中原大學

110 學年度研究傑出教師獲獎人-

■物理學系 張勝雄副教授

第一次獲獎 研究類(自然科學工程領域)

■化學工程學系 劉偉仁教授

第二次獲獎 研究類(自然科學工程領域)

■應用外國語文學系 許秀貞副教授

第一次獲獎 當然得獎者(獲吳大猷先生紀念獎)

■物理學系 張勝雄副教授

Dr. Sheng Hsiung Chang, Associate Professor

Department of Physics

■ 研究論述

在最近十年，我的研究團隊專注在鈣鈦礦光電元件的物理機制之探討以及奈米尺度下光與材料的交互作用之研究。在光電元件方面，為了能促進鈣鈦礦元件的商品化，我們透過低成本的溶液製程方式製作太陽能電池及發光二極體元件。除此之外，我們正嘗試研究鈣鈦礦寬頻光偵測器的光物理過程，鈣鈦礦光測偵器具備高速響應的特性，因此有潛力應用在多功能智慧汽車。在數值模擬方面，透過研究次波長尺度的電漿子波導結構及具掌性特徵的金屬結構之近場光學性質，能夠更深層的理解光與材料在奈米尺度下之交互作用。

■ 經驗分享

我認為讓研究永續經營是在大學任教非常重要的事情，因此建立研究實驗室是我加入中原大學物理學系之後最重的要事情之一，我的研究實驗室以兩個方向為主：(一) 鈣鈦礦光電元件的製作、量測及分析、(二) 奈米光學數值計算。鈣鈦礦光電元件的製作、量測與分析之研究方向可以透過實作的方式訓練專題生及研究生，讓學生獲得與半導體產業高度相關的技能與知識；奈米光學數值計算之研究方向可以透過理論計算的方式訓練專題生及研究生，讓學生具備知識門檻較高的研究能力。獲取資源則是建立研究實驗室的重要關鍵，因此我很感謝物理學系在空間及研究經費的支持、校內老師在研究資源的互助，另外，取得科技部的專題研究計畫之經費支持更是讓研究實驗室持續運作的關鍵。

Research focus

In the recent decade, my research team focused on the device physics of perovskite optoelectronics and light-material interactions at nanoscales. In the aspect of optoelectronic devices, the solar cells and light-emitting diodes are fabricated by using the solution processes at low temperatures in order to facilitate the commercialization of perovskite devices. Besides, we are trying to investigate the photophysics of perovskite based broadband photo-detectors, which has the potential to be used as the light sensors in a multi-functional smart car due to the fast response time. In the aspect of numerical simulations, the near-field optical properties of sub-wavelength plasmoinc waveguides and chiral metallic structures are investigated, which provides a way to deeply understand the light-material interactions at nanoscales.

Experience sharing

I think that it is very important to establish a research laboratory when I joined the faculty of the Department of Physics of CYCU as an Associate Professor. There are two main topics in my research team: device physics of perovskite optoelectronics and optical numerical simulations at nanoscales. In my laboratory, undergraduate students and graduate students can learn how to investigate the device physics and material sciences via fabricating, measuring, analyzing and modeling the optoelectronic devices. I would like to thank the research funding from the MOST and the supports from CYCU, which encouraged me to establish a research laboratory in the Department of Physics. Besides, I want to emphasize that it is extremely important to obtain research funding from the MOST projects, which enables us to explore new things during our academic career.

