出國報告（出國類別：其他）

赴大陸(香港)參加 2016 年工程與應用科學國際研討會(HKICEAS 2016)出國報告

服務機關：核能研究所
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派赴國家：大陸(香港)
出國期間：105 年 12 月 14 日~105 年 12 月 17 日
報告日期：106 年 1 月 6 日

摘 要

2016 年工程及應用科學國際研討會(2016 Hong Kong International Conference on Engineering and Applied Sciences，簡稱 HKICEAS 2016)，主題涵蓋生物醫學工程、環境科學、材料科學與工程、基礎與應用科學、土木工程、計算機與資訊科學、機械工程、化學工程、電機與電子工程等以及相關領域，為世界各地的教授、研究人員和學者提供很好的機會，以發表創新的研究成果以及最新的工程和應用科學領域的發展和趨勢，並提供一個可互相交流分享前瞻發展的平台。

該研討會關於環境友善、替代能源、再生能源上皆有不少的研究成果發表，有學者利用流體力學精進地表風力預測，能更準確預估風力發電機的輸出功率，有助於判斷風機擺放的最佳位置，可供我國在發展風力發電時參考。而在發展替代能源時，有學者提出對於其周邊相關技術的開發也是同等重要，因為完善的周邊技術有助於替代能源的推廣，是值得注意的研究方向。另在薄膜製程有學者將其應用於生醫技術上，顯示電漿鍍膜製程應用的更多可能性，可做為本所未來在利用電漿技術開發薄膜材料時參考之依據。

此次參加研討會觀摩世界各地學者的研究成果，同時也以海報論文方式發表核能研究所以類神經網路即時監測薄膜鍍膜厚度的技術，該項技術提供一個快速準確的膜厚量測方式，可應用於電漿鍍膜的回饋控制，並有助於提升鍍膜品質。榮幸能參與這種多領域的研討會，讓研究思維更加廣闊，對於未來的研究增添助益。

目　　次

圖 目 錄

一、目　的

本屆「工程與應用科學國際研討會」(2016 Hong Kong International Conference on Engineering and Applied Sciences)探討主題包含生物醫學工程、環境科學、材料科學與工程、基礎與應用科學、土木工程、計算機與資訊科學、機械工程、化學工程、電機與電子工程……等相關領域，其中環境科學、材料科學與工程及電機與電子工程領域針對環境友善的建設和發展、分散式發電、燃料電池和可再生能源系統等綠色能源相關技術皆有研究探討，與本所之新型能源開發的關鍵技術極為相關，在此會議中將可獲得新能源技術之最新發展，可作為本組未來電漿鍍膜技術於綠色節能相關技術開發之參考。

本所於電漿環保能源技術、電漿鍍膜元件製備技術之研發卓有成效，參加該研討會並發表論文除能彰顯本所之研發成果外，並能藉由會議專題討論了解國際間發展現況，尋求可能之應用市場與合作機會，強化合作關係及增益本所研發技術，以利本所相關計畫工作之加速推動。

二、過　程

本次公差之行程如下：

12 月 14 日　07:00 自桃園國際機場出發，搭乘 BR891 航班，於當地時間 08:50 抵達香港國際機場。

09:45 從機場搭乘飯店接駁車前往會議舉行地點(香港逸東酒店)，於 10:25 到達會議場地，隨即準備研討會相關事宜。

12 月 15 日　08:35 辦理完會議報到與註冊程序。

參加 2016 年 Hong Kong International Conference on Engineering and Applied Sciences 國際研討會、蒐集研發資料，並於 14:40 以海報發表核能研究所研究成果及會議論文。

12 月 16 日　參加 2016 年 Hong Kong International Conference on Engineering and Applied Sciences 國際研討會、蒐集研發資料，並與國際學者交流互動。

12 月 17 日　於當地時間 18:00 自香港逸東酒店出發，搭乘機場巴士(A21)前往香港國際機場，接著搭乘 BR858 航班返回桃園國際機場，因班機延遲起飛，返抵台灣時間為 23:30，順利完成本次公差任務。

三、心　得

作者目前在核能研究所(以下簡稱本所)從事與節能技術相關之研究工作，對於節能膜的製程控制技術有一些成果表現，並期望能更了解目前世界上對於綠色能源、環境科學等發展現況，故投稿參加「2016 年工程與應用科學國際研討會」(2016 Hong Kong International Conference on Engineering and Applied Science) 。由於最近世界各國對能源的需求日益增加，又同時要兼顧對環境的影響，此次會議有不少的研究著重在與再生能源、新能源、充電電池與環境友善技術等相關研究，藉由參加該會議可發表本所於能源相關領域的研究成果，並可收集與綠色能源技術相關資訊，作為往後研究發展的參考。

本屆研討會的舉辦地點在香港的逸東酒店舉行(圖 1)，位於佐敦彌敦道上，距離地鐵站約莫六分鐘腳程，是一個交通與生活機能十分便利的會議場所。

圖1. 會議舉辦地點，香港逸東酒店

會議的主辦單位為「高等教育論壇」(Higher Education Forum)，該組織致力於學術的發展與傳播，為學術界、各國政府與商業團體提供交流平台，並通過舉辦各種國際學術活動，鼓勵世界各地的學者發表研究成果並互相交流，由互動中得到更寬廣領域的知識以增進學者們研究的質與量。

主辦單位在會議場地(圖 2)同時舉辦自然科學類與社會科學類的研討會，會議場地主要分為三個演講廳，Jordan, Pearl A 與 Pearl B，學術演講於三個會議室同時進行，其中自然科學類在最大的 Jordan 會議廳中舉辦，海報部分則在大廳內展示(Foyer) 展示，Jade Ballroom 為餐廳。作者所參加的「工程與應用科學國際研討會」是屬於自然科學類會議，著重在自然科學類中收集有關新型能源、綠色能源以及環境友善等發展現況，報告後續內容將以自然科學類會議為主。

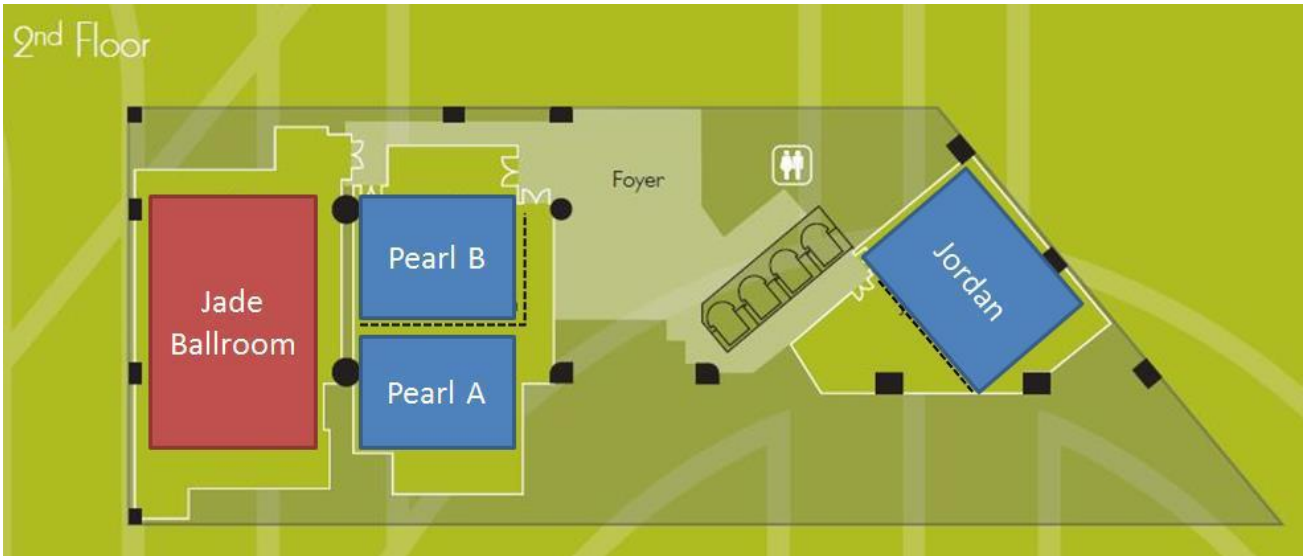


圖2. 會議場地演講廳及海報展示配置圖

會議內容主要以演講與海報方式呈現，與自然科學相關的研究報告，其研究主題分布包括基礎與應用科學(含基礎科學、生醫工程、化學工程、材料科學、土木工程等)、計算機科學、電子與電機科學(圖 3)。

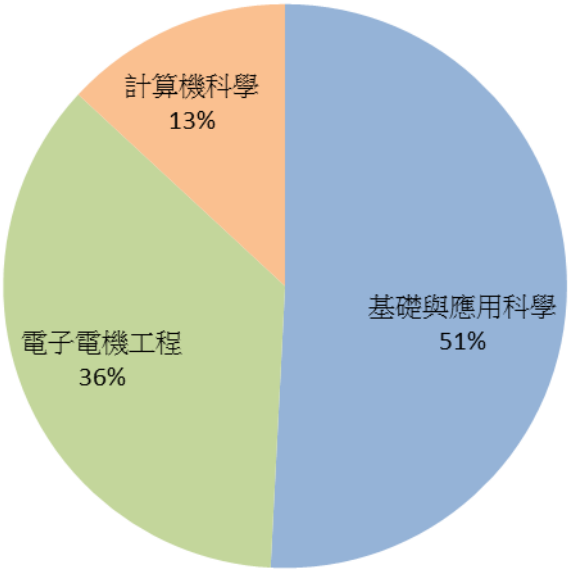


圖3. 研究主題分布

自然科學類會議共計有 27 場學術演講與 32 篇海報發表，與會發表的研究多數來自亞洲地區，亦有來自於歐洲、美洲與非洲的學術研究，而亞洲地區的研究又以韓國與日本為大多數(圖 4)。

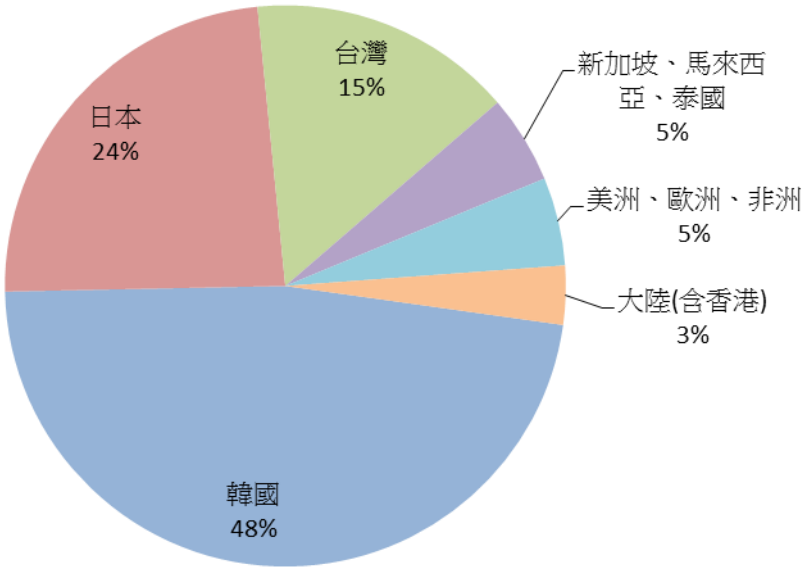


圖4. 研究發表地區分布

相關議程如下表所示：

Thursday, December 15, 2016		
Oral Presentation		
Eaton Hotel (2nd Floor)		
Time	**Schedule**	**Venue**
08:30-16:30	Registration	Foyer Area
09:00-10:00	Biomedical Engineering	Jordan
10:00-10:20	**Tea Break & Networking**	Foyer Area
10:20-10:50	**Welcome Speech & Best Paper Award Ceremony**	Pearl A
10:50-12:00	**Nature Science Keynote Speech** **Prof. Sergei Gorlatch** **University of Muenster** Topic: Modern Distributed Applications Based on Mobile Cloud Computing and Software-Defined Networks	
12:00-13:00	**Lunch Time**	Jade Ballroom
13:00-14:30	Computer and Information Sciences & Computer Science Applications & Communication Engineering & Networking, Communication and Multimedia	Jordan
14:30-14:40	**Tea Break & Networking**	Foyer Area
14:40-16:10	Fundamental and Applied Sciences & Environmental Science & Geosciences and Petroleum Engineering	Jordan

Thursday, December 15, 2016	
Poster Session	
Eaton Hotel(2nd Floor) Foyer Area	
Time	**Schedule**
13:20-14:20	Poster Sessions (1) Electrical and Electronic Engineering / Mechanical Engineering
14:40-15:40	Poster Sessions (2) Biomedical Engineering / Chemical Engineering / Civil Engineering /

	Fundamental and Applied Sciences / Material Science and Engineering

Friday, December 16, 2016		
Oral Presentation		
Eaton Hotel (2nd Floor)		
Time	**Schedule**	**Venue**
08:30-16:30	Registration	Foyer Area
08:50-10:20	Electrical and Electronic Engineering	Jordan
10:20-10:30	**Tea Break & Networking**	Foyer Area
10:30-12:00	Civil Engineering & Material Science and Engineering & Mechanical Engineering	Jordan
12:00-13:00	**Lunch Time**	Jade Ballroom

圖5. 抵達會議場地

研討會會場位於飯店二樓，有寬敞的大廳供海報展示(圖 6)，在休息時間提供簡單的茶點與飲料，提供與會學者們互相交流的平台，來自各國的學者在這裡熱烈討論並分享研究經驗以及尋找合作機會。

圖6. 會場 Foyer 大廳提供海報論文展示以及學者交流討論的場所

會議的開場演講是由來自德國明斯特大學(University of Münster)的 Sergei Gorlatch 教授所發表與雲端運算相關的研究(圖 7)。

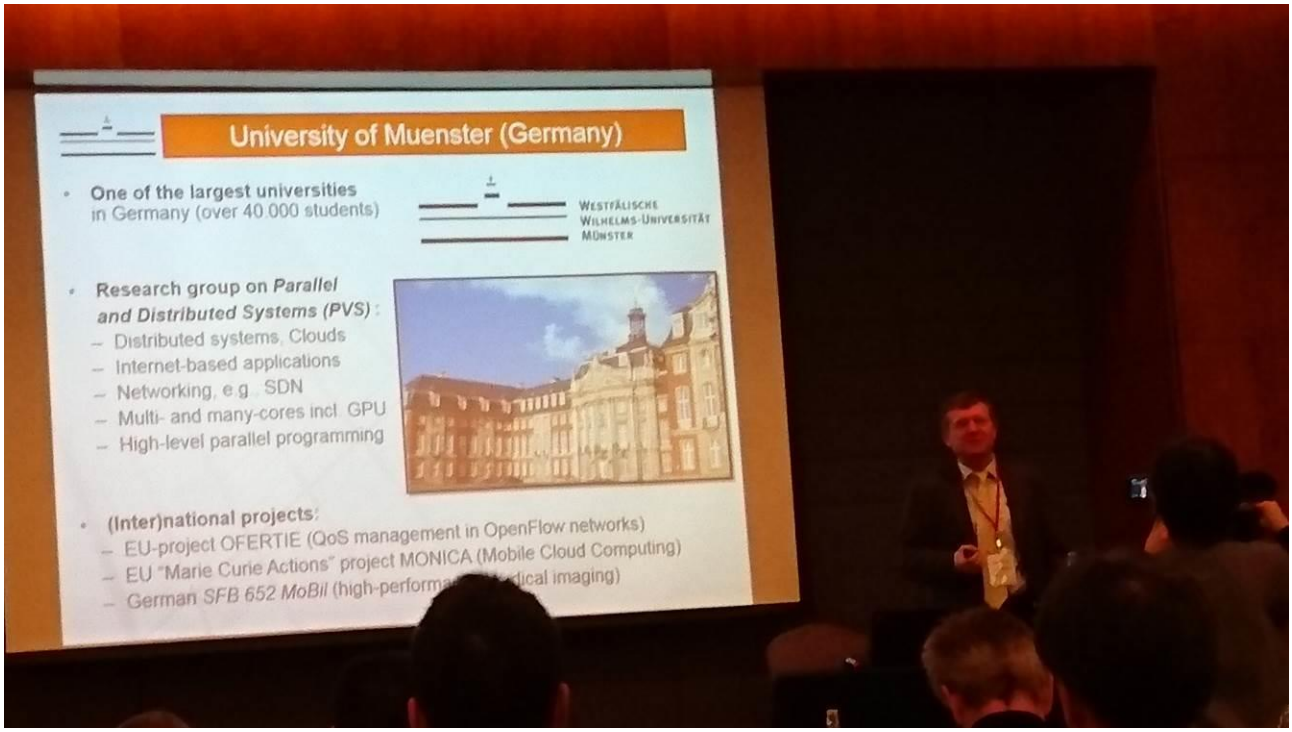
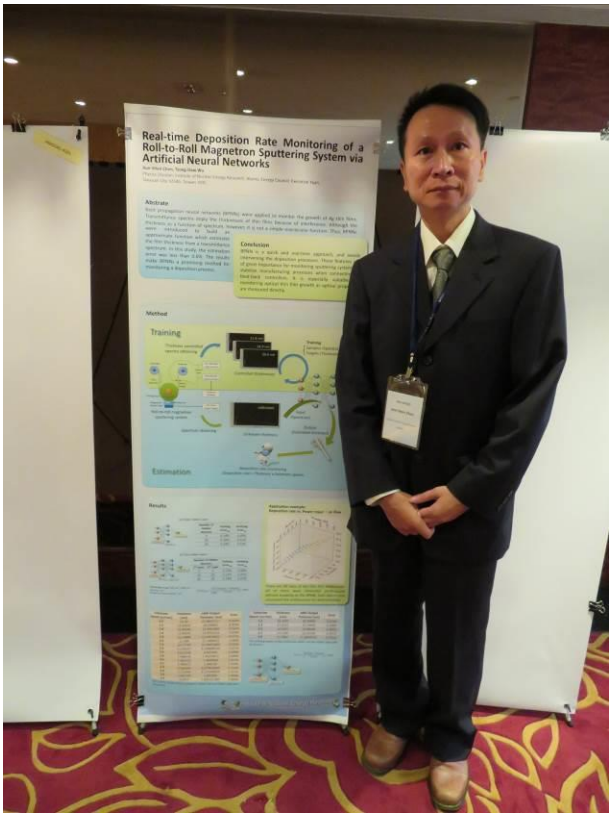


