科技部海外人才歸國橋接方案(LIFT)生物醫學研究交流研習會

日期：107 年 5 月 15 日(星期二) 13:30-16:30
地點：立夫教學大樓 6 樓第一會議室
議程：

時間	議程	報告人
13:00~13:30	報到	
13:30~13:50	主席致詞	中國醫藥大學 湯智昕 研發長
13:50~14:20	Immunotherapy	徐湘庭 美國貝勒醫學院免疫學博士
14:20~14:50	Synthetic Biology: Design and Build Microbial Factories in Artistic Ways	劉照國 英國愛丁堡大學生物科學博士
14:50~15:10	茶敘交流	提供餐點
15:10~15:40	Gene level pathogenicity prioritization: sequencing studies of rare and oligogenic disorders	許書睿 香港大學醫學院生物資訊及統計遺傳學博士
15:40~16:10	Using EEG to Classify Psychogenic Non-Epileptic Seizure and Complex Partial Seizure Patients	簡睿宏 美國佛羅里達大學生物醫學工程博士
16:10~	大合照&賦歸	

附件：講題介紹

劉照國　英國愛丁堡大學生物科學博士

中文題目：合成生物學：設計與建造微生物工廠的藝術

(英文)：Synthetic Biology: Design and Build Microbial Factories in Artistic Ways

摘要：

從分子生物學到資訊工程、從基因改造到數學模式建立，合成生物學連結數個科學及工程領域創以造新的思維、方法來達成科學研究及製造新產品。其研究與生產包含能源、藥物、醫療、農產品、特殊化合物等範疇。在過去二十年的時間中，新技術與新方法的普遍使用創造了合成生物學的名詞也帶動生物科技產業的發展。本次演講將以過去二十年生物技術之發展為起點，介紹分子生物實驗設計的改變，應用新的實驗方法以減少結果產出的時程。其次，將介紹如何設計打造微生物工廠以及說明合成生物學的未來。

Synthetic biology aims to achieve scientific research and manufacture in the areas like bioenergy, pharma industry, agriculture and special chemicals with multidisciplinary research field including molecular biology, computer science, engineering and mathematics. During the past twenty years, development of novel methods such as modular DNA assembly, high-throughput screening, biological circuit design, metabolic engineering and automation platform make biological processes faster and easier and let bio-industry jump into next era. This quick talk is going to introduce novel bio-experimental processes based on the idea of synthetic biology and will also discuss the future of synthetic biology and its influence of bio-industry.

許書睿　香港大學醫學院生物資訊及統計遺傳學博士

中文題目：致病性基因評估方法在人類疾病上的應用

(英文)：Gene level pathogenicity prioritization: sequencing studies of rare and oligogenic disorders

摘要：
次世代定序常用於尋找人類致病基因，但在人類基因體也同時存在許多未知的突變位點。因此，系統化的評估基因的致病性可提供重要的資訊。我們利用機器學習的方式結合現有的方法工具，發現相同遺傳模式的基因存在類似的分子特徵。進一步針對顯性遺傳，隱性遺傳，性聯遺傳以及先天性疾病進行基因致病性評估。另外，也將此方法應用到實際兩個罕見先天性發育缺陷的疾病，包含殘留性泄殖腔(Persistent Cloaca, PC）以及先天性肺部呼吸道發育缺陷（congenital pulmonary airway malformation, CPAM）。此整合性的方法可同時考慮的不同的疾病模式，給予準確的基因層面致病性評估。

Next generation sequencing has facilitated the detection of causal genetic variants in human diseases. Many methods to estimate the pathogenicity at gene-level have been proposed to select and prioritize those genes harboring potential pathogenic variants amongst a plethora of genes carrying variants of unknown significance. We have combined the current gene-level prioritization methods by machine learning approach to develop a more comprehensive and unified pathogenicity prioritization system at gene level. This newly developed method has been applied to whole exome sequencing (WES) studies of two rare congenital pediatric disorders whose genetic etiology is yet to be discovered, namely persistent cloaca (PC) and congenital pulmonary airway malformation (CPAM). Our pathogenicity prioritization framework has assigned a pathogenic score to almost all protein-coding genes (N=18,859) for inheritance modes and paediatric disease. Our integrative gene-level pathogenicity method designed to take into account different disease etiologies outperformed most of the other methods.　This method has been particularly instrumental in the detection of genes involved in congenital paediatric disorders.

簡睿宏　美國佛羅里達大學生物醫學工程博士

中文題目：腦電波分辨心因性與生理性癲癇

(英文)：Using EEG to Classify Psychogenic Non-Epileptic Seizure and Complex Partial Seizure Patients

摘要：
癲癇