■化學工程學系 劉偉仁教授

Dr. Wei-Ren Liu, Professor

Department of Chemical Engineering

■ 研究論述

我的實驗室是能源材料與光電實驗室，研究主題涵蓋了(1)石墨烯材料；(2)儲能材料；(3)發光材料，我們成功發展了綠色石墨烯量產技術，並將石墨烯應用在鋰電池導電添加劑、散熱塗料、防腐蝕塗料、電磁波屏蔽等應用；儲能材料包含了鋰電池、鈉電池跟固態電池的材料開發；發光材料則針對 LED 螢光材料、碳量子點發光材料、鈣鈦礦量子點發光材料，近五年(2016-2021)共發表 101 篇 SCI paper，h-index: 36，其中 Nanoscale (IF:6.895)、Carbon (IF:9.594)、Applied Materials Today (IF:9.650)、ChemComm.(IF: 6.222)、Materials Today Energy (IF:7.010)、ACS Applied Materials & Interfaces (IF:9.229)、Small (IF:13.81)、Advanced Optical Materials (IF:9.926)、J. Membrane Science (IF: 8.742)、Journal of Materials Chemistry A (IF:11.301)、Chemical Engineering Journal (IF: 10.652)、Applied Catalysis B – Environmental (IF: 19.503). 除此之外，也將相關研究成果進行專利申請與技術移轉，共計獲證至少 30 篇專利以及 10 件技術移轉。期許這些技術能夠與相對應的廠商合作，為台灣的產業盡一份心力!

■ 經驗分享

本人也很開心也很榮幸第二次榮獲中原大學傑出研究獎，在中原大學任教9年的時間積極耕耘石墨烯、儲能材料與發光材料三大領域，除了與國內的廠商有緊密的產學合作計畫，也與日本、波蘭、英國與德國有國際合作計畫，此外，也與廠商陸續培育許多優秀的博士生與碩士生，我覺得研究領域以及相關的技術拓展很重要，唯有勇於創新、持續建構新的實驗室技術與相關研究設備，才有機會持續爭取更多的研究經費，在有限的空間與人力架構下進行最佳化的資源分配與策略規劃；此外，跨領域的合作是必須的，在建構自己特有的技術領域後，可多參加國際或國內的研討會或相關的學會組織，拓展自己的人脈並建立合作的橋梁，方能讓自己的研究產出有更多元的出口，共勉之!

Research focus

Dr. Wei-Ren Liu obtained his Bachelor degree from Department of Chemical Engineering, Chung Yuan Christian University (CYCU) in 1999 and got his Ph.D. degree from Department of Chemical Engineering, National Taiwan University in 2006. From 2006 to 2012, he served as a researcher in Industrial Technology Research Institute (ITRI) for 5 years. He served as an assistant professor from Department of Chemical Engineering, CYCU in 2012 and promoted as Professor in 2019. He got some awards, such as outstanding young researcher award (3 times), outstanding research award (2 times), CYCU Invention award and outstanding technology transfer award. Prof. Liu served as many keynote and invited speakers in some international conferences and also serve as chairman in the 4th Annual Conference of Carbon Society of Taiwan in Chung Yuan Christian University in 2020. Now, he serves as the associate editors in *Frontiers in Energy Research* and *Current Chinese Science*.

The research areas of Prof. Liu are divided into three fields: (1) Synthesis of graphene-based materials and their applications of energy storage, heat dissipation, anticorrosion and EMI shielding; (2) Synthesis of energy storage materials, such as anode and cathode materials for Li and Na ion batteries and solid electrolytes; (3) Luminescence materials, such as LED phosphors, perovskite quantum dots and graphene quantum dots. Prof. Liu published lots of paper in Q1, such as *Nanoscale* (IF:6.895)、*Carbon* (IF:9.594)、*Applied Materials Today* (IF:9.650)、*ChemComm.*(IF: 6.222)、*Materials Today Energy* (IF:7.010)、*ACS Applied Materials & Interfaces* (IF:9.229)、*Small* (IF:13.81)、*Advanced Optical Materials* (IF:9.926)、*J. Membrane*

Science (IF: 8.742)、*Journal of Materials Chemistry A* (IF:11.301)、Chemical Engineering Journal (IF: 10.652)、*Applied Catalysis B – Environmental* (IF: 19.503). Prof. Liu also got more than 30 patents and 10 technique transfers.

Experience sharing

I am also very happy and honored to be awarded the Chung Yuan Christian University Outstanding Research Award for the second time. I have been actively working in the three fields of graphene, energy storage materials and luminescent materials during 9 years of teaching at Chung Yuan Christian University. Apart from carry out cooperation projects with Taiwan companies. We also proposed the cooperation projects with Japan, Poland, the United Kingdom and Germany. In addition, many excellent doctoral and master students have been cultivated successively with manufacturers. I think the research field and related technological expansion are very important, and only the courage to Innovative and continuous construction of new laboratory technology and related research equipment will have the opportunity to continue to strive for more research funds, optimize resource allocation and strategic planning under limited space and human resources. In addition, cross-field cooperation is necessary. After constructing your own unique technical field, you can participate in more international or domestic seminars or related societies to expand your network and establish bridges of cooperation, so that your research output can be more diverse. We encourage each other!