圖7. 會議開場演講

本所發表關於利用類神經網路監控卷對卷電漿鍍膜的技術(圖 8)，該技術結合計算機科學、薄膜光學與真空製程技術，有助於穩定高品質節能膜的製程。



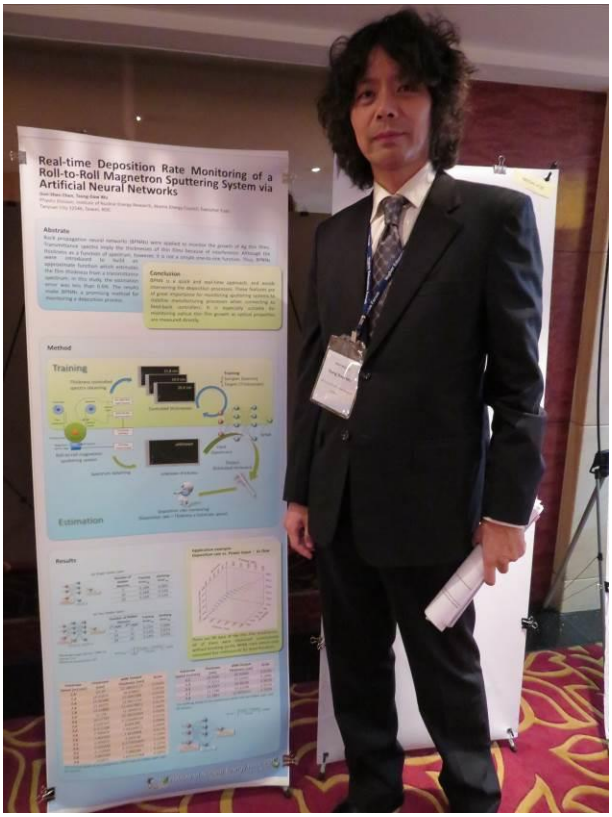


圖8. 本所的研究成果發表

鑒於再生能源對於環境的友善，全球對於再生能源的重視日益增加，如何增進各種再生能源的效率自然成為重要的課題，例如在同樣的區域設立風力發電機，以何種角度、高度擺放可以達到最佳效率，來自韓國能源研究所的學者針對此議題，發表精進測量地表風速的方法(圖 9)，藉由更精準的風速量測，能有效預測風機的輸出功率，有助於規劃風機的擺放，進而增進整體效率。

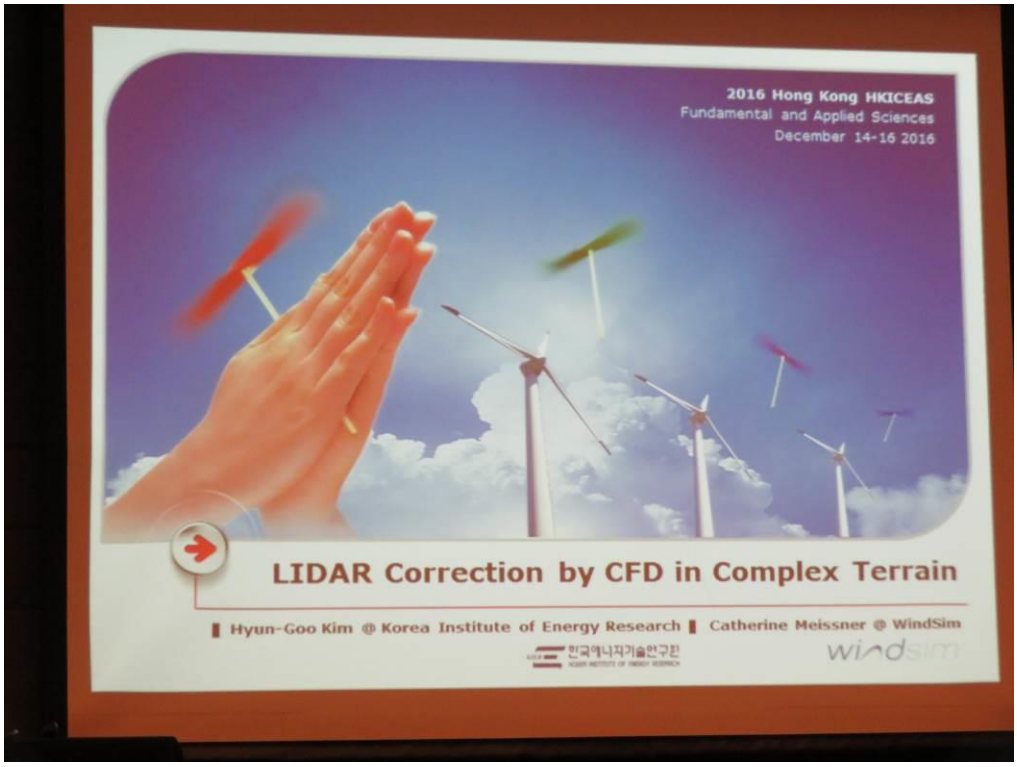


圖9. 韓國能源研究所的學者發表精進測量地表風速的方法

在複雜地形中，由於地形的效應，在地表處附近的水平面風速並非均勻分布(圖 10)，而一般採用光學雷達(Light Detection And Ranging, LiDAR)於地面量測高度處的水平風速，是建立在風速為均勻的假設基礎上，故測量結果與實際風速有落差。為了補償測量誤差，多數的風力繪圖軟體，例如 WindSim 等軟體，會加入一種校正方法，該方法包括以流體力學計算的沿水平方向的垂直風速梯度代入 LiDAR 的風向量可更精準地預測風力，也就能更準確的預測風機的輸出功率，有助於判斷風機擺放的最佳位置，值得我國在發展風力發電時參考。

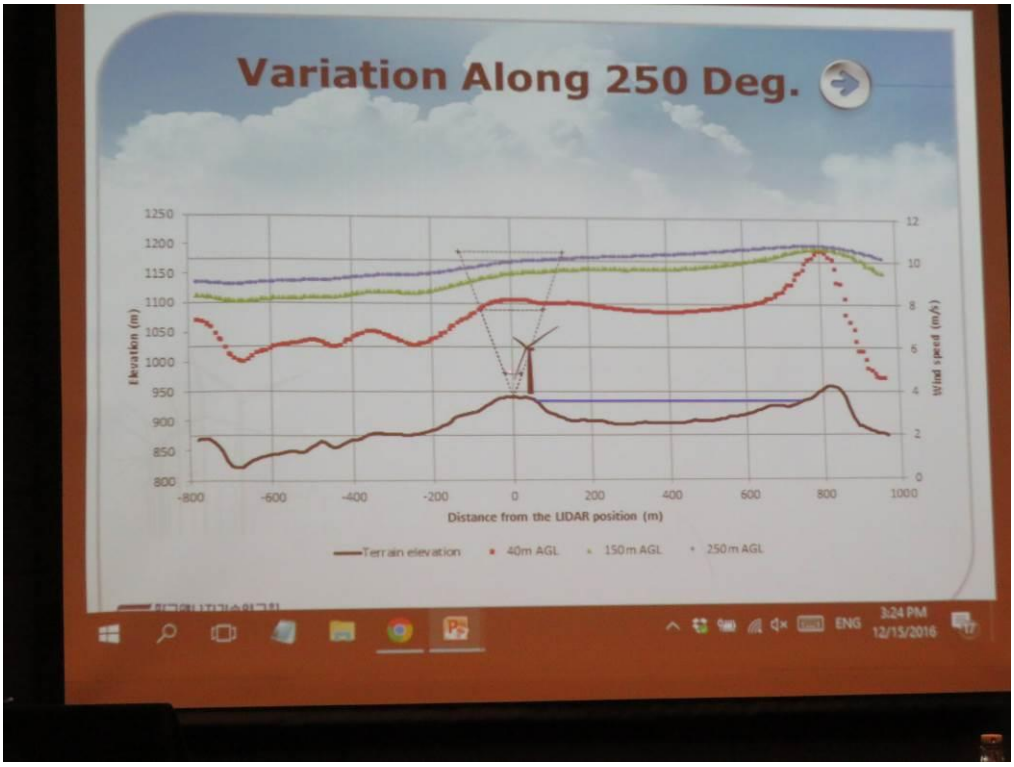


圖10. 地表處附近的水平面風速並非均勻分布

以位於韓國襄陽郡抽水蓄能電廠(Yangyang Pumped Storage Plant)的兩座風機為例(圖11)，採用此校正方法預測的風機功率大幅接近實際的輸出功率(圖 12)。

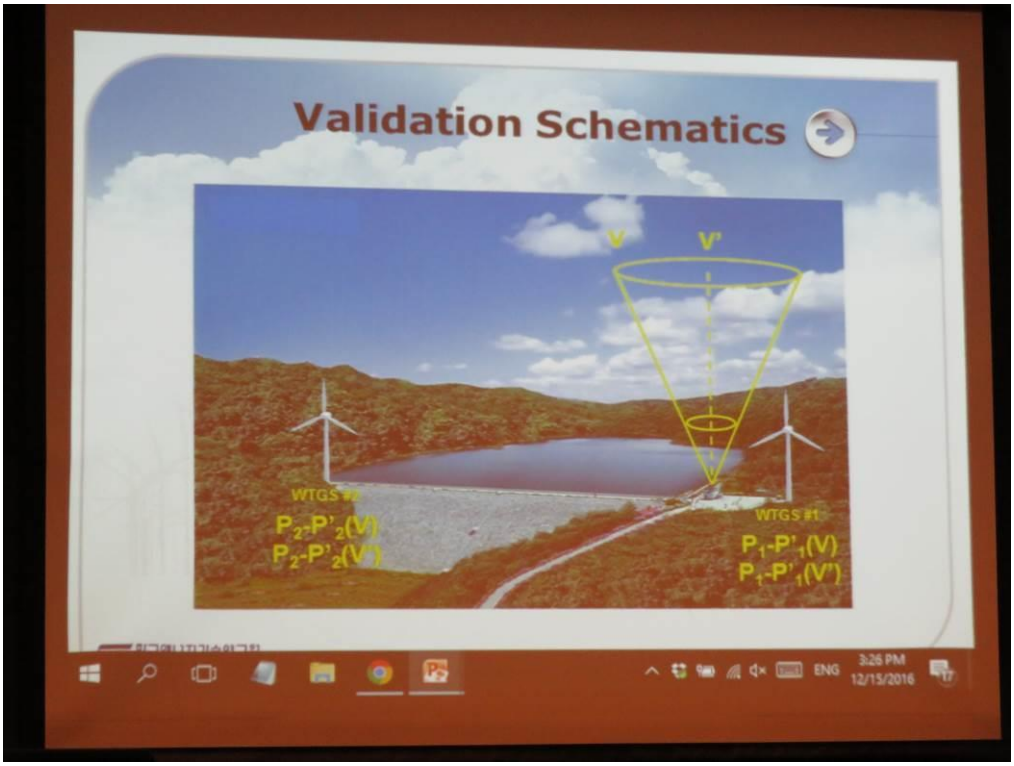


圖11. 韓國襄陽郡抽水蓄能電廠的兩座風機

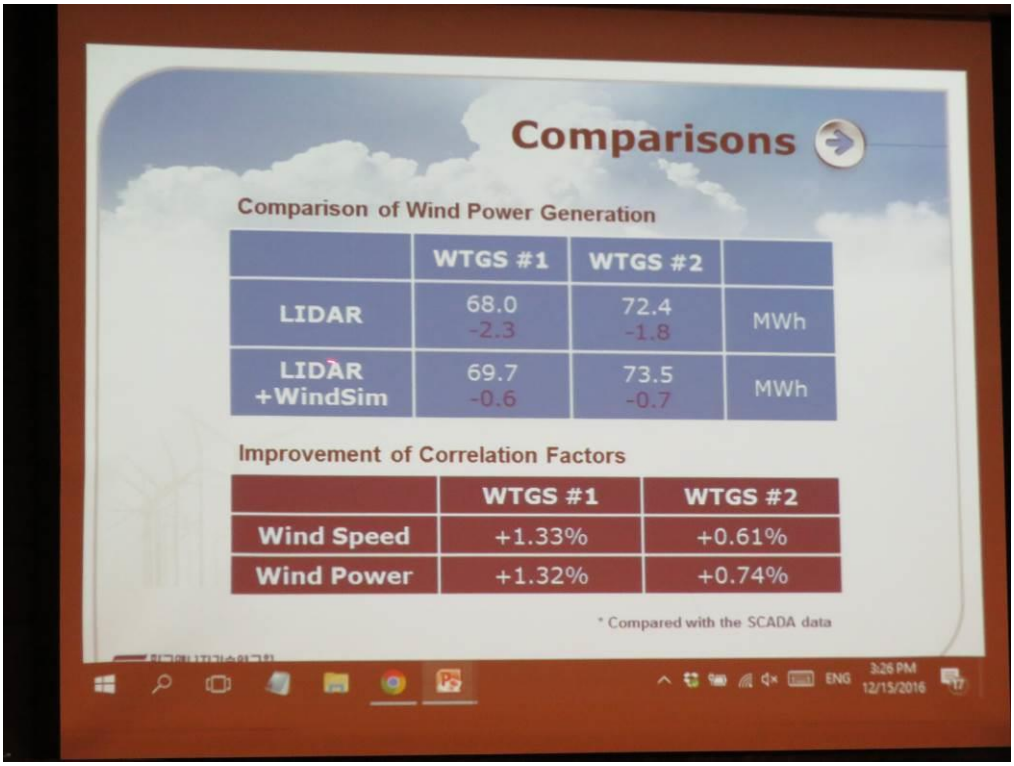


圖12. 經校正後風機功率的預測大幅接近實際的輸出功率

目前燃煤發電在全球仍為主要發電方式之一，而煤礦中的硫化物、重金屬等，對於環境的影響極大，在燃煤前降低這些有害的物質含量，有助於減少在燃煤過程中對環境的破壞，來自泰國素羅娜麗科技大學工程研究所(Institute of Engineering, Suranaree University of Technology)的學者分享關於低品質煤礦脫硫技術的研究(圖 13)。

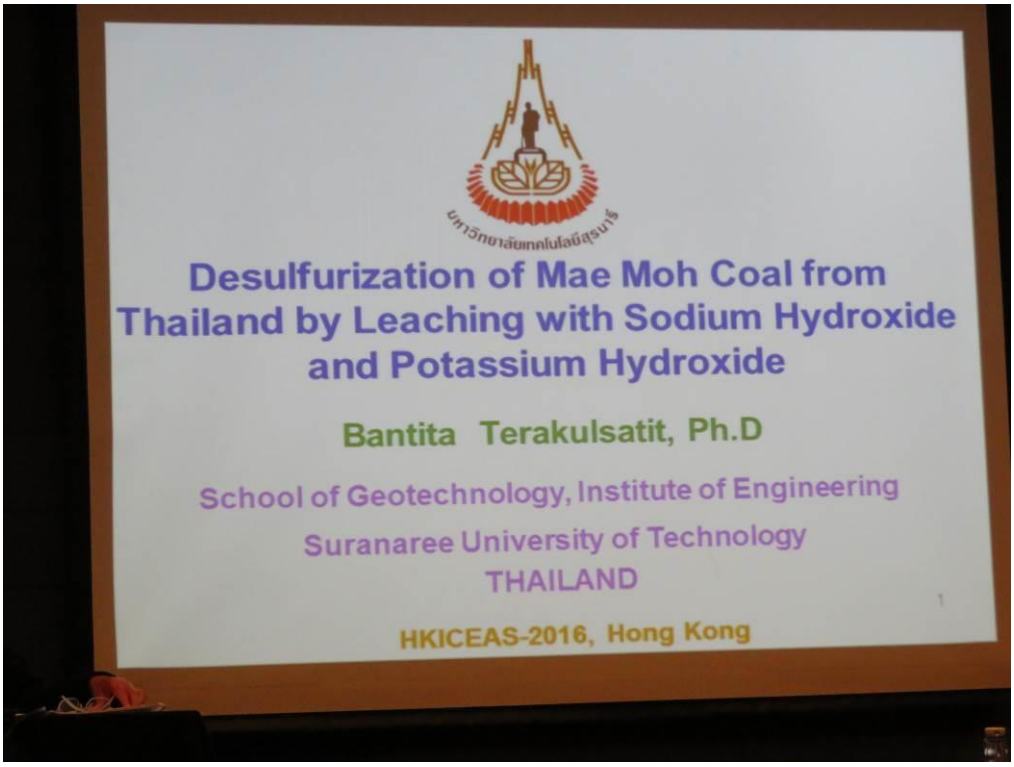


圖13. 泰國素羅娜麗科技大學的學者分享煤礦脫硫技術的研究

該學者並比較了各種不同去除硫化物的技術(圖 14)，煤礦脫硫除能減少硫化物對環境的汙染，同時也去除礦中之黃鐵礦與石膏等其他物質，更能增加煤礦中碳比率，提升熱值。

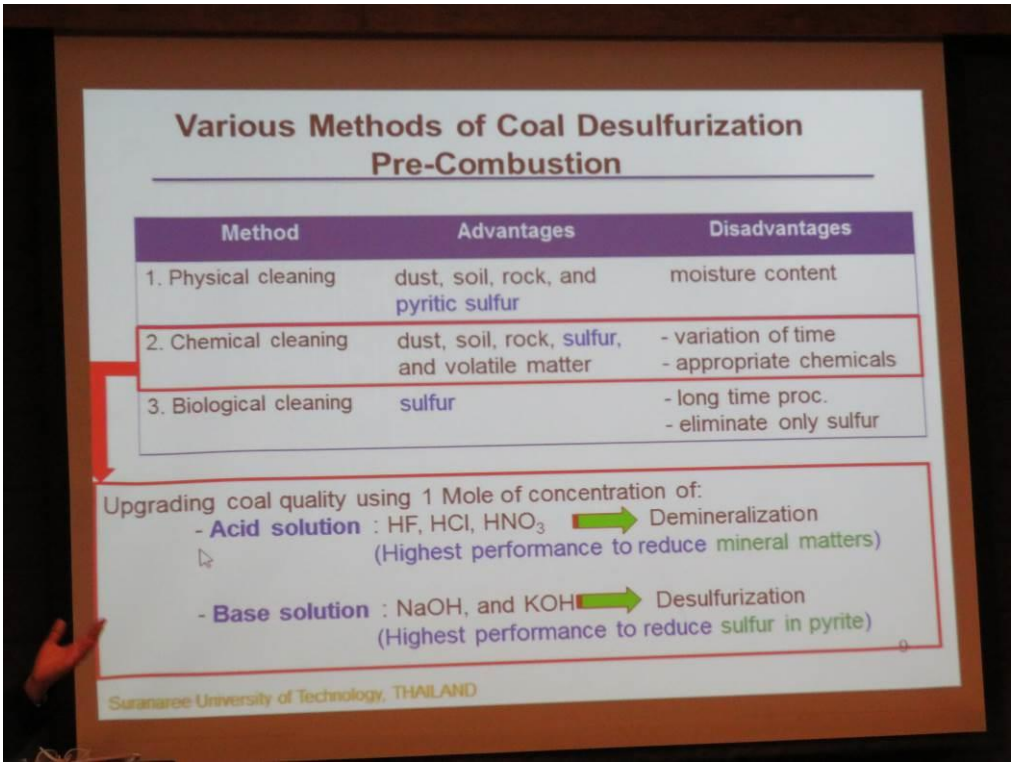


圖14. 各種不同的脫硫方式比較(物理方式、化學方式與生物方式)

