegation.

After the formal meeting, the Taiwanese delegation was led to meet with a group of students from Taiwan. Among these students from Taiwan, I met a doctoral student, Ms. Chia-Lin Chen, who graduated from the Department of Architecture of NCKU and is working on her doctoral degree on Urban Planning. Among the members of our delegation, Vice President Perng of National Taiwan University of Science and Technology is an alumnus of Department of Architecture of NCKU. Ms. Chen was happy to meet with us at UCL which is far away from home. Ms. Chen is supported by Taiwanese government for studying abroad.



VP Perng, Ms. Chen, and Dean Tzeng (from left to right) in UCL on July 15, 2010.

students in Taiwan spend too many years for their degrees. More effective means of graduate education and skill training will need to be explored.

The staff-to-faculty ratio of UCL is much higher than that of NCKU. This, when coupled with the low teaching load for faculty members, allows faculty members of UCL to focus on high quality and high impact research. In UK, BS students spend 3-4 years, MS 1-2 years, and Ph.D. 3-4 years for their degrees, respectively. Besides, research graduate students are not required to take a minimum number of credit hours of courses for graduation. Instead, advisors will instruct research graduate students to take certain courses which are relevant to their topics of research. By means of leading graduate students into high quality research quickly within a short period of preparative time, graduate students in UK save one year or so for earning each of their degrees. Graduate

Design & Layout : Ivan Tarn, The Banyan Editorial Office

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