■應用外國語文學系 許秀貞教授

Dr. Hsiu-Chen Hsu, Associate Professor

Department of Applied Linguistics and Language Studies

■ 研究論述及經驗分享

在過去幾十年中，社會科技(social technologies) 的誕生提供了外語學習者更多機會，透過合作的方式相互學習，也為第二語言協作式寫作(collaborative writing) 開啟新的契機。我的研究重點在於：探究以社會科技(e.g. wikis, Google Docs) 為媒介進行協作式寫作，是否能增強學生英語書寫能力。研究結果顯示，科技輔助協作式寫作對提升學生寫作內容的質量以及語言的精確度是有幫助的。

之後的研究便以此主題延伸，探討學生以社會科技為媒介進行協作式寫作可能產生的互動模式。再者探討是否能以不同寫作任務複雜度(task complexity) 來改善同儕間的互動模式，讓學生進行更有效的協作式寫作。此研究發現寫作任務複雜度對改善同儕間互動模式的影響有限。此一發現也讓我將研究主題再延伸至—探究不同科技輔助寫作形式(同步 vs. 非同步)對同儕互動模式，以及同儕針對寫作問題討論重點、討論深度及討論結果的影響。此研究發現同步寫作形式(相較於非同步形式)對改善同儕互動模式及提升同儕討論深度是較有利的。此研究發現也讓我進一步思考若要讓學生進行非同步協作式寫作，那要如何進行才能發揮科技輔助協作式寫作的功效。再次探討文獻讓我發現任務培訓(pretask training)或許可行。這也啟發我另一個研究—探究使用協作寫作任務培訓來促進科技輔助協作式寫作的成效。此

研究發現經過任務培訓的學生比未經過任務培訓的學生在同儕互動及英語寫作上表現得好。

我目前的研究主題都在於探討如何運用科技輔助協作式寫作提升學生英語寫作能力。研究的構想通常由探討文獻及我先前的研究發現而來。一份研究不可能涵蓋所有的點，所以會需要多份的研究一步一步慢慢地將所有的點涵蓋及連結，以達到對一個研究議題（目前這個議題對我而言便是科技輔助協作式英語寫作的功效）較為完整的了解。這是我一直在做的。完成一份研究需要時間，研究過程也絕不輕鬆。不過只要持續不間斷一定可以看到成果。與大家共勉之。

Research focus & Experience sharing

In the past few decades, the birth of social technology has offered easier collaboration opportunities among second language (L2) learners and has brought a renewed attention to collaborative L2 writing. The focus of my research is investigating whether collaborative L2 writing via social technology (e.g. wikis, Google Docs) can enhance students' English writing proficiency. I have found that technology-mediated collaborative L2 writing is helpful in improving the quality of students' writing content and the accuracy of their language.

My subsequent research is to explore the possible interaction patterns that students may generate when they use social technology as a medium for collaborative writing tasks. I first explored whether writing task complexity could affect the interaction patterns among peers; that is, whether more complex writing tasks could promote more peer collaboration. This study found that writing task complexity had a limited effect on peer interaction patterns. I then wondered whether task modality might have a role to play. I extended my research to explore the impact of different technology-mediated writing modes (i.e., synchronous vs. asynchronous) on peer interaction patterns and learner engagement levels. This study revealed that synchronous writing mode was more beneficial to fostering collaborative peer dynamics and promoting more elaborate learner engagement. This result led me to think further about how to facilitate asynchronous collaborative L2 writing. I came across the idea of pretask training in the literature, which inspired me to investigate the effectiveness of using pretask training to facilitate technology-mediated asynchronous collaborative writing. Results showed that trained students produced more collaborative peer dynamics during collaborative writing processes and made greater improvement in individual L2 writing.

I believe that it is impossible for one study to cover all the research ideas so multiple studies are needed. Completing a study takes time, and the research process is never easy. However, as long as we continue researching, we will get a fruitful result in the end.