研究中以泰國 Mae Moh 煤礦場之 Q 與 K 煤層所生產的煤礦為研究對象，以氫氧化鉀與氫氧化鈉溶液進行化學脫硫，研究指出以此方式脫硫能有效去除黃鐵礦、石膏與硫化物並提升碳百分比與單位質量所能產生的熱量(圖 15)。

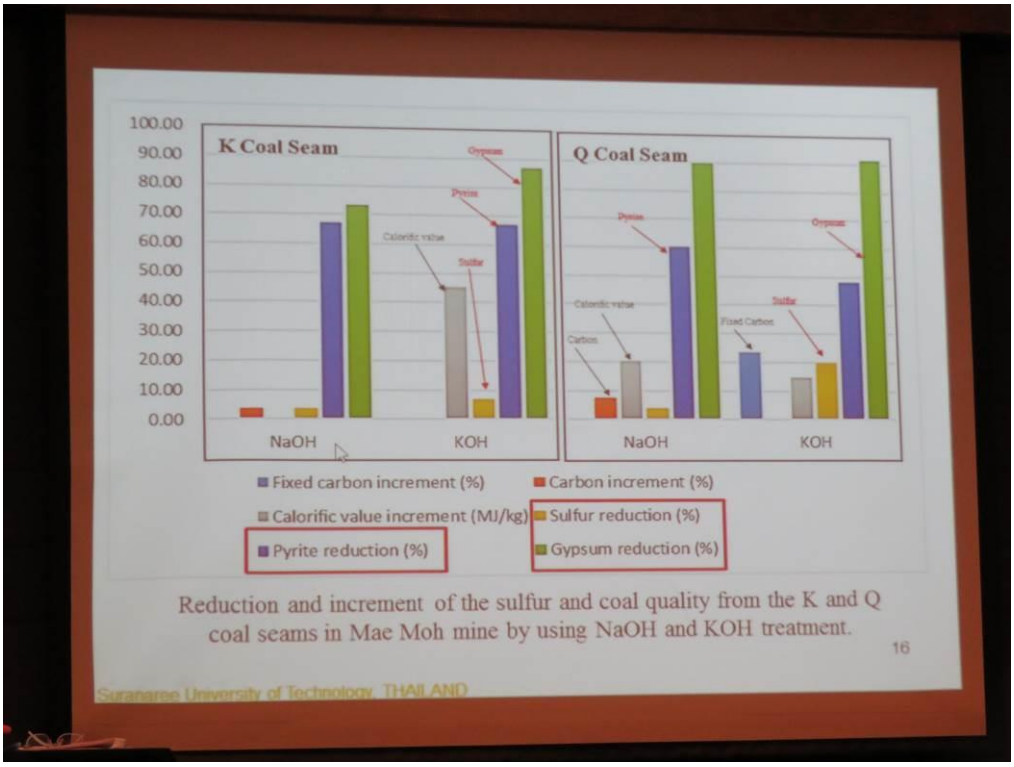


圖15. 進行化學脫硫後能有效去除黃鐵礦、石膏與硫化物並提升碳百分比與單位質量所能產生的熱量

在再生能源尚未能取代大部分能量來源，以及逐步降低核能發電的情況下，勢必增加對於燃煤發電的需求，而如何有效降低燃煤對環境的衝擊，是值得研究且迫切的課題。

氫能具有燃燒後不產生二氧化碳、硫化物等有害環境物質的特性，是作為化石燃料如石油、煤和天然氣的理想替代能源，然而由於氫分子小，容易洩漏且當在空氣中濃度 4% ~ 75% 時具有爆炸性質，所以發展可靠廉價的氫感測器有其必要性。來自日本岡山大學的學者發表製造薄膜型氫感測器的技術(圖 16)。

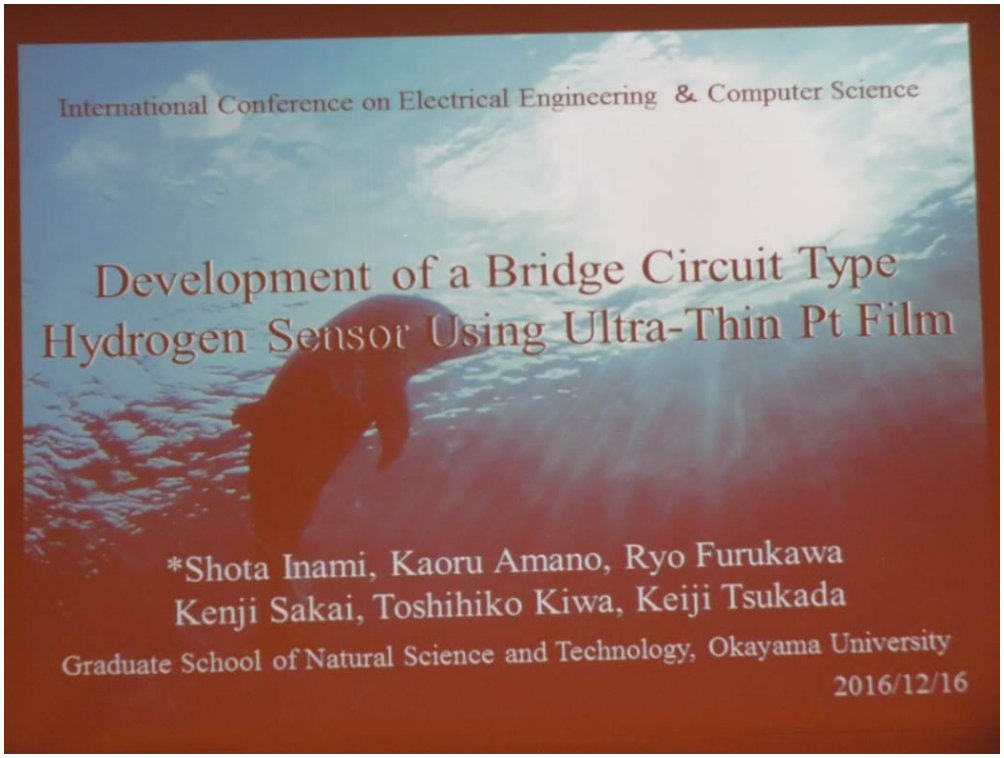


圖16. 日本岡山大學的學者發表製作薄膜型氫感測器的技術

該研究團隊以濺鍍技術在玻璃上鍍鈦與鉑雙層薄膜，製作出薄膜型氫感測器(圖 17)，並以氮化鈦(TiN)與氧化鋁(Al_2O_3)薄膜製作橋式電路(圖 18)以增進穩定度，解決因溫度變化感測器不準的問題(圖 19)。

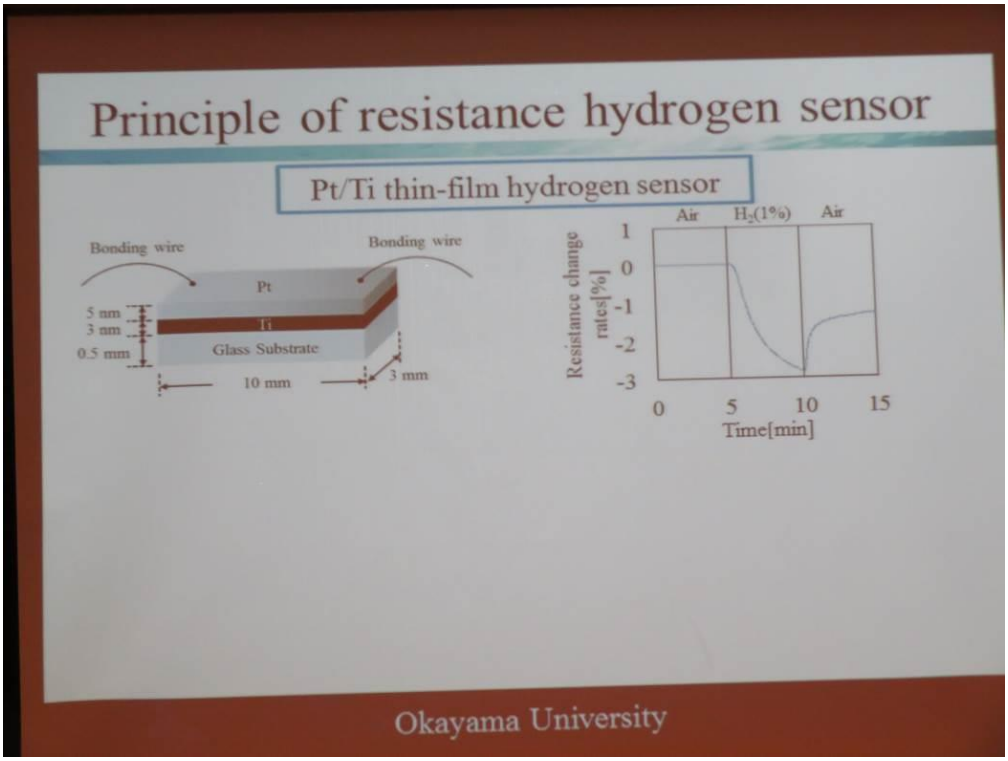


圖17. 鈦與鉑雙層薄膜製作薄膜型氫感測器

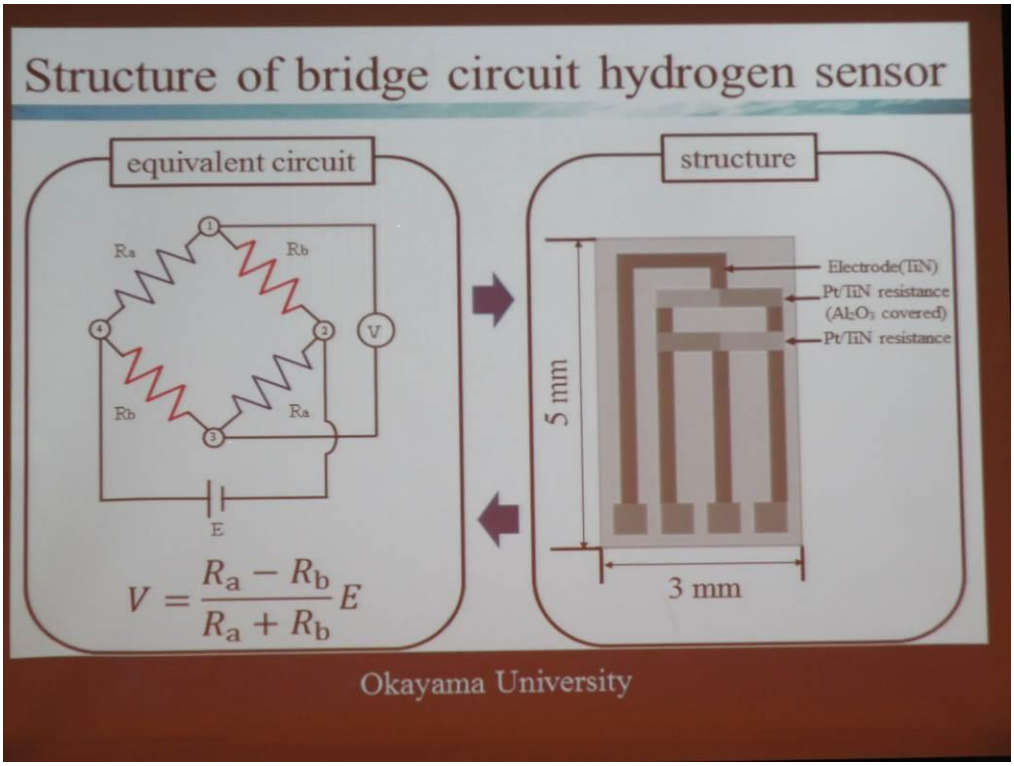


圖18. 氮化鈦(TiN)與氧化鋁(Al_2O_3)薄膜製作橋式電路

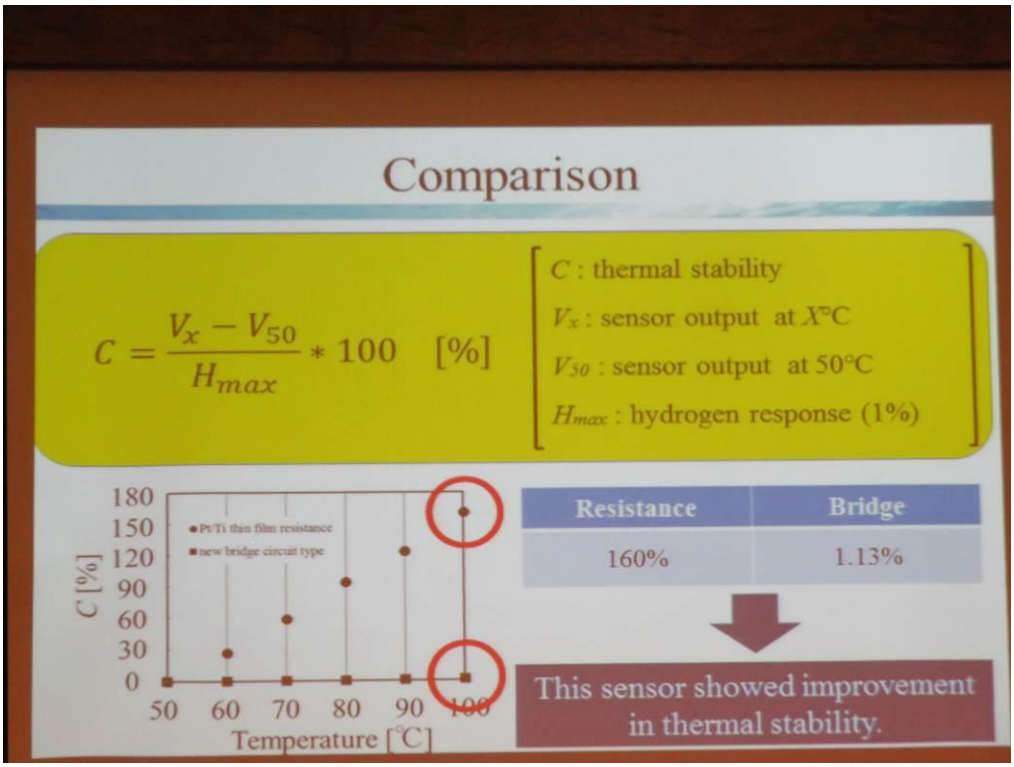


圖19. 感測器因橋式電路增加對溫度變化的穩定性

在發展替代能源時，對於其周邊相關技術的開發也是同等重要的，完善的周邊技術有助於替代能源的推廣，是值得我們注意的研究方向。

在各種行動裝置日益增多且功能更加繁複的情況下，充電電池被要求具備穩定性更高的電壓輸出與更長的使用壽命，而成功的電池模型將有助於製造商能更精準的預測電池行為以製造符合需求的電池，並有效地降低生產成本。來自於韓國成均館大學電子與電機學院(School of Electronic and Electrical Engineering, Sungkyunkwan University)的學者提出一種新的平衡態電池模型(圖 20)。

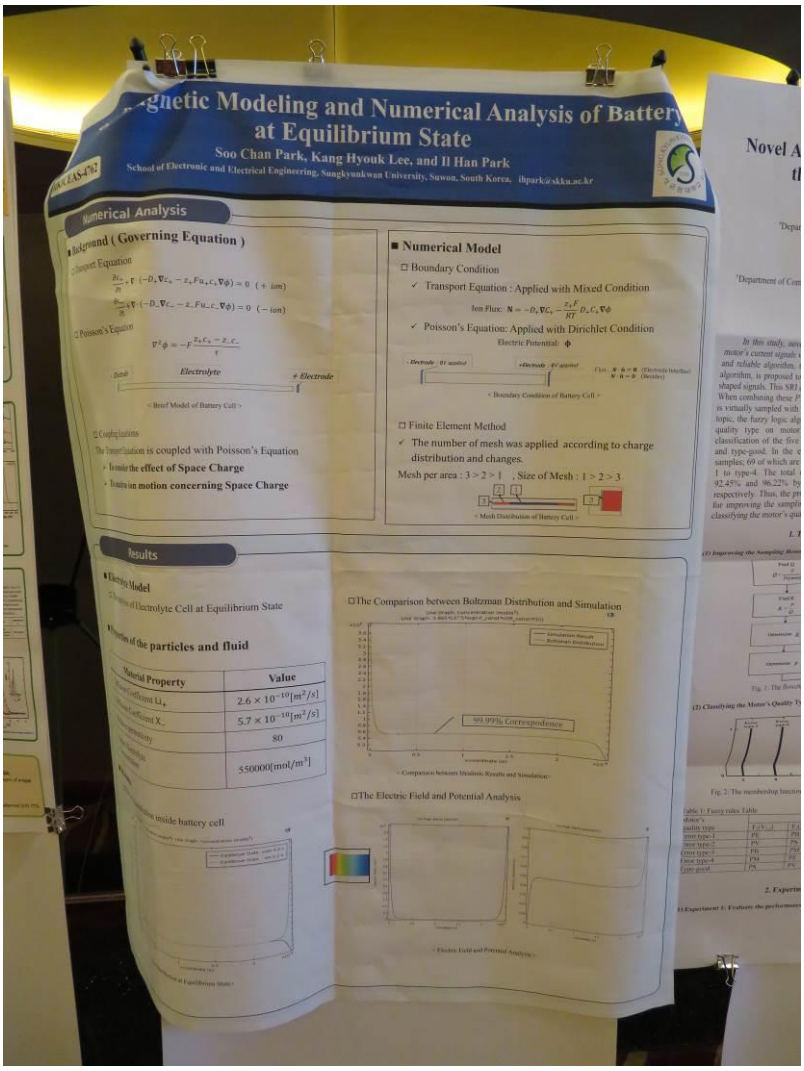


圖20. 韓國學者提出一種新的平衡態電池模型

不同於多數其他的模型以充電連續性方程和電流守恆條件來計算電池中的電勢和電流，欠缺考慮空間電荷分布的電場效應，該新模型以求解三個方程計算空間電荷的場效應，其一為泊松方程(Poisson‘s equation)，另兩個是離子的運輸方程，並使用有限元素方法求解，達到可考慮空間電荷的場效應、提供剛性雙電層中的電勢降，擴散層分佈和其他物理現象的估計。

