尤嘯華

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得獎著作：

- Bo Zhu, Shyh-Chyang Luo, Haichao Zhao, Hsing-An Lin, Jun Sekine, Aiko Nakao, Chi Chen, Yoshiro Yamashita, Hsiao-hua Yu*, 2014, "Large Enhancement in Neurite Outgrowth on a Cell Membrane-Mimicking Conducting Polymer", *Nature Communications*, 5, 4523-4531.

- Zunfu Ke*, Millicent Lin, Jie-Fu Chen, Jin-sil Choi, Yang Zhang, Anna Fong, An-Jou Liang, Shang-Fu Chen, Qingyu Li, Wenfeng Fang, Pingshan Zhang, Mitch A. Garcia, Tom Lee, Min Song, Hsing-An Lin, Haichao Zhao, Shyh-Chyang Luo, Shuang Hou*, Hsiao-hua Yu*, Hsian-Rong Tseng*, 2015, “Programming Thermoresponsiveness of NanoVelcro Substrates Enables Effective Purification of Circulating Tumor Cells in Lung Cancer Patients”, *ACS Nano*, 9, 62-70.

- Hui Chong, Hsing-An Lin, Mo-Yuan Shen, Ching-Yuan Liu, Haichao Zhao, and Hsiao-hua Yu*, 2015, "Step-Economical Syntheses of Functional BODIPY-EDOT π-Conjugated Materials Through Direct C–H Arylation", *Organic Letters*, 17, 3198-3201.

得獎簡評：

尤嘯華博士是臺灣學術界的後起之秀，研究表現亮麗，主要研究是在由有機前驅物製作的智能材料方面。他使用乙烯二氧噻吩（EDOT），分別製備出可用於細胞成像的新螢光團及創造出一個活性表面讓神經細胞生長。特別的是，具功能的導電膜能夠整合生化和電刺激並促進神經細胞行為。這是在神經細胞修補的相關研究

中一個重要實驗結果。未來相當具有發展潛力。也因為是突破性發展所以可以發表在 *Nature Communications* 上。除此之外，他合成一個在微流體系統中可抓取和釋出循環腫瘤細胞（CTC）的功能介面。他在功能材料（膜）的使用已在生物醫學技術上展現出重要潛力。這三著作篇基本上都具創意性及未來生醫應用性。

他傑出的研究表成果展示了他在應用導電聚合物的生物技術上之創造力和領導能力。此外，他與不同領域的人合作也強化本身的跨學科研究。除了代表性論文外，過去 5 年他所發表的其他論文的數量和品質也十分出色。

得獎人簡歷：

Hsiao-hua (Bruce) Yu received his B.S. degree in chemistry from National Taiwan University and his Ph.D. degree from Massachusetts Institute of Technology in organic chemistry under the supervision of Prof. Timothy M. Swager. He became interested in chemistry when he was young. As a high-school student, he was the first gold medallist for Taiwan in the International Chemistry Olympiad competition. After attending NTU, he started his research career working in Institute of Chemistry, Academia Sinica in the laboratory of late Professor Ta-Shue Chou on Prof. Chou's famous 3-sulfolenes. Subsequently, he conducted research in the laboratory of Prof. Man-kit Leung and Prof. Tien-Yau Luh before going abroad. After completing his postdoctoral research in Department of Chemical Engineering, Massachusetts Institute of Technology (Prof. Paula T. Hammond), he joined Institute of Bioengineering and Nanotechnology, Singapore as a Team Leader and Senior Research Scientist. In Singapore, his research focused on utilizing organic conductive materials, particularly conducting polymers for biosensors. In 2008, he received an Initiative Research Unit fund from RIKEN, the most prestigious research institute in Japan, as a young principle investigator to work on the area “Synthetic organic chemistry directed toward materials science”. He relocated to Japan and initiated a research concept described as “organic conductive biomaterials”, where he develops an independent and multidisciplinary research program though the triangle of chemistry, electronic materials, and biomedical/biological investigations based on molecular and nano-assembled building blocks of conducting polymers. In 2014, after he successfully obtained a tenured position in RIKEN, he decided to move back to Taiwan and joined where he started his research career. He is currently a tenured Associate Research Fellow in Institute of Chemistry, Academia Sinica. He does not limit his research work in science and technology level and is eager to see real applications blossomed from the cross-sections among molecular science, nanotechnology and biomedical engineering.

得獎著作簡介：

Functional organic molecules and materials for biological studies emerge and attract numerous attentions recently because they provide new solutions for diagnostic and therapeutic applications. The development of new materials platform involves multidisciplinary research contributions from not only synthetic organic and polymer chemistry but also nanostructure assembly and bioengineering. These three publications represent major contributions to respective frontier research direction in this field: organic bioelectronics, capturing of rare cells from body fluid, and new probes for bioimaging. Utilization of novel organic materials plays an critical role to understand and control cell behaviors.

We develop, for the first time, a cell membrane–mimicking conducting polymer for electrically stimulated cell growth. This new organic conductive biomaterial displays high resistance toward nonspecific enzyme/cell binding and recognizes targeted cells specifically to allow intimate electrical communication on the cell-materials interface over long periods of time. Its low electrical impedance also relays electrical signals more efficiently. As a result, we report greater than 1.5 times longer neurite outgrowth when neuron cells are cultured and stimulated grown on this interfacial material, one of the largest enhanced growth reported in the literature.

In the case of rare cell (i.e. circulating tumor cells, CTCs) capturing, we develop a new functional organic material-based approach to capture CTCs from blood samples – a liquid biopsy – and then release them from the surface with great cell viability. An integrated purification system, whose centerpiece is a smart organic material based biochip from grafting thermoresponsive polymer brushes onto nanostructured silicon substrates, allows us to raise the temperature to adhere the cells, then lower it to release them. Moreover, mutational genetic analysis is successfully demonstrated to monitor the disease evolution of sample lung cancer patients, which shows the translational value in cancer management and prognosis.

For bioimaging probes, we apply new step-economical and environmental-friendly approach for synthesizing extended π-conjugated molecules. These molecules display superior optical properties. By integrating with specific side-chain molecular moieties, they can be directed as imaging probes for specific destinations (i.e. mitochondria) inside the cells.

Our research works expand the molecular diversities and biomedical applications of functional organic materials. Not only limited within scientific research, these new cell-materials platforms provide translational value to offer new diagnostic and therapeutic solutions.

得獎感言：

很幸運不論是在新加坡、日本、臺灣，我都和一群很優秀的研究人員共事，所

有的研究成果，都是他們在實驗室的努力以及貢獻所成就的。也要感謝妻兒的陪伴，是我在工作之餘，支持我的力量。希望我們研究團隊現在的努力，能夠在未來透過轉譯醫學研究，成為能夠真正幫助病人的應用科技。