在電池空間日益緊縮且容量日益增大的發展趨勢下，電池的穩定性將逐漸受到挑戰，所以電池的設計在注重充放電次數與電容量的同時，亦須注意空間電荷的場效應，有助於維持其穩定性，減少爆炸等意外發生的可能性。

類鑽石碳鍍膜(Diamond-Like Coating, DLC)因具有細胞親和力、血液相容性與在人體中的生物穩定性等特質，可用於改善醫療裝置的生物材料表面的潔度，然而 DLC 膜的特性與製程條件息息相關，選擇適當的條件以製作出符合生物醫療設備的鍍膜是相當重要的，由過去的研究得知，細胞黏附與樣品表面的 C=O 鍵結具有高度相關性，以往皆是利用 X 射線光電子能譜(X-ray photoelectron spectroscopy, XPS)評估樣品的表面是否符合需求，但這方法成本高且耗時，日本的東京電機大學(Tokyo Denki University)電機系所的研究團隊則是發展了較低成本且快速的分析發法，利用橢圓偏振儀分析表面膜層的光學特性，間接得知表面結構是否符合生醫需求(圖 21)。

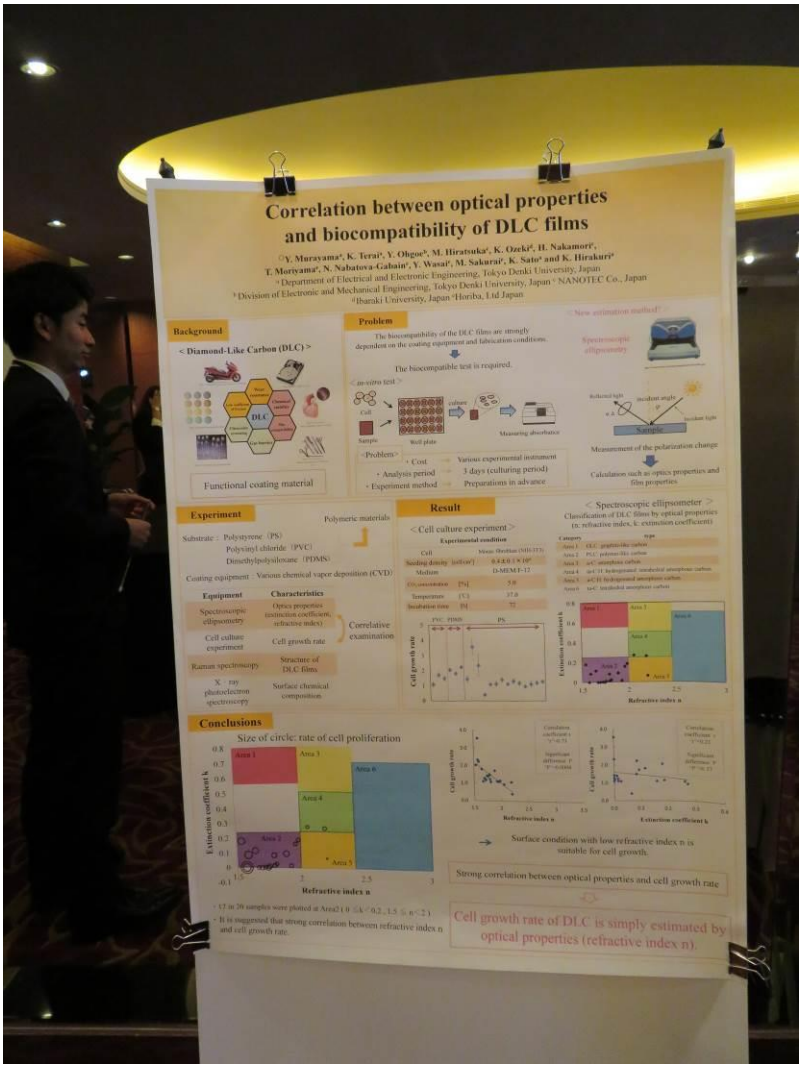


圖21. 利用分析表面膜層的光學特性得知表面結構是否符合需求

以光學特性取代 X 射線光電子能譜分析材料表面特性的方法，能降低成本與分析時間，可做為我們在利用電漿製程方面的參考。

同樣來自日本的東京電機大學電機系所的研究團隊另外也發表了鍍膜在生醫上的應用，以反應濺鍍法(reactive sputtering)在類鑽石碳鍍膜(DLC)上摻雜鋅(Zn)，製作可促進骨質生長的生物材料 Zn-DLC(圖 22)，類鑽石碳鍍膜具有高硬度，生物相容性和化學惰性等特性，適合作為生物醫療材料，另外，鋅被認為具細胞修護功能或結構超過 300 種蛋白質的基本成分，並參與大量的細胞生長過程，如 DNA 合成，酶活性和細胞分裂。Zn-DLC 具有從膜釋放 Zn 的機制，釋放的 Zn 促進骨細胞生長活性，在該團隊的研究中比較了含鋅的 DLC(Zn-DLC)與一般的 DLC，發現 Zn-DLC 明顯地較 DLC 更具有促進骨細胞生長的能力。

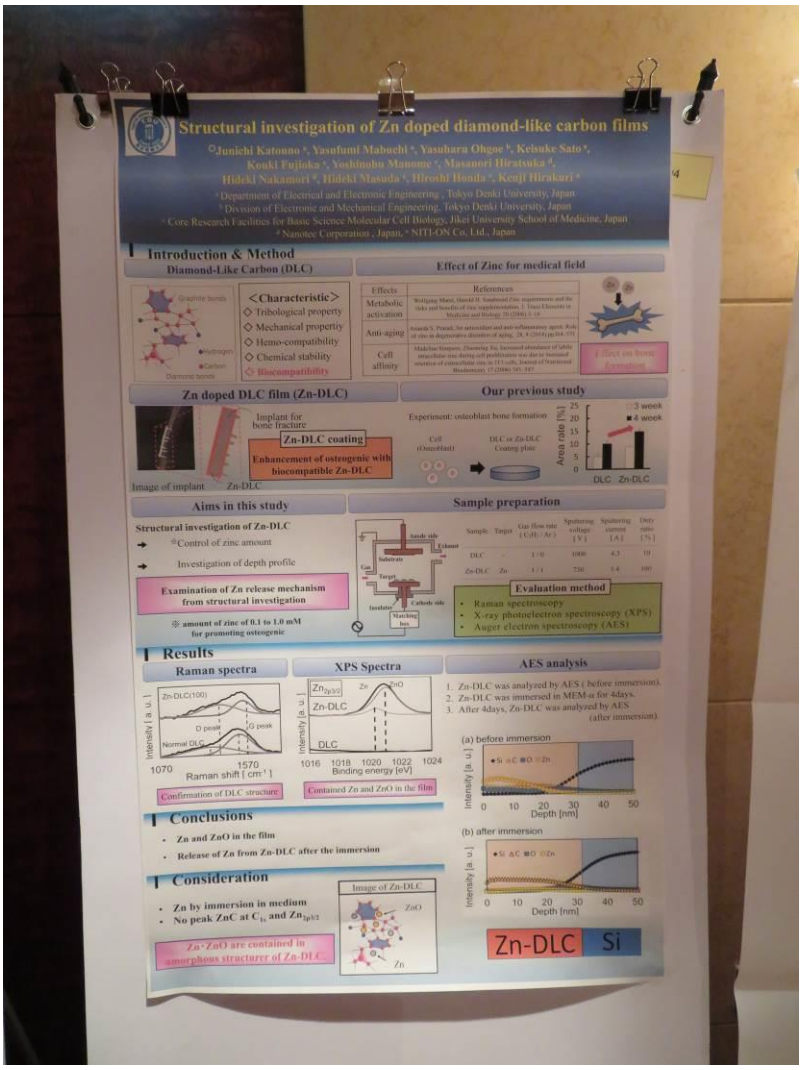


圖22. 反應濺鍍法於生醫上的應用

薄膜製程應用於生醫技術上，提供了我們將電漿鍍膜製程應用於其他領域的靈感，未來在研究電漿技術時，可參考其他領域上的應用，使本所獨到電漿技術能推廣至更多的層面。

關於穿戴裝置的相關研究，目前許多的研究已指出，有機場效應電晶體(Organic Field-Effect Transistors, OFET)、有機光伏電池(OPV)、充電電池和有機發光二極體(OLED)，應用於電紡織品的可行性，為使電紡織品裝置能更實用並更容易製造出多功能紡織複合材料，韓國化學技術研究所的學者提出一個簡單的方法來製造高導電性和柔性紡織複合的材料，用於實現可穿戴紡織品的 OFET。

利用真空過濾與石墨烯濕轉移方式到 PET 上製作多功能紡織品，並摻雜奈米銀已提高導電率，通過轉移介電層/半導體層/金屬電極於石墨烯/銀織物的複合材料上，得到可繞性的有機電晶體，而該紡織物複合材料不但可用作可繞性基板且可用作導電柵電極。

由於紡織品電晶體在彎曲半徑 3mm，重複測試超過 1000 次循環，仍保有高度的穩定性性質，此外，紡織品電晶體的熱處理改善了各電介質層之間的界面性質，賦予了該紡織品可歷經洗滌處理的耐久性，因為這些特性，預期在未來將可用這簡單的方法製作出大面積的電子衣物(圖 23)。

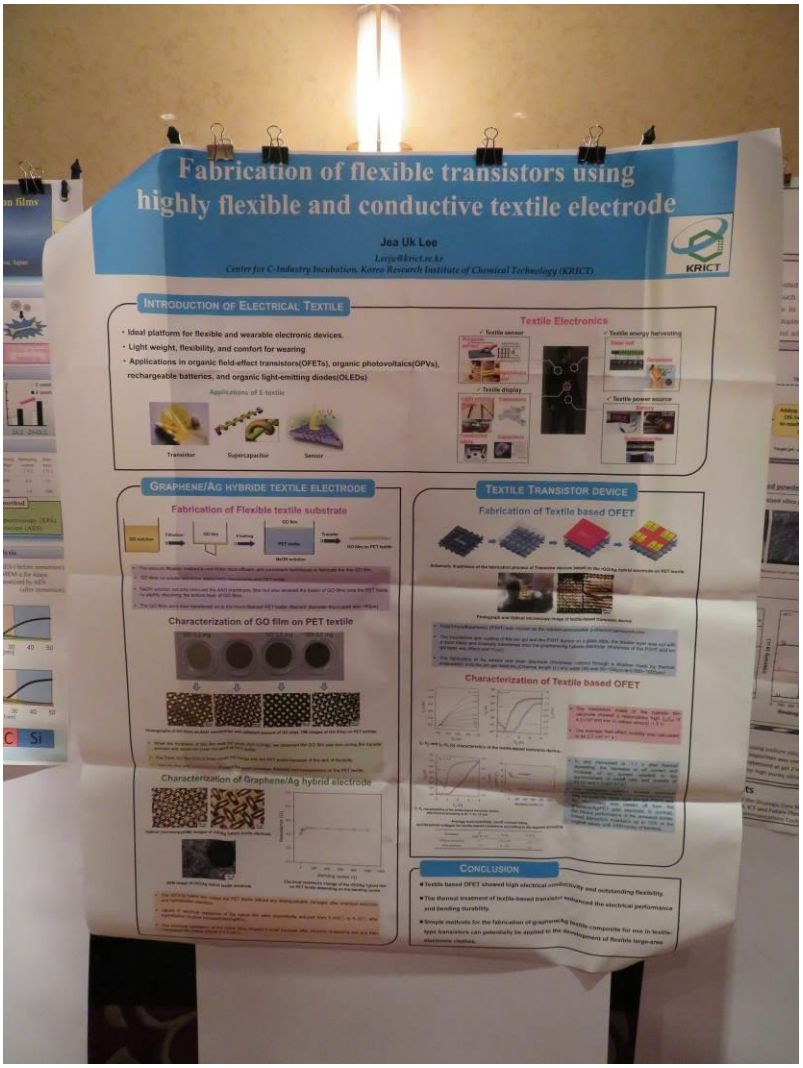


圖23. 以高導電性和柔性紡織複合的材料實現可穿戴紡織品的 OFET

以紡織方式製作太陽電池或其他能源擷取裝置，具有更高的變化性，以此方式提供行動裝置電源或物聯網使用，減少使用大型電力網充電，進而降低電廠負擔，甚至供給家庭其他需求用電，是值得我們參考的研究方向。

四、建 議 事 項

2016 年 Hong Kong International Conference on Engineering and Applied Sciences 是一場高水準並包含多項工程與應用科學領域的研討會，有許多與環境友善以及綠色能源相關的技術值得參考。

參加本次會議的建議事項如下：

(一) 該研討會包含非常廣泛的學術領域，有生醫材料、土木工程、化學工程、電子與電機工程、材料工程以及基礎科學等，而在各個學科領域上，關於環境友善、替代能源、再生能源等皆有不少的研究成果發表，足見各領域在環境與能源議題上的重視，參與這種多領域的研討會，可得到更寬廣的研究思路，對於未來的研究增添更多的可能性。

(二) 有學者利用流體力學精進地表風力預測，能更準確的預估風力發電機的輸出功率，有助於判斷風機擺放的最佳位置，值得我國在發展風力發電時參考。

(三) 在發展替代能源時，對於其周邊相關技術的開發也是同等重要的，完善的周邊技術有助於替代能源的推廣，是值得我們注意的研究方向。

(四) 有研究團隊以紡織方式製作有機場效應電晶體，此技術十分的新穎，值得未來核能研究所在發展能源擷取裝置時，做為研究參考。

(五) 薄膜製程應用於生醫技術上，顯示電漿鍍膜製程應用的更多可能性，未來在利用電漿技術開發薄膜材料時，可參考其他領域上的應用，使本所獨到電漿技術能推廣至更多的層面，並成為本所的獨占技術。

(六) 有些以海報方式發表研究的學者，其海報上幾乎無文字敘述，皆以圖表表示，但現場輔以筆記型電腦或實體模型等配合解說，與參觀者互動有極佳的效果，易於了解整個研究的來龍去脈，值得我們在做海報發表時學習。

五、附　錄

(一) 會議資料

Conference Proceedings
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Ming-Chang Chih	National Chung Hsing University	Taiwan
Mingchu (Neal) Luo	Emporia State University	USA
Mohamad Hafis Amat Simin	University Sultan Zainal Abdin	Malaysia
N. S. Ravishankar	Axis Bank	India
Naim Uzun	Aksaray University	Turkey
Nezaket Memmedli	Azerbaijan National Academy of Sciences	Azerbaijan
Obydullah Al Marjuk	Independent University, Bangladesh	Bangladesh
Ozgul Keles	Aksaray University	Turkey
Prasong Tanpichai	Kasetsart University	Thailand

Qi Wang	University of Southern Denmark	China
Rajesh U. Chheda	Shri. MD Shah Mahila College	India
Ramayah Thurasamy	Universiti Sains Malaysia	Malaysia
Reem Abed Almotaleb Abuiyada	Dhofar University	Palestine
Ricky Ng	Vocational Training Council	Hong Kong
Ronald Griffin	Florida Agricultural & Mechanical University	USA
Rotaru Ioan-Gheorghe	Timotheus Brethren Theological Insititute of Bucharest	Romania
Ruby Ann L. Ayo	Bicol University	Philippines
Sadiq Abdulwahed Ahmed Ismail	United Arab Emirates University	UAE
Sally dhruva' Stephenson	Frosterburg State University	USA
Seonjeong Ally Lee	Kent State University	USA
Shaik. Feroz	Caledonian College of Engineering	Oman
SHANG Songmin	The Hong Kong Polytechnic University	Hong Kong
Shujen Lee Chang	Asia University	Taiwan
Soon SONG	Wonkwang University	South Korea
Suzanne Beasterfield	Idaho State University	USA
Szu-Wei (Chris) Chen	I-Shou University	Taiwan
T.S.Devaraja	University of Mysore, Hemagangothri Campus	India
Tan Khay Boon	SIM Global Education	Singapore
Theeraphab Phetmalaikul	Srinakharinwirot University	Thailand
Thoedsak Chomtohsuwan	Rangsit University	Thailand
Vijayaletchumy Subramaniam	Universitas Putra Malaysia	Malaysia
Wang Yu-Shan	National Kaohsiung First University of Science and Technology	Taiwan
Warren Matthews	Belhaven University	USA
Wei-Cheng(Joseph) Mau	Wichita State University	USA
Wen-Pei Sung	National Chin-Yi University of Technology	Taiwan
William Richeson	University of Kentucky	USA
Ye PeiShi	Family Justice Courts Singapore	Singapore
Ying Zhang	Southeast University	China
Yong-Ho Kim	Pukyong National University	South Korea
Yuki Yokohama	Kanto Gakuin University	Japan
Zabihollah Rezaee	The University of Memphis	USA
Zhou Xiao	Fudan University	China

Conference Schedule

Thursday, December 15, 2016		
Oral Presentation		
Eaton Hotel (2nd Floor)		
Time	**Schedule**	**Venue**
08:30-16:30	Registration	Foyer Area
09:00-10:00	Education (1)	Pearl A
	Education (2)	Pearl B
	Biomedical Engineering	Jordan
10:00-10:20	**Tea Break & Networking**	Foyer Area
10:20-10:50	**Welcome Speech & Best Paper Award Ceremony**	Pearl A
10:50-12:00	**Social Science Keynote Speech** **Mr. Joseph Lau** **The Hong Kong Polytechnic University** Topic: Hong Kong 334 Educational Reform	
	Nature Science Keynote Speech **Prof. Sergei Gorlatch** **University of Muenster** Topic: Modern Distributed Applications Based on Mobile Cloud Computing and Software-Defined Networks	
12:00-13:00	**Lunch Time**	Jade Ballroom
13:00-14:30	Education (3)	Pearl A
	Psychology(1)	Pearl B
	Computer and Information Sciences & Computer Science Applications & Communication Engineering & Networking, Communication and Multimedia	Jordan
14:30-14:40	**Tea Break & Networking**	Foyer Area

14:40-16:10	Education(4)	Pearl A
	Psychology(2)	Pearl B
	Fundamental and Applied Sciences & Environmental Science & Geosciences and Petroleum Engineering	Jordan
16:10-16:20	**Tea Break & Networking**	Foyer Area
16:20-17:20	Education(5)	Pearl A
	Society (1) & Culture	Pearl B

Thursday, December 15, 2016	
Poster Session	
Eaton Hotel(2nd Floor) Foyer Area	
Time	**Schedule**
13:20-14:20	Poster Sessions (1) Electrical and Electronic Engineering / Mechanical Engineering
14:40-15:40	Poster Sessions (2) Biomedical Engineering / Chemical Engineering / Civil Engineering / Fundamental and Applied Sciences / Material Science and Engineering
16:00-17:00	Poster Sessions (3) Psychology

Friday, December 16, 2016		
Oral Presentation		
Eaton Hotel (2nd Floor)		
Time	**Schedule**	**Venue**

08:30-16:30	Registration	Foyer Area
08:50-10:20	Education (6)	Pearl A
	Economics & Finance	Pearl B
	Electrical and Electronic Engineering	Jordan
10:20-10:30	**Tea Break & Networking**	Foyer Area
10:30-12:00	Education (7)	Pearl A
	Business & Management	Pearl B
	Civil Engineering & Material Science and Engineering & Mechanical Engineering	Jordan
12:00-13:00	**Lunch Time**	Jade Ballroom
13:00-14:30	Education (8)	Pearl A
	Society (2)	Pearl B
14:30-14:40	**Tea Break & Networking**	Foyer Area
14:40-16:10	Education (9)	Pearl A
	Education (10)	Pearl B

Friday, December 16, 2016	
Poster Session	
Eaton Hotel(2nd Floor) Foyer Area	
Time	**Schedule**
09:30-10:30	Poster Sessions (4) Society / Education / Economics / Business

Oral Sessions

Education (1)

Thursday, December 15, 2016 09:00-10:00 Pearl A

Session Chair:

HKICEPS-6029
Business Sustainability in Asia in the Aftermath of 2015 Hong Kong Stock Exchange Requirements
Zabihollah Rezaee｜*University of Memphis*
Danny Lo｜*Wenzhou-Kean University*
Alexis Suen｜*Pro-FIT Industrial Co. Ltd*
HKICEPS-5990
Qualitative Study to Identify Common Practices Used by Mentors Participating in New Teacher Mentoring Programs that Encourage Identified Teachers to Remain in the Teaching Profession
Rudo Emilia Tsemunhu｜*Valdosta State University*
Jana Laster Sparks｜*Phenix City School District*
Robert Green｜*Valdosta State University*
William F. Truby｜*Valdosta State University*
Kathy Nobles｜*Valdosta State University*
HKICEPS-6282
The Impact of Variation Theory for Secondary School Students on Acquiring Probabilistic Knowledge
Doi Pei Yick｜*The Education University of Hong Kong*
APCBSS-532
The Arts and Academic Achievement: A Model for Developing Countries
Karendra Devroop｜*University of South Africa*

Education (2)

Thursday, December 15, 2016 09:00-10:00 Pearl B

Session Chair:

HKICEPS-6068
An Assessment of Learning Difficulty Level of Math Class Topics - A Case Study of a Japanese Public Junior High School -
Tomoko Nishikawa｜*Yamagata Prefectural Yonezawa Women's Junior College*

Giido Izuta｜*Yamagata Prefectural Yonezawa Women's Junior College*

HKICEPS-6191

On Popperian Epistemology: A Critical Review of the Design Research Tradition

Ulku Ozten｜*Osmangazi University*

Hakan Anay｜*Osmangazi University*

HKICEPS-6195

The Long-Term Outcomes of Graduates: Does Public and Private College Education Make a difference?

Mingchu Neal Luo｜*Emporia State University*

Daniel Stiffler｜*Emporia State University*

HKICEPS-6287

Development of Blended Learning Instructional Model Based on Connectivism to Enhance the Student's 21st Century Skills: Critical Thinking Skills of Undergraduate Students

Pangleela Burapapichitpai｜*Kasetsart University*

Nattaphon Rampai｜*Kasetsart University*

Biomedical Engineering

Thursday, December 15, 2016 09:00-10:00 Jordan

Session Chair:

HKICEAS-4719

Enhanced Coupling Approach for Computing FFR$_{CT}$

Xinzhou Xie｜*Northwest Polytechnical University*

Xu Duan｜*Northwest Polytechnical University*

Songyun Xie｜*Northwest Polytechnical University*

HKICEAS-4757

Adaptive Boundary Tracking of Retinal Vessel in Fundus Image

Eisaku Tohma｜*Yamaguchi University*

Eiji Uchino｜*Yamaguchi University*

Noriaki Suetake｜*Yamaguchi University*

HKICEAS-4768

The Effect of E229V Mutation on Ventricular Mechanics: Simulation Study

Ki Moo Lim｜*Kumoh National Institute of Technology*

Yoo Seok Kim｜*Kumoh National Institute of Technology*

HKICEAS-4874

Designing Hollow Particles for Controlled Drug Release in Managing Metabolic and Neurological Disorders

Sharad Kharel｜*Nanyang Technological University*

Jongsuep Baek｜*Nanyang Technological University*

Say Chye Joachim Loo｜*Nanyang Technological University*

Education (3)

Thursday, December 15, 2016 13:00-14:30 Pearl A

Session Chair:

HKICEPS-5783

KM Processes in a Higher Education Organization: The Students' Perspective

Elisabeth Brito｜*University of Aveiro*

Leonor Pais｜*University of Coimbra*

Nuno Rebelo dos Santos｜*Universidade de É vora*

João Vasconcelos｜*University of Coimbra*

HKICEPS-5992

Representation of NOS Aspects in One Singapore Grade 9 and 10 Biology Textbook

Jia Xun Chua｜*Nanyang Technological University*

Aik Ling Tan｜*Nanyang Technological University*

HKICEPS-6014

Motivation and Learning Strategies of Liberal Arts (LA) Students in a Catholic University

Rhene Carbonell Tabajen｜*Adamson University*

HKICEPS-6032

Designing Collaborative Learning Environment on Mobile Device

Suebwong Chuensombat｜*Kasetsart University*

Sasichaai Tanamai｜*Kasetsart University*

HKICEPS-6067

Using Universal Design for Learning Collaborative Lesson Planning to Advance Equity in Mathematics Education: Two Cases of Teacher Discourse

Paulo Tan｜*University of Tulsa*

HKICEPS-6165

A Model University Teacher?: Investigating What Makes a 21st Century Educator

Michelle M. Mukherjee｜*Queensland University of Technology*

Shaun S. Nykvist｜*Queensland University of Technology*

Psychology (1)

Thursday, December 15, 2016 13:00-14:30 Pearl B

Session Chair:

HKICEPS-5780

Knowledge Management in a University Context: The Professors` Perspective

Leonor Pais｜*University of Coimbra*
Nuno Rebelo dos Santos｜*Universidade de É vora*
Joana Almeida｜*University of Coimbra*

HKICEPS-5893

The Validation of Student's Self-Motivated Strategies Scales for Learning English in Thai Context

Thamarat Jangsiriwattana｜*Kasem Bundit University*

HKICEPS-6096

Trauma in Chinese Narratives: A Case Study of Ah Ying's *An Anthology of the Opium Wars Literature*

Eric Chia-Hwan Chen｜*National Taipei University of Education*

HKICEPS-6098

The Influence of Cognitive Style and Emotion on Moral Decision

Lei-Hsuan Yu｜*National Taiwan University of Science and Technology*
Johnson Ting｜*National Taiwan University of Science and Technology*
Cui Liu｜*Jiangsu Normal University*
Sufen Chen｜*National Taiwan University of Science and Technology*
Wen Hua Chang｜*National Taiwan Normal University*

HKICEPS-6100

Exploring Singapore Primary School Students' Motivation to Learn Mathematics – A Scale in Development

Kok Cheng Ang｜*Ministry of Education*
Seet Min Charmian Chng｜*Ministry of Education*

HKICEPS-6127

To Promote Campus Mental Health from Community Psychology Perspective

Sze Ming Chye｜*National Chi Nan University*
Yu-Ju Chang｜*National Chi Nan University*

Computer and Information Sciences & Computer Science Applications& Communication Engineering & Networking, Communication and Multimedia

Thursday, December 15, 2016 13:00-14:30 Jordan

Session Chair:

HKICEAS-4763

Quantitative Analysis of Feature Detection and Descriptor Algorithms for Utilization of Panoramic Image in Geographical Labeling

Hyung Woo Kim｜*Pukyong National University*
Yang-Won Lee｜*Pukyong National University*

HKICEAS-4769

Accelerated Convergent Method for Designing High-Accuracy Digital Phase-System

Tian-Bo Deng｜*Toho University*

EECS-20671

Automatic Quantification of Coronary Blood Flow Using Multi-Block Voting Method and Temporal Information

Ying-Che Tsai｜*Tzu Chi University*
Hsi-Jian Lee｜*Tzu Chi University*
Michael Yu-Chih Chen｜*Tzu Chi Medical Center*

EECS-20635

Ultra Wide Band Butterfly Antenna with Enhanced Gain

Cengizhan Mustafa Dikmen｜*Kocaeli University*
Gonca Çakır｜*Kocaeli University*
Sibel Ç imen｜*Kocaeli University*

EECS-20673

A Dynamic GA-Based Flow Scheduling in Fat-Tree Networks

Wen-Hsuan Liang｜*National Cheng Kung University*
Sun-Yuan Hsieh｜*National Cheng Kung University*
Chih-Heng Ke｜*National Quemony University*

Education (4)

Thursday, December 15, 2016 14:40-16:10 Pearl A

Session Chair:

HKICEPS-6111

Good Work in Higher Education: A University of the Philippines Case Study

Grace Shangkuan Koo｜*University of the Philippines*

HKICEPS-6196

A Conjoint Analysis-Based Grouping Strategy for a Metacognitive Study Aimed to Assess Students' Feeling of Difficulty towards Learning

Giido Izuta｜*Yamagata Prefectural Yonezawa Women's Junior College*
Tomoko Nishikawa｜*Yamagata Prefectural Yonezawa Women's Junior College*
Megumi Nakagawa｜*Yamagata Prefectural Yonezawa Women's Junior College*

HKICEPS-6388

Development and Validation of Module in Probability

Victoria Elip Tamban｜*Laguna State Polytechnic University*
Gloria Lapitan Banasihan｜*Laguna State Polytechnic University*

HKICEPS-6234

High Parental Expectations: (Un) Achievable Target?

Mercy Karuniah Jesuvadian｜*Nanyang Technological University*

HKICEPS-6240

Positive Psychology Education: Reflections on Teaching at a Japanese University

Elvyra Rombs｜*Waseda University*

HKICEPS-6248

Enhancing Students' Motivation to be Auditor through Conducting Auditing Classes Using Mixed-Pedagogical Method: A comparative Study of Thailand and Malaysia.

Patcharin Saramath｜*Maejo University*

Lee Teck Heang｜*Help University*

Psychology (2)

Thursday, December 15, 2016 14:40-16:10 Pearl A

Session Chair:

HKICEPS-6135

Young Children's Fairness Judgments on Distribution of Rewards and Responsibilities: Developmental Trends during Preschool Years

Yuko Hashimoto｜*Kwansei Gakuin University*

Yuichi Toda｜*Osaka Kyoiku University*

HKICEPS-6150

Cyber Bullying and Employees' Self-Esteem and Job Performance: A Literature Review

Margaret S. Sanapo｜*Ritsumeikan University Osaka-Ibaraki Campus*

HKICEPS-6179

Psychological Education for Safety in Road Traffic

Arkadiusz Letkiewicz｜*Police Academy in Szczytno*

Izabela Nowicka｜*Police Academy in Szczytno*

Anna K. Zubrzycka｜*Police Academy in Szczytno*

Ewa Kuczyńska｜*Police Academy in Szczytno*

HKICEPS-6186

Empathy, Self-Efficacy, Hope and Lifelong Learning among Medical Students

Mustafa Afifi｜*RAK Medical & Health Sciences University*

HKICEPS-6249

An Investigation of the Relationship between Counseling Self-Efficacy and Multicultural Counseling Competencies of Counselors

Ö mer Ö zer｜*Anadolu University*

Murat Yıkılmaz｜*Anadolu University*

Ezgi Ekin Şahin｜*Anadolu University*

HKICEPS-6158

The Effects of Age and Self-Assessment on Singing Achievement of Chinese Children and Adults

Esther Mang｜*Hong Kong Baptist University*

Fundamental and Applied Sciences & Environmental Science & Geosciences and Petroleum Engineering

Thursday, December 15, 2016 14:40-16:10 Jordan

Session Chair:

HKICEAS-4759

A Comparative Study on Validation Accuracies of Satellite Images According to Spatio-Temporal Collocation Methods

Soo-Jin Lee｜*Pukyong National University*

Yang-Won Lee｜*Pukyong National University*

HKICEAS-4760

Air-Temperature Ensembles of 19 GCMs Using Ensemble Bayesian Model Averaging (EBMA) for Northeast Asia

Kwangjin Kim｜*Pukyong National University*

Yang-Won Lee｜*Pukyong National University*

HKICEAS-4857

Correction of LiDAR Measurement Error in Complex Terrain by CFD - Case Study of the Yangyang Pumped Storage Plant

Hyun-Goo Kim｜*Korea Institute of Energy Research*

Catherine Meissner｜*WindSim AS*

HKICEAS-4752

Retrieval and Validation of Fire Radiative Power Using Himawari-8 Satellite

Dae-Sun Kim｜*Pukyong National University*

Yang-Won Lee｜*Pukyong National University*

HKICEAS-4676

Desulfurization of Mae Moh Coal from Thailand by Leaching with Sodium Hydroxide and Potassium Hydroxide

Bantita Terakulsatit｜*Suranaree University of Technology*

HKICEAS-5080

Topological Basis of Flat Electroencephalography's State Space

Tan Lit Ken｜*Universiti Teknologi Malaysia*

Tahir Bin Ahmad｜*Universiti Teknologi Malaysia*

Lee Kee Quen｜*Universiti Teknologi Malaysia*

Wong Wai Kit｜*Hospital Sungai Buloh*

Education (5)

Thursday, December 15, 2016 16:20-17:20 Pearl A

Session Chair:

HKICEPS-5823

From the Theatre of War to the Classroom: Educational and Psychological Implications for Enabling Newcomer English Language Learners to Pursue Academic Excellence

Melinda Trice Cowart｜*Texas Woman's University*

HKICEPS-6350

Design for Blended Synchronous Learning: An Educational Design Research

Qiyun Wang｜*National Institute of Education*

Choon Lang Quek｜*National Institute of Education*

HKICEPS-6110

Vocalization of Reading for Communicative Ability and Integrated Language Learning

Young Mee Kim｜*Korea Science Academy of KAIST*

HKICEPS-6131

Two Meanings of Courage in Michael Foucault's *Fearless Speech* and in *The Analects of Confucius*

Verena Xiwen Zhang｜*Tunghai University*

Society (1) & Culture

Thursday, December 15, 2016 16:20-17:20 Pearl B

Session Chair:

HKICEPS-6049

Constructing Identity with Gayspeaking on Facebook

Bethany Marie Cabantac Lumabi｜*Adamson University*

HKICEPS-6331

Information Systems Job Trend in the United States

Zachary Wong｜*Sonoma State University*

HKICEPS-6333

The Implementation of the Integrated Marketing Communication Tool in Provoking Numbers of Entrepreneur on the Project Participation for the Multi-Functioning Water Heat Solar Energy System

Pattarika Maneepun｜*Maejo University*

APCBSS-572

The Effects Remittances Have on Kinship Ties in Urban Philippines
Bryan W. Rich｜*Palawan State University*

Education (6)

Friday, December 16, 2016 08:50-10:20 Pearl A

Session Chair:

HKICEPS-6273
Influence of Culture of Quality to Teachers' Perception on School Effectiveness, School Climate and Collective Efficacy
Nilda Wines Balsicas｜*St. Dominic College of Asia*
Rosalina M. Makalintal｜*La Consolacion College Manila*
Jennefer Yap Yap｜*St. Dominic College of Asia*

HKICEPS-6041
Learning Environment of Self-Directed Learning on Web-Based Instruction for Creative Thinking Development
Boonjira Wongpa｜*Kasetsart University*
Sasichaai Tanamai｜*Kasetsart University*

HKICEPS-6045
Learning Environment Imagineering Approach on Web Based Instruction for Creative Thinking Development
Punrumpa Yingheng｜*Kasetsart University*
Sasichaai Tanamai｜*Kasetsart University*

HKICEPS-6048
Task-Based Dictation: A Means of Improving the Language Proficiency of College Students
Bethany Marie Cabantac Lumabi｜*Adamson University*

HKICEPS-6060
Career Planning Activities with Hearing-Impaired University Students: Preparing Job Application Portfolio
Zehranur Kaya｜*Anadolu University*
Meltem Ö zten Anay｜*Anadolu University*
Güzin Karasu｜*Anadolu University*
Gökçen Abalı｜*Anadolu University*

HKICEPS-6061
On Environmental Discourse and Phenomenology in Doctoral Research in Architecture in Turkey
Ulku Ozten｜*Eskisehir Osmangazi University*
Hakan Anay｜*Eskisehir Osmangazi University*
Meltem Ozten Anay｜*Anadolu University*

Yigit Acar｜*Middle East Technical University*

Economics & Finance

Friday, December 16, 2016 08:50-10:20 Pearl B

Session Chair:

APCBSS-565

Model Analysis Zakat Productive Fund Management in Mustahik Empowerment (Case Study: Rumah Amal Salman ITB and DPU Daarut Tauhid, Bandung, Indonesia)

Gina Noviana Yuniar｜*Padjadjaran University*

Hani Hanifah｜*Padjadjaran University*

Bagdja Muljarijadi｜*Padjadjaran University*

APCBSS-616

Dependency on Imported Oil and Its Effects on Current Account Balance of Developing Countries: The Case of Turkey

Talha Yalta｜*TOBB University of Economics and Technology*

Yasemin Yalta｜*Hacettepe University*

APCBSS-617

The Time Varying Nature of the Trade Elasticities in China

Yasemin Yalta｜*Hacettepe University*

APCBSS-620

Time Series Forecasting of Tourist Arrival in Singapore

Tan Khay Boon｜*Singapore Institute of Management Global Education*

APCBSS-576

Valuation of Reverse Mortgage Loan with Bequest Motives in Korea

Yoonkyung Yuh｜*Ewha Womans University*

Electrical and Electronic Engineering

Friday, December 16, 2016 08:50-10:20 Jordan

Session Chair:

HKICEAS-4728

Fault-Tree Analysis of Cascaded H-Bridge Inverter According to Various Switching Schemes

Feel-Soon Kang｜*Hanbat National University*

HKICEAS-4734

Enhancement of Static Frequency Converter Start-up Reliability for Pumped Storage Power Units of Guangzhou Pumped Storage Power Station

Fu Kit Edward Chow｜*CLP Power Hong Kong Limited*
Wei Huang｜*Power Generation Company, China Southern Power Grid*
Wai Lun Wong｜*CLP Power Hong Kong Limited*

EECS-20661
Nondestructive Testing Using a Tunneling Magnetoresistance Sensor with AC Modulation Driving
Takuya Yasugi｜*Okayama University*
Yatsuse Majima｜*Okayama University*
Kenji Sakai｜*Okayama University*
Toshihiko Kiwa｜*Okayama University*
Keiji Tsukada｜*Okayama University*

EECS-20663
Magnetic-Flux Leakage Testing for Backside Crack on Steel Plate by Using Low-Frequency Magnetic Field Vector
Yuta Haga｜*Okayama University*
Tsuyoshi Goda｜*Okayama University*
Toshihiko Kiwa｜*Okayama University*
Keiji Tsukada｜*Okayama University*
Kenji Sakai｜*Okayama University*

EECS-20665
Measurement of Magnetic Relaxation of Magnetic Nanoparticles by Using a High-Temperature SQUID Magnetometer
Yasuaki Matsunaga｜*Okayama University*
Ryota Isshiki｜*Okayama University*
Yuta Nakamura｜*Okayama University*
Toshihiko Kiwa｜*Okayama University*
Keiji Tsukada｜*Okayama University*
Kenji Sakai｜*Okayama University*

EECS-20674
Development of a Bridge Circuit Type Hydrogen Sensor Using Ultra-Thin Pt Film
Shota Inami｜*Okayama University*
Kaoru Amano｜*Okayama University*
Ryo Furukawa｜*Okayama University*
Toshihiko Kiwa｜*Okayama University*
Keiji Tsukada｜*Okayama University*
Kenji Sakai｜*Okayama University*

Education (7)

Friday, December 16, 2016 10:30-12:00 Pearl A

Session Chair:

HKICEPS-5784

Psychological Approach to Decent Work: Its Measure and Managerial Implications

Nuno Rebelo dos Santos｜*Universidade de É vora*

Leonor Pais｜*University of Coimbra*

Tânia Ferraro｜*University of Coimbra*

HKICEPS-6071

Promote 21st Century Skills through Instruction and Assessment Innovation in Higher Education: The Case Analysis of an Undergraduate Microbiology Course

Youyan Nie｜*Nanyang Technological University*

Jun Zheng｜*University of Macau*

HKICEPS-6092

Elements of MMORPGs Environment Affecting Skills Development of Players

Chatchai Puangplub｜*Kasetsart University*

Sasichai Tanamai｜*Kasetsart University*

Watsatree Diteeyont｜*Kasetsart University*

HKICEPS-6101

Learning on MOOC Environment Design

Nilrumpai Pattaranont｜*Kasetsart University*

Sasichaai Tanamai｜*Kasetsart University*

HKICEPS-6109

The Role of Three-Dimensional Printed Models of Skull in Anatomy Education: A Randomized Controlled Trail

Shi Chen｜*Peking Union Medical College Hospital (PUMCH), Chinese Academe of Medical Sciences & Peking Union Medical College (CAMS & PUMC)*

Zhouxian Pan｜*Peking Union Medical College Hospital (PUMCH), Chinese Academe of Medical Sciences & Peking Union Medical College (CAMS & PUMC)*

Yanyan Wu｜*Peking Union Medical College Hospital (PUMCH), Chinese Academe of Medical Sciences & Peking Union Medical College (CAMS & PUMC)*

Zhaoqi Gu｜*Peking Union Medical College Hospital (PUMCH), Chinese Academe of Medical Sciences & Peking Union Medical College (CAMS & PUMC)*

Man Li｜*Peking Union Medical College Hospital (PUMCH), Chinese Academe of Medical Sciences & Peking Union Medical College (CAMS & PUMC)*

Ze Liang｜*Peking Union Medical College Hospital (PUMCH), Chinese Academe of Medical Sciences & Peking Union Medical College (CAMS & PUMC)*

Huijuan Zhu｜*Peking Union Medical College Hospital (PUMCH), Chinese Academe of Medical Sciences & Peking Union Medical College (CAMS & PUMC)*

Yong Yao｜*Peking Union Medical College Hospital (PUMCH), Chinese Academe of Medical Sciences & Peking Union Medical College (CAMS & PUMC)*

Wuyang Shui｜*Beijing Normal University*
Zhen Shen｜*Chinese Academy of Sciences (CASIA)*
Jun Zhao｜*Peking Union Medical College Hospital (PUMCH), Chinese Academe of Medical Sciences & Peking Union Medical College (CAMS & PUMC)*
Hui Pan｜*Peking Union Medical College Hospital (PUMCH), Chinese Academe of Medical Sciences & Peking Union Medical College (CAMS & PUMC)*

HKICEPS-6214
Preparing Students for Professional Practice: Incorporating Industry-Aligned Work-Integrated and Situated Learning Practices into Media Communication Curricula.
Rod McCulloch｜*University of the Sunshine Coast*

Business & Management

Friday, December 16, 2016 10:30-12:00 Pearl B

Session Chair:

APCBSS-615
The Usage of Accounting Software Package for Study in Bachelor of Accountancy Program
Thamonwan Pomsanam｜*Vongchavalitkul University*

APCBSS-619
The Relationship between Earnings, Cash Flows and Dividend Yield: Evidence from SET High Dividend of Companies Listed on the Stock Exchange of Thailand.
Sunanta Pasalao｜*Vongchavalitkul University*

APCBSS-549
The Effects of Person-Organization Fit on Identification: Focusing on Cross-Level Analysis
Yongsun Chang｜*Chosun University*
Jingjing Li｜*Chosun University*

APCBSS-577
Antecedents of Consumers' Loyalty toward the Retailers: The Role of Asset Specificity
Min-Chieh Chuang｜*Tunghai University*

APCBSS-618
The Thai Tourist's Satisfactions to Travel at Wat Sala Loi, Nakhon Ratchasima Province
Nalinthip Ngoensoongnoen｜*Vongchavalitkul University*

Civil Engineering & Material Science and Engineering & Mechanical Engineering

Friday, December 16, 2016 10:30-12:00 Jordan

Session Chair:

HKICEAS-4442

Soil's Pore Size Distribution Modelling by Means of Multimodal Statistical Distributions

Luan Carlos de Sena Monteiro Ozelim｜*University of Brasília*

André Luís Brasil Cavalcante｜*University of Brasília*

HKICEAS-4570

Cointegrated and Heteroskedastic Properties of the Time Series of Monthly Earthquake Numbers in the Three Eastern Coast Counties of Taiwan

Ko-Ming Ni｜*Ling Tung University*

HKICEAS-4745

A Preliminary Study on Analyzing Risks of Introducing BIM in Building Administration in Taiwan

Mei-Fang Huang｜*National Central University*

Han-Hsiang Wang｜*National Central University*

HKICEAS-4543

Facile Approach to Prepare Kesterite CZTSSe Nanotubes via a Solvothermal Technique

Lin-Jer Chen｜*National Cheng Kung University*

HKICEAS-4585

The Parametric Analysis in Fabrication of Tungsten Carbide Alloy Rod by Electrochemical Machining

Lih-Wu Hourng｜*National Central University*

Qing-Huang Zhao｜*National Central University*

Zhi-Wen Fan｜*Metal Industries Research and Development Centre*

Chin-Wei Liu｜*Metal Industries Research and Development Centre*

HKICEAS-4722

Infrared Signature Characteristic of Exhaust Plume from a Small Scale Engine

Bonchan Gu｜*Korea Advanced Institute of Science and Technology*

Seung Wook Baek｜*Korea Advanced Institute of Science and Technology*

Hyunwook Jaegal｜*Korea Advanced Institute of Science and Technology*

Won Cheol Kim｜*Agency for Defense Development*

Education (8)

Friday, December 16, 2016 13:00-14:30 Pearl A

Session Chair:

HKICEPS-6115

Designing Physical Learning Environments of a Digital Classroom

Paiboon Nasumran｜*Kasetsart University*

Sasichaai Tanamai｜*Kasetsart University*

HKICEPS-6120

An Investigation on the Use of English Medium Instruction in Teaching Chinese as a Foreign Language

Ping Xu｜*Assumption University*

HKICEPS-6126

A Reflective Practice of Improving Student Teachers' Abilities in Conducting PE in CLIL through an Overseas Teaching Project

Takayuki Shishido｜*Osaka Kyoiku University*

Kazuko Kashiwagi｜*Osaka Kyoiku University*

Sakiko Matsuo｜*Osaka Kyoiku University*

Tetsuo Kida｜*Osaka Kyoiku University*

HKICEPS-6143

The Impact of Innovation Climate on Organizational Effectiveness

Jodie Claire Aquino Ngo｜*University of Asia and the Pacific*

HKICEPS-6393

Teaching Students the Skills of Referencing Sources: Cite It!

Anna Woodrow｜*John Abbott College*

APCBSS-613

Pesantren (Islamic Boarding School) in Indonesia: Developing Gender Equality in Patriarchy Planet

Siti Kholifah｜*Brawijaya University*

Society (2)

Friday, December 16, 2016 13:00-14:30 Pearl B

Session Chair:

HKICEPS-5978

The Graciousness of the Buddha towards Sentient Beings

Chamnong Kanthik｜*Mahamakut Buddhist University*

Sudaporn Khiewngamdee｜*Mahamakut Buddhist University*

HKICEPS-5986

Economic Promotion through One-Town One Product

Eric Santos Parilla｜*University of Asia and the Pacific*

HKICEPS-6034

Model of Forestry Policy Implementation for Sustainable Forest Governance in Kapuas Hulu, West Kalimantan, Indonesia

Ginung Pratidina｜*Djuanda University*

Euis Salbiah｜*Djuanda University*

Rita Rahmawati｜*Djuanda University*

HKICEPS-6057

The Development Model of Community Paradigm of House Ownership Separated From Land Ownership

Martin Roestamy｜*Juanda University*

Rita Rahmawati｜*Juanda University*

HKICEPS-6064

Intentions and Behaviors of Adolescents in Purchasing Green Products

Lota Kristine Cruz SanJuan-Nable｜*University of Asia and the Pacific*

HKICEPS-6070

An Investigation of the Depopulation in Northeastern Rural Regions of Japan Based on the Conjoint Analysis Modeling Approach

Megumi Nakagawa｜*Yamagata Prefectural Yonezawa Women's Junior College*

Giido Izuta｜*Yamagata Prefectural Yonezawa Women's Junior College*

Education (9)

Friday, December 16,2016 14:40-16:10 Pearl A

Session Chair:

HKICEPS-6005

Functional Digital Literacy Calls for SOS by a Smuggled Afghan Boy: Teaching Phonics and Pragmatics for Survival Language

Lucia Y. Lu｜*Valdosta State University*

HKICEPS-6164

Reverse Merger versus Reverse Takeover Deals: Policy, Practical and Research Implications

Zabihollah Rezaee｜*University of Memphis*

Jacky Cheung｜*Shinhint Group*

HKICEPS-6154

Attitudes of Students with Special Educational Needs (SEN) and Their Parents towards Mediated Learning Experience (MLE) in Hong Kong: A Qualitative Study

Yan Tat Liu｜*The Education University of Hong Kong*

Ting Wu｜*The Education University of Hong Kong*

Mei Lan Au｜*The Education University of Hong Kong*

Kuen Fung Sin｜*The Education University of Hong Kong*

HKICEPS-6156

Support for Students with Disabilities in Higher Education: Exploring Students with Visual Impairments in Singapore

Meng Ee Wong｜*National Institute of Education, Nanyang Technological University*

HKICEPS-6162

Impact of Teacher-Student Relationships on Children's Well-Being: Foregrounding Children's Voices

Joanna Tay-Lim｜*National Institute of Education (Nanyang Technological University)*

Wong Meng Ee｜*National Institute of Education (Nanyang Technological University)*

HKICEPS-6108

Massive Open Online Course (MOOC) Instructional Model Based on Collaborative learning

Sirikanya Maneenil｜*Kasetsart University*

Sasichaai Tanamai｜*Kasetsart University*

Education (10)

Friday, December 16, 2016 14:40-16:10 Pearl B

Session Chair:

HKICEPS-6117

Understanding Transition: An Analysis of Transition Practices from Preschools to Primary Schools in Mauritius

Saraswatee Rajiah｜*Mauritius Institute of Education*

Jayaluxmi Naidoo｜*University of Kwa Zulu Natal*

HKICEPS-6168

Study on Learning Outcomes of Chinese Character Key-Image Pictures Applied in Distance Learning Environment

Hsuan-Po Wang｜*National Taiwan Normal University*

Yin Sim Lam｜*National Taiwan Normal University*

Zhen-Xing Lin｜*National Taiwan Normal University*

HKICEPS-6317

The Video Blog Based Role Play Lessons to Enhance English Oral Communication Skills for Tourism Students

Annop Bunjan｜*Suranaree University of Technology*

Suksan Suppasetseree｜*Suranaree University of Technology*

HKICEPS-6330

The Impact of Transformational Leadership toward Teachers' OCB in Elementary School of Bogor Indonesia

Siti Pupu Fauziah｜*Djuanda University*

Radif Khotamir Rusli｜*Djuanda University*

HKICEPS-6419

Assessment of the Capacity Building Program for Grade 10 Science Teachers: The K to 12 Perspectives

Dr. Ricky M. Magno｜*West Visayas State University! College of Education, Iloilo City, Philippines / Department of Science and Technology-Science Education Institute Bicutan, Taguig Metro Manila, Philippines*

Poster Sessions (1)

Electrical and Electronic Engineering / Mechanical Engineering

Thursday, December 15, 2016 13:20-14:20 Foyer Area

HKICEAS-4606

Preparation of Photo-Patterned ZnO Film for Low-Voltage Organic/Inorganic Hybrid Complementary Inverters Using Crosslinked Zinc Acrylate

Yong Jin Jeong｜*Korea National University of Transportation*
Tae Kyu An｜ *Korea National University of Transportation*

HKICEAS-4762

Electromagnetic Modeling and Numerical Analysis of Battery at Equilibrium State

Soo Chan Park｜*Sungkyunkwan University*
Kang Hyouk Lee｜*Sungkyunkwan University*
Il Han Park｜*Sungkyunkwan University*

ECCS-20552

Novel Algorithms on Determining Motor's Quality Types by Improving the Sampling Resolution of Periodic Spike Shaped Signals

Yun-Chi Yeh｜*Chien Hsin University of Science and Technology*
Tsung-Fu Chien｜*Chung Yuan Christian University*
Che Wun Chiou｜*Chien Hsin University of Science and Technology*
Che-Hung Lin｜*Chien Hsin University of Science and Technology*
Cheng-Yuan Chang｜*Chung Yuan Christian University*

ECCS-20647

A Human Target Detection Scheme with IR-UWB Radar in Indoors

Yohan Park｜*Kwangwoon University*
Changsoo Kim｜*HoseoTelnet*
Youngok Kim｜*Kwangwoon University*

ECCS-20675

Fluorescent SiPOF Microparticles with Thermostability

Masayuki Suzuki｜*Tokyo Denki University*
Keisuke Sato｜*Tokyo Denki University*
Kenji Hirakuri｜*Tokyo Denki University*

ECCS-20679

Magnetic Performance of Fluorescent Ammonium Silicon Fluoride/Magnetite Composite Microparticles

Masaya Kudo｜*Tokyo Denki University*
Keisuke Sato｜*Tokyo Denki University*
Hiroaki Sukegawa｜*National Institute for Materials Science*
Kenji Hirakuri｜*Tokyo Denki University*

ECCS-20681

Electrical Conductivity of Phosphorus-Doped Silicon Nanoparticles Using a Wet Process

Tsubasa Iguchi｜*Tokyo Denki University*
Keisuke Sato｜*Tokyo Denki University*
Kenji Hirakuri｜*Tokyo Denki University*

ECCS-20683

Correlation between Boron Concentration and Electrical Conductivity in Silicon Quantum Dots

Keita Kato｜*Tokyo Denki University*
Keisuke Sato｜*Tokyo Denki University*
Kenji Hirakuri｜*Tokyo Denki University*

HKICEAS-4642

Liquid Sloshing in a Rotating, Laterally Oscillating Cylindrical Container

Yusuke Saito｜*Keio University*
Tatsuo Sawada｜*Keio University*

HKICEAS-4727

Experimental Study of a Seawater Ice Machine Applied Two-Stage Vapor Compression Refrigeration System

Seong-Kwan Heo｜*Pukyong University*
Chang-Hyo Son｜*Pukyong University*
Jeong-In Yoon｜*Pukyong University*
Min-Ju Jeon｜*Pukyong University*
Hyun-Kyung Lee｜*Pukyong University*

HKICEAS-4732

New Calculation Technique for the Attitude of Hull Combined by Knockdown Pontoons

Yuji Doya｜*Matsubara Construction Co., Ltd*
Tatsuo Sawada｜*Keio University*

HKICEAS-4749

Performance Comparison between Thermal Energy Conversion System Applying Single-Ejector and Dual-ejector

Sung-Hoon Seol｜*Pukyong National University*
Jung-In Yoon｜*Pukyong National University*
Chang-Hyo Son｜*Pukyong National University*
Ho-Saeng Lee｜*Korea Research Institute of Ships & Ocean Engineering*
Hyeon-Ju Kim｜*Korea Research Institute of Ships & Ocean Engineering*
Jung-Hyun Moon｜*Korea Research Institute of Ships & Ocean Engineering*

HKICEAS-4750

Performance Analysis on Liquid-Vapor Jet Ejector Cycle for Thermal Energy Conversion System

Hyung-Min Han｜*Pukyong National University*
Jung-In Yoon｜*Pukyong National University*
Chang-Hyo Son｜*Pukyong National University*
Ho-Saeng Lee｜*Korea Research Institute of Ships & Ocean Engineering*
Hyeon-Ju Kim｜*Korea Research Institute of Ships & Ocean Engineering*
Jung-Hyun Moon｜*Korea Research Institute of Ships & Ocean Engineering*

HKICEAS-4758

5-DOF Specimen Stage Design and Kinematic Analysis for Electron Microscope

Sang-Chul Lee｜*Korea Basic Science Institute*
Jong-Man Jeung｜*Korea Basic Science Institute*
Cheolsu Han｜*Korea Basic Science Institute*
Jin-Gyu Kim｜*Korea Basic Science Institute*

HKICEAS-4858

Thrust under Wind Shear for a 2MW Wind Turbine below Rated

Chae Wook Lim｜*Hanbat National University*

HKICEAS-5106

Vibration analysis of fertilizer distributor using commercial FE code

Changmin Keum｜*Changwon National University*
Chaesil Kim｜*Changwon National University*
JungHoon Lee｜*Changwon National University*
Jaemin Kim｜*Changwon National University*
Minjae Shin｜*Changwon National University*

Poster Sessions (2)

Biomedical Engineering / Chemical Engineering / Civil Engineering / Fundamental and Applied Sciences / Material Science and Engineering

Thursday, December 15, 2016 14:40-15:40 Foyer Area

HKICEAS-4905

Correlation between Optical Properties and Biocompatibility of DLC Films

Yuta Murayama｜*Tokyo Denki University*
Kyoichi Terai｜*Tokyo Denki University*
Yasuharu Ohgoe｜*Tokyo Denki University*

Keisuke Satoh｜*Tokyo Denki University*
Kenji Hirakuri｜*Tokyo Denki University*
Kazuhide Ozeki｜*Ibaraki University*
Masanori Hiratsuka｜*NANOTEC Co*
Hideki Nakamori｜*NANOTEC Co*
Takumi Moriyama｜*HORIBA , Ltd*
Nataliya Nabatova Gabain｜*HORIBA , Ltd*
Youko Wasai｜*HORIBA , Ltd*
Masayuki Sakurai｜*HORIBA , Ltd*

HKICEAS-4958

Factors that Predict Prognosis in Preterm Infants with Desaturation during Feeding – A Pilot Study

Dong Rak Kwon｜*Catholic University of Daegu*
Gi-Young Park｜*Catholic University of Daegu*

HKICEAS-4138

Synthesis of Eco-Friendly Biosurfactants from Vegetable Oil Sources and Characterization of Their Interfacial Properties for Cosmetics and Household Product Applications

SooMin Lee｜*Dongguk University*
JuYeon Lee｜*Dongguk University*
JongChoo Lim｜*Dongguk University*

HKICEAS-4907

Efficient IRMOF-16 Based Cu Catalyst for Oxidation with TEMPO

Young-Pyo Ko｜*Inha University*
Seung-I Lee｜*Inha University*
MD Abu Taher｜*Inha University*
Myung-Jong Jin｜*Inha University*

HKICEAS-4908

IRMOF-16 Based Pd Catalyst for Hydrogenation at Room Temperature

Young-Pyo Ko｜*Inha University*
Seung-I Lee｜*Inha University*
MD Abu Taher｜*Inha University*
Myung-Jong Jin｜*Inha University*

HKICEAS-4720

Uplift Resisting Device of Isolation System for Light Weight Structures

Gee-Cheol Kim｜*Seoil University*
Joo-Won Kang｜*Yeungnam University*

HKICEAS-4303

Real-Time Deposition Rate Monitoring of a Roll-to-Roll Magnetron Sputtering System via Artificial Neural Networks

Jiun-Shen Chen｜*Institute of Nuclear Energy Research*

Tzong-Daw Wu｜*Institute of Nuclear Energy Research*

HKICEAS-4521

A Practical Sample Preparation Method for Ambient Scanning Tunneling Microscopy Visualization of DNA Molecules on Annealed Gold Surface

Jiun-Yih Ting｜*Tunghai University*

HKICEAS-4764

Motional Behavior Analysis of Dielectric Particle in Liquid Flow under Non-Uniform Electric Field

Han Baek Chung｜*Sungkyunkwan University*

Kang Hyouk Lee｜*Sungkyunkwan University*

Il Han Park｜*Sungkyunkwan University*

HKICEAS-5024

Forkhead Box O 6 Modulates Immunological Functions of Murine Bone Marrow-Derived Dendrtitic Cell

Mi Eun Kim｜*Chosun University*

Jun Sik Lee｜*Chosun University*

HKICEAS-5026

***Hijikia fusiforme Okamura* Modulates Immunological Function of Murine Bone Marrow-Derived Dendritic Cells**

Mi Eun Kim｜*Chosun University*

Jun Sik Lee｜*Chosun University*

HKICEAS-4726

Synthesizing High Purity Silica with Low Cost Sol-Gel Process and Water Glass as a Raw Material

Bongjun Gu｜*Kumoh National Institute of Technology*

Dongwook Ko｜*Kumoh National Institute of Technology*

Jongbok Kim｜*Kumoh National Institute of Technology*

HKICEAS-4863

Fabrication of Flexible Transistors Using Highly Flexible and Conductive Textile Electrode

Jea Uk Lee｜*Korea Research Institute of Chemical Technology (KRICT)*

HKICEAS-4904

Structural Investigation of Zn Doped Diamond-Like Carbon Films

Junichi Katouno｜*Tokyo Denki University*

Yasufumi Mabuchi｜*Tokyo Denki University*

Yasuharu Ohgoe｜*Tokyo Denki University*

Keisuke Sato｜*Tokyo Denki University*

Kouki Fujioka｜*Jikei University School of Medicine*

Yoshinobu Manome｜*Jikei University School of Medicine*

Masanori Hiratsuka｜*Nanotec Corporation*

Hideki Nakamori｜*Nanotec Corporation*

Hideki Masuda｜*NITI-ON Co, Ltd.*
Hiroshi Honda｜*NITI-ON Co, Ltd.*
Kenji Hirakuri｜*Tokyo Denki University*

HKICEAS-5104
Ambipolar DPP-RH-Based Small Molecules in Organic Photovoltaic Cells
Eunhee Lim｜*Kyonggi University*

Poster Sessions (3)

Psychology

Thursday, December 15, 2016 16:00-17:00 Foyer Area

APCBSS-553
Neural Activity and Gender Differences of Empathy on Competitive and Non-Competitive Situation: An fMRI Study
Su-Young Hwang｜*Dankook University*
Mi-Sun Yoon｜*Dankook University*

APCBSS-574
Analysis of Big Data in Social, Educational and Behavioral Sciences
Suzanne Jak｜*University of Amsterdam*
Mike W.-L. Cheung｜*National University of Singapore*

HKICEPS-6059
Effect of Working Memory Training on the Performance of Visual-Spatial Working Memory Task in the Elderly
Boseong Kim｜*Dong-Eui University*

HKICEPS-6133
A Comparison of Two Survey Styles: Difference between an Internet Survey and a Paper-and-Pencil Mail Survey
Mingming Lin｜*The University of Tokyo*

HKICEPS-6151
Psychological Effects of School Camp Experience in Elementary School Children
Aya Yamada｜*Sophia University*
Mitsuru Hisata｜*Sophia University*

HKICEPS-6152
Work Engagement and Its Related Factors in the Members of a NPO in Japan
Momoka Ikebe｜*Sophia University*
Mitsuru Hisata｜*Sophia University*

HKICEPS-6153
The Psychological Sense of Community and Subjective Adjustment in Japanese University Students

Mai Inoue｜*Suzunoki Hospital*

Mitsuru Hisata｜*Sophia University*

HKICEPS-6160

Internal Marketing and Employees' In-Role Performance in the Tourism and Hospitality Industries: A Cross-Level Mediation Analysis

Yu-Ru Hsu｜*Chang Jung Christian University*

Chun-Tsen Yeh｜*Chang Jung Christian University*

An-Chin Cheng｜*Chang Jung Christian University*

Chien-Chi Lin｜*Chang Jung Christian University*

HKICEPS-6235

Structure Equation Model Verification of Parental Social Support, Internal Motivation and Stress of Korean Junior Golfer

Dong-Hyoen Kim｜*Daegu University*

Yong-Kyu Kim｜*Daegu University*

Yeong-Gu Kang｜*Daegu University*

HKICEPS-6244

How Do Age-Related Cultural Schemas Affect Perspective Taking?

Christie Chung｜*Mills College*

Serena Tsang｜*Mills College*

HKICEPS-6246

The Relationship between Adult Attachment and College Life Adjustment for College Freshman: The Mediating Effect of Professor-Student Interaction and Major Satisfaction

Mina Ko｜*Dong-Eui University*

HKICEPS-6277

The Investigation of Counselors' Attitudes toward Online Counseling upon Taking Clients' Perspective

Ö mer Ö zer｜*Anadolu University*

Murat Yıkılmaz｜*Anadolu University*

Ahmet Altınok｜*Anadolu University*

Ferhat Bayoğlu｜*Anadolu University*

HKICEPS-6295

Examining Perceptions of Academic Stress of Undergraduate Students in Hong Kong

Man Yee Kwok｜*The Hong Kong Polytechnic University*

Kei Shing Ng｜*The Open University of Hong Kong*

HKICEPS-6427

Ethnic Identity of the Migrants Depending on Their Involvement in the Activities of the National-Cultural Autonomy

Vsevolod Valentinovich Konstantinov｜*Penza State University*

HKICEPS-6128

Interaction Effects on Mood, and Advertising Message Framing: The Moderating Role of

Personality Traits

Minjung Kim｜*Dongeui University*

HKICEPS-6065

Bring Life to your Classroom in Story Lessons

Ghania Rashid Sulaiman AL-Kharusi｜*Ministry of Education*

HKICEPS-6090

Health Challenges and Promotion Action Areas in Higher Educational Institutions towards a Wellness Framework and Program

Emilie Marin Lopez｜*Woosong University*

HKICEPS-6137

The Characteristics of Employment Needs and Desired Career of Students in Majoring Courses Perceived by Students, Parents, and Teachers

Hyegyeoung Lim｜*Pusan National University*

Jaekook Park｜*Pusan National University*

Yeonjae Lee｜*Pusan National University*

HKICEPS-6144

An Analysis of University Teaching and Learning Support Systems in Korea

Myunghyun Song｜*Chungnam National University*

Doojung Kim｜*Chungnam National University*

Soyoung Kim｜*Chungnam National University*

Yunso Lee｜*Keara Research Institute for Vocational Education & Training*

HKICEPS-6148

Positive Behavioral Interventions and Supports in Improving the Mental Health with a Schizophrenia Student: A Case Study

Ching-Wen Liu｜*National Hsinchu University of Education*

HKICEPS-6116

Qualities of Entrepreneurs

Ekaterina S. Latynina｜*Siberian Federal University*

HKICEPS-6458

Innovative Techniques in Teaching English Students of Nonlinguistic Specialties Using Blended Learning In Terms of the Russian Academic Excellence Program

Tatyana Vladimirovna Zhavner｜*Siberian Federal University*

APCBSS-662

Children, Income and Subjective Well-Being - Is China Still Son Preference?

Lingli Xu｜*Shanghai University*

Chunrong Ai｜*University of Florida*

Jonathan H. Hamilton｜*University of Florida*

APCBSS-676

The Effect of Corporate Social Responsibility on Corporate Activity: Comparing Domestic and Multinational Cooperation in Korea

Young-Su Jung｜*FedEx Express Korea Operations(KAGA)*
Shinae Kang｜*Seoul National University of Science and Technology*

Poster Sessions (4)

Society / Education / Economics / Business

Friday, December 16, 2016 09:30-10:30 Foyer Area

APCBSS-676
The Effect of Corporate Social Responsibility on Corporate Activity: Comparing Domestic and Multinational Cooperation in Korea
Young-Su Jung｜*FedEx Express Korea Operations(KAGA)*
Shinae Kang｜*Seoul National University of Science and Technology*

HKICEPS-6128
Interaction Effects on Mood, and Advertising Message Framing: The Moderating Role of Personality Traits
Minjung Kim｜*Dongeui University*

HKICEPS-6065
Bring Life to your Classroom in Story Lessons
Ghania Rashid Sulaiman AL-Kharusi｜*Ministry of Education*

HKICEPS-6090
Health Challenges and Promotion Action Areas in Higher Educational Institutions towards a Wellness Framework and Program
Emilie Marin Lopez｜*Woosong University*

HKICEPS-6137
The Characteristics of Employment Needs and Desired Career of Students in Majoring Courses Perceived by Students, Parents, and Teachers
Hyegyeoung Lim｜*Pusan National University*
Jaekook Park｜*Pusan National University*
Yeonjae Lee｜*Pusan National University*

HKICEPS-6144
An Analysis of University Teaching and Learning Support Systems in Korea
Myunghyun Song｜*Chungnam National University*
Doojung Kim｜*Chungnam National University*
Soyoung Kim｜*Chungnam National University*
Yunso Lee｜*Keara Research Institute for Vocational Education & Training*

HKICEPS-6148
Positive Behavioral Interventions and Supports in Improving the Mental Health with a Schizophrenia Student: A Case Study
Ching-Wen Liu｜*National Hsinchu University of Education*

HKICEPS-6116

Qualities of Entrepreneurs

Ekaterina S. Latynina｜*Siberian Federal University*

HKICEPS-6458

Innovative Techniques in Teaching English Students of Nonlinguistic Specialties Using Blended Learning In Terms of the Russian Academic Excellence Program

Tatyana Vladimirovna Zhavner｜*Siberian Federal University*

APCBSS-662

Children, Income and Subjective Well-Being - Is China Still Son Preference?

Lingli Xu｜*Shanghai University*
Chunrong Ai｜*University of Florida*
Jonathan H. Hamilton｜*University of Florida*

APCBSS-675

The Health among the Elderly with Disabilities Living Alone: The Impact of Housing Environment

Miok Kim｜*Chonbuk National University*
Eunsil Yi｜*Chonbuk National University*
Yunhee Go｜*Chonbuk National University*
Junyoung Jeon｜*Chonbuk National University*
Harim Go｜*Chonbuk National University*

(二) 發表證明

HKICEAS-4303

HIGHER EDUCATION FORUM
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Certificate of Presentation

Hong Kong International Conference on Engineering and Applied Sciences
December 14-16, 2016, Hong Kong

Jiun-Shen Chen
Institute of Nuclear Energy Research

Has attended the conference and presented a paper entitled

Real-Time Deposition Rate Monitoring of a Roll-to-Roll Magnetron Sputtering System via Artificial Neural Networks

Chief Executive Committee

HKICEAS-4303-1

HIGHER EDUCATION FORUM
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Certificate of Presentation

Hong Kong International Conference on Engineering and Applied Sciences
December 14-16, 2016, Hong Kong

Tzong-Daw Wu
Institute of Nuclear Energy Research

Has attended the conference and presented a paper entitled

Real-Time Deposition Rate Monitoring of a Roll-to-Roll Magnetron Sputtering System via Artificial Neural Networks

Chief Executive Committee

(三) 本次會議發表全論文

Real-time Deposition Rate Monitoring of a Roll-to-Roll Magnetron Sputtering System via Artificial Neural Networks

Jiun-Shen Chen[a,*], Tzong-Daw Wu[b]

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Abstract

A back propagation neural network (BPNN) is applied to determine the deposition rate of a roll-to-roll magnetron sputtering system in real time. Because the transmittance spectra of thin films are highly related to their thicknesses, the spectrum is a function of the thickness. Thus, determining deposited thickness through the functions is possible. However, these functions are not simple one-to-one functions; solving the inverse function to find thicknesses from spectra is difficult. Therefore, BPNNs are introduced to build approximate functions of spectra and output thicknesses. They are trained with various spectra which correspond to different film thicknesses, and will have abilities to estimate thicknesses of thin films. In this study, the estimation error of BPNNs was less than 0.6%. The results of low error and real-time response make BPNNs be a potential method for monitoring a deposition process.

Keywords: Deposition Rate, Magnetron Sputtering, Neural Networks

1. Introduction

For manufacturing optical thin films, the control of thicknesses is essential because their optical properties highly depend on the thicknesses. Thus, monitoring and stabilizing the manufacturing process are the key points of producing high quality thin films. In this study, back propagation neural networks (BPNNs) are introduced to monitor the deposition rate of a roll-to-roll sputtering system, which was designed for producing optical thin films.

In order to maintain the deposition rate of sputtering, frequent measuring is necessary. In general, measuring the deposition rate of a roll-to-roll sputtering system is to attach a piece of silicon wafer or other substrates in the chamber and then measure the thickness of the deposited film after sputtering. Some methods are applied for determining thicknesses such as using Alpha-Step by mechanical approach directly or fitting the optical properties by software like FilmTek and Essential Macleod to estimate the thicknesses indirectly. However, all the methods require breaking the manufacturing process to take out the deposited substrates. They are not only time-consuming but also change the environment of manufacturing.

Optical emission spectroscopy (OES) provides another method to monitor the stability of deposition. Unlike the methods mentioned above, it monitors the intensity of particular plasma species in real time [1]. In other words, it monitors the density of a particular ion to identify the stability of deposition rate immediately by supposing that they are related to each other. Deposition rate, however, depends on not only ion densities but also various sputtering conditions such as vacuum pressure, temperature and energy of charged particles [2]. Monitoring the stability of deposition by OES is limited.

According to the optical properties highly depending on the thickness of thin films, transmittance spectra imply the thicknesses. Nevertheless, the transmittance spectra of thin films are complex. Only considering the light absorptions of the materials is not sufficient. Interferences of films are also considerable. In other words, the transmittance of thin films depends on their optical constants, i.e. the refraction index and the extinction coefficient [3].

Fitting thicknesses from the transmittance spectra via using optical equations is an option, and Lee et al. have used admittance diagram to find thickness excellently [4,5]. However, BPNNs provide another choice to find the thickness without applying optical equations. Shown in Fig. 1 is a typical feedforward neural network with two hidden layers, and the corresponding function is described as

$$y_i = \sum_{r=1}^{n_{h_2}} w_{ir}\, \sigma\left(\sum_{s=1}^{n_{h_1}} v_{rs}^{(2)} \sigma\left(\sum_{j=1}^{m} v_{sj}^{(1)} x_j + \beta_s^{(1)}\right) + \beta_r^{(2)}\right), \quad i = 1,2,\ldots,l. \qquad (1)$$

Where x and y are the values of input and output respectively, σ is the activation function of neurons in hidden layers, β is bias value of hidden neurons, and w, v are weights for output and hidden layers respectively [6].

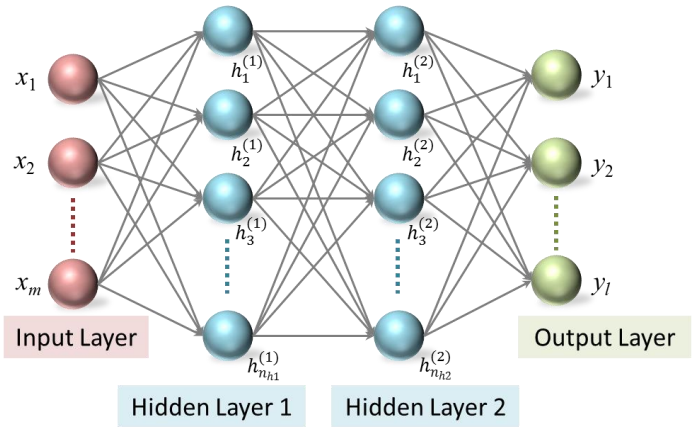


Fig. 1: A typical feedforward neural network with two hidden layers.

By adjusting w, v and β, the neural network has the potential to simulate any continuous function, and the back propagation method is used for finding these parameters. Thus, BPNNs were introduced to build an approximate function of spectrum because that thickness has some kind of relation with transmittance. In this study, various transmittance spectra of different thicknesses were

used to train BPNNs, and then these BPNNs had ability to estimate thicknesses from transmittance spectra. These BPNNs were also applied to measuring the sputtering deposition rate at different plasma power and gas flows.

2. Methods

The experimental system is a roll-to-roll magnetron sputtering system with a balanced deuterium halogen source (DH-2000-BAL), a spectra monitor and process control system (EMICON MC) which detection range is 200 - 1100 nm with 1.4 nm resolution, and a computer that analyzed the transmittance spectra to estimate the deposited thicknesses in real time by running BPNNs. Fig. 2 shows the layout of the system.

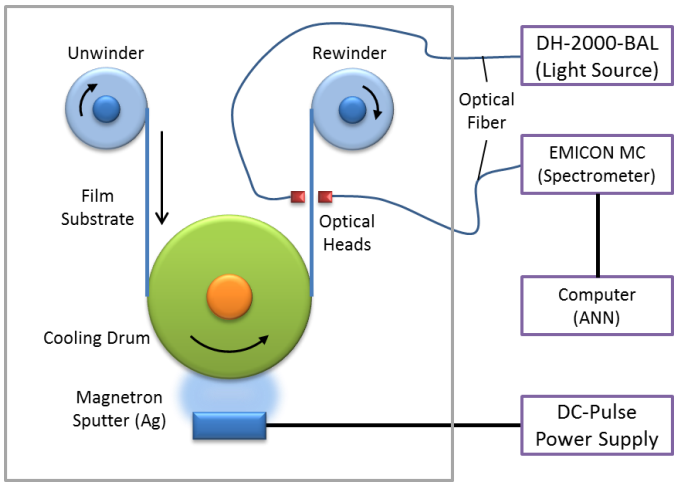


Fig. 2: The roll-to-roll magnetron sputtering and monitoring system.

The target and substrate used here were silver (Ag) and polyethylene terephthalate (PET). EMICON MC took transmittance spectra and sent to the computer every 100 ms. The pulsed DC power of 350 kHz was applied to the magnetron cathode from 734 to 1227 W, and the mass flow controller for the system controlled the flow rate of argon (Ar) from 100 to 500 sccm and hydrogen (H2) at 12 sccm. The background pressure of the chamber was 5.5×10-6 torr, and the process pressure was around 3×10-3 torr.

The Artificial Neural Network (ANN) used in this experiment was a BPNN, one kind of supervised neural network, and Levenberg—Marquardt (LM) algorithm was applied for the learning method. Fig. 3 illustrates the architecture of the BPNN. There were one input layer, one or two hidden layers, and one output layer. The input layer accepted a transmittance spectrum whose wavelength range was from 320 nm to 1000 nm and the output layer gave us the estimated thickness of the Ag thin film. The activation function of neurons placed in hidden layers was sigmoid and in output layer was linear.

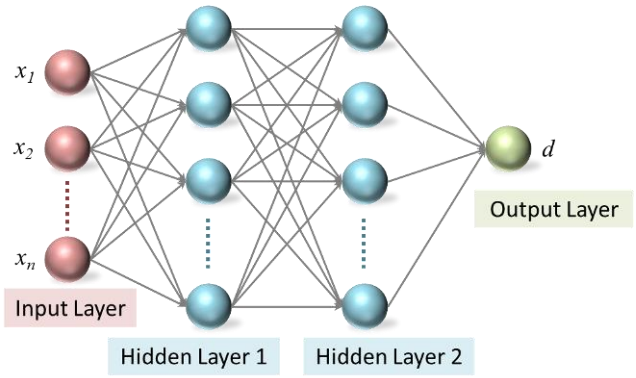


Fig. 3: Architecture of the ANN. The input set {xi} and the output d represent the transmittance spectrum and film thickness respectively.

The BPNN played as a function of a spectrum, and thickness d could be found through this function.

$$d = f(\{x_i\}). \quad (2)$$

Where the set $\{x_i\}$ means transmittance a spectrum and the element x_i represents a transmittance at specified wavelength.

3. Results

To train the BPNNs, various transmittance spectra corresponding different thicknesses of Ag films are necessary. The spectra and thicknesses are the input and learning target for the BPNNs respectively. The training spectra were prepared from transmittance spectra of thin films that were deposited on PET at different substrate speed with constant deposition rate. In a roll-to-roll system, the deposition rate is defined as deposited thickness at unit substrate speed, so the thicknesses can be described as the following equation.

$$Thickness = Deposition\ rate / Substrate\ speed. \quad (3)$$

In this study, 21 groups of spectra were taken, in which 16 groups were used for training and five groups for verifying. Each group presented one thickness and contained 15 transmittance spectra that would be averaged as input data (as $\{x_i\}$ in Eq. 2) for the BPNNs.

In order to find out a suitable architecture of the BPNN, six different architectures were tested. They were one hidden layer or two hidden layers, and each hidden layer contained 5, 10, or 20 neurons. These BPNNs were trained via training data at first, and then verified via verifying data. The results are shown in Table 1 and Table 2.

Table 1: The training and verifying results of single hidden layer architectures.

Wavelength Range [nm]	Interval [nm]	Number of Input Neurons	Number of Hidden Neurons	Training $Error_{avg}$	Verifying $Error_{avg}$
320 - 1000	5	137	5	0.19%	0.68%
			10	0.18%	0.53%

			20	0.14%	0.52%

Table 2: The training and verifying results of two hidden layers architectures.

Wavelength Range [nm]	Interval [nm]	Number of Input Neurons	Number of Hidden Neurons		Training $Error_{avg}$	Verifying $Error_{avg}$
			1st Layer	2nd Layer		
320 - 1000	5	137	5	5	0.22%	0.99%
			10	10	0.12%	0.81%
			20	20	0.14%	0.67%

The average error is defined as

$$Error_{avg} = \frac{1}{n}\sum_{i=1}^{n}\left|\frac{T_i - O_i}{T_i}\right| \times 100\%. \quad (4)$$

Where T_i and O_i represent the thickness which was the target for learning and the output of the i-th group respectively.

According to the result, the errors of these architectures were all less than 1%, thus the performances of them were remarkable. The best architecture among them was the one which had one hidden layer with 20 neutrons, and was chosen for the following experiments. Table 3 and Table 4 show the training and verifying details of this architecture respectively.

Table 3: The training details of the architecture which had one hidden layer with 20 neurons.

Substrate Speed [m/min]	Thickness [nm]	ANN Output Thickness [nm]	Error
1.0	22.39	22.38425117	0.026%
1.2	18.65833	18.658831	0.003%
1.4	15.99286	15.9947084	0.012%
1.6	13.99375	13.9931316	0.004%
1.8	12.43889	12.43678051	0.017%
2.0	11.195	11.1896432	0.048%
2.2	10.17727	10.18035404	0.030%
2.4	9.329167	9.326688334	0.027%
2.6	8.611538	8.607285	0.049%
2.8	7.996429	7.99294972	0.044%
3.0	7.463333	7.4620964	0.017%
3.2	6.996875	6.989238	0.109%
3.4	6.585294	6.577810449	0.114%
3.6	6.219444	6.213149926	0.101%

3.8	5.892105	5.895309	0.054%
4.0	5.5975	5.602231584	0.085%

Table 4: The verifying details of the architecture which had one hidden layer with 20 neurons.

Substrate Speed [m/min]	Thickness [nm]	ANN Output Thickness [nm]	Error
1.1	20.3545	20.35804	0.015%
1.3	17.2231	17.19445	0.166%
1.5	14.9267	14.98108	0.362%
1.7	13.1706	13.21534	0.337%
1.9	11.7842	11.8494322	0.555%

The error in Table 3 and Table 4 is defined as

$$Error = \left|\frac{T-O}{T}\right| \times 100\%. \quad (5)$$

T and O represent values of the thickness and the BPNN output respectively.

When a BPNN was fully trained, it was applied to estimate the thicknesses of films in the sputtering system, and the deposition rate could be also monitored in real time since the substrate speed was controlled.

In the following experiment, an application of the BPNN was demonstrated by monitoring the deposition rate while changing the sputtering conditions. The deposition rate of a sputtering system is influenced by sputtering conditions such as intensity of plasma and pressure of a chamber [7]. If we could determine the dependence of deposition rate on sputtering conditions, we could stabilize the film growth by adjusting sputtering conditions. However, the dependence is not identical in various sputtering systems; it is related to the design of a system. Rapid finding of the relationship will be valuable for deposition process. Hence, we applied a BPNN trained previously to monitoring the deposition rate while changing the power input and Ar flow. Table 5 reveals the result. Fig. 4 and Fig. 5 indicate the deposition rate as a function of power input and Ar flow. It is significant to note that the table contains 99 data of measuring thicknesses of thin films, and all of them were measured continuously without breaking the vacuum to take the samples out from the chamber. Each datum only consumed few milliseconds for determination.

Table 5: The deposition rate of the roll-to-roll magnetron sputter at various power input and Ar flow.

Deposition rate [nm·m/min]		Ar Flow [sccm]								
		100	150	200	250	300	350	400	450	500
Power [W]	734	15.9871	15.9696	15.9945	15.9908	16.0136	15.8713	15.8733	15.3633	14.8184
	783	16.9935	17.2272	17.2332	17.3119	17.3431	17.2962	17.2902	16.8094	16.1926
	832	17.9789	18.3512	18.3697	18.4326	18.5270	18.5113	18.5313	18.1092	17.5236
	882	19.0224	19.4247	19.5192	19.5818	19.6949	19.6459	19.7247	19.3346	18.8261

	933	20.0906	20.5308	20.6174	20.6681	20.7695	20.8336	20.9064	20.5153	20.0965
	980	21.0839	21.5848	21.6314	21.7691	21.8735	21.9446	22.0039	21.7209	21.2826
	1028	22.0785	22.6387	22.7258	22.8535	22.9771	23.0057	23.0633	22.7719	22.4443
	1077	23.0880	23.7282	23.7946	23.9207	24.0693	24.1024	24.1078	23.7952	23.4812
	1126	24.0962	24.8505	24.8612	24.9783	25.1558	25.1847	25.1961	24.8941	24.6005
	1176	25.1654	25.7857	25.9077	26.0882	26.1854	26.2708	26.3328	25.9658	25.6447
	1227	26.2062	26.8797	27.0502	27.1182	27.2598	27.3347	27.3455	27.0702	26.7323

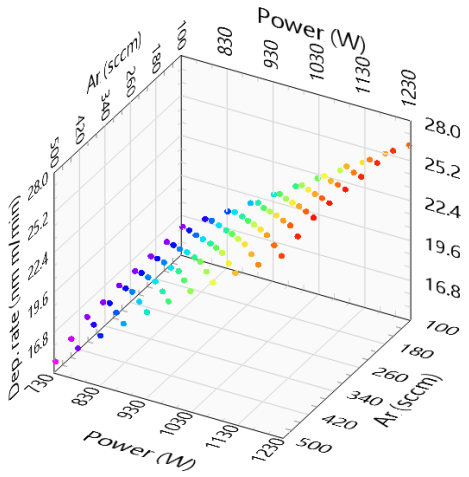
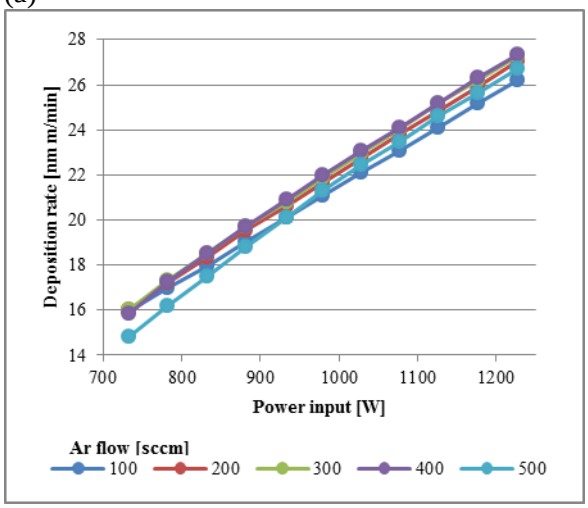


Fig. 4: The deposition rate as a function of power input and Ar flow. These data were all measured in real time by the BPNN.

(a)



(b)

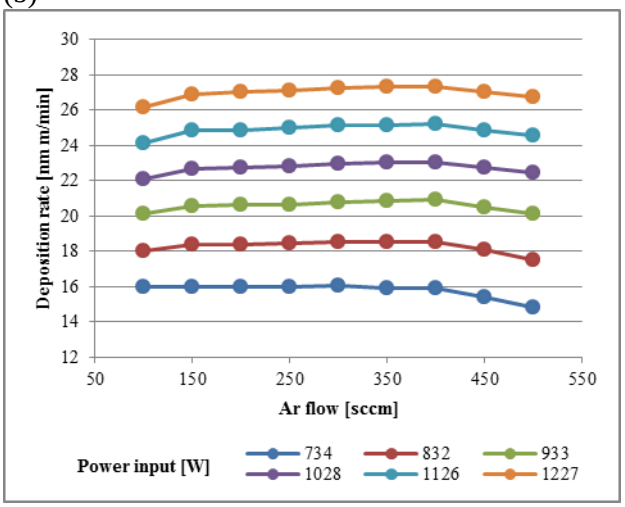


Fig. 5: (a) The deposition rate versus power input. (b) The deposition rate versus Ar flow.

4. Conclusion

There are several advantages to determine the deposition rate of a roll-to-roll sputtering system by using BPNN. BPNN is a quick and real-time approach, and avoids intervening in deposition processes. These features are valuable for monitoring sputtering systems to stabilize manufacturing processes when connecting to feed-back controllers. It is especially suitable for monitoring optical

thin film growth as measuring optical properties directly.

5. References

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(四) 本次會議海報發表之論文內容

Real-time Deposition Rate Monitoring of a Roll-to-Roll Magnetron Sputtering System via Artificial Neural Networks

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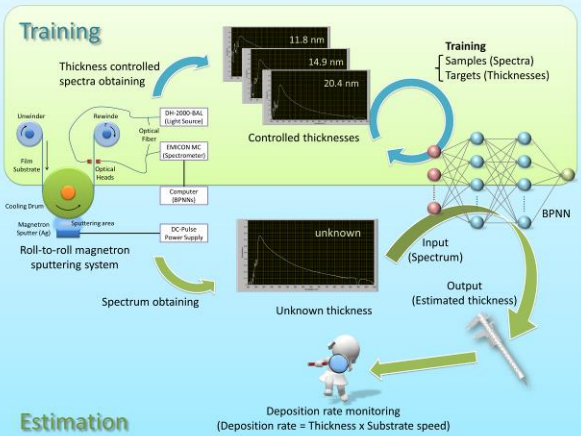
Abstrate

Back propagation neural networks (BPNNs) were applied to monitor the growth of Ag thin films. Transmittance spectra imply the thicknesses of thin films because of interference. Although the thickness as a function of spectrum, however, it is not a simple one-to-one function. Thus, BPNNs were introduced to build an approximate function which estimates the film thickness from a transmittance spectrum. In this study, the estimation error was less than 0.6%. The results make BPNNs a promising method for monitoring a deposition process.

Conclusion

BPNN is a quick and real-time approach, and avoids intervening the deposition processes. These features are of great importance for monitoring sputtering systems to stabilize manufacturing processes when connecting to feed-back controllers. It is especially suitable for monitoring optical thin film growth as optical properties are measured directly.

Method



Results

(a) Single hidden layer

Number of Hidden Neurons	Training $Error_{avg}$	Verifying $Error_{avg}$
5	0.19%	0.68%
10	0.18%	0.53%
20	0.14%	0.52%

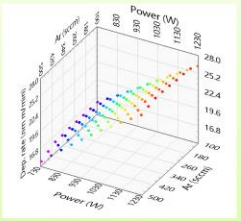
(b) Two hidden layers

Number of Hidden Neurons		Training $Error_{avg}$	Verifying $Error_{avg}$
1st Layer	2nd Layer		
5	5	0.22%	0.99%
10	10	0.12%	0.81%
20	20	0.14%	0.67%

Wavelength range: 320 nm – 1000 nm
Spacing: 5 nm
Number of input neurons: 137

$$Error_{avg} = \frac{1}{n}\sum_{i=1}^{n}\left|\frac{Target_i - Output_i}{Target_i}\right| \times 100\%$$

Application example:
Deposition rate vs. Power input × Ar flow



There are 99 data of the thin film thicknesses. All of them were measured continuously without breaking by the BPNN. Each datum only consumed few milliseconds for determination.

Substrate Speed [m/min]	Thickness [nm]	ANN Output Thickness [nm]	Error
1.0	22.39	22.38425117	0.026%
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The training details of the architecture which had one hidden layer with 20 neurons.

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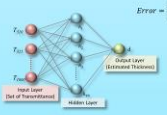
The verifying details of the architecture which had one hidden layer with 20 neurons.

$$Error = \left|\frac{Target - Output}{Target}\right| \times 100\%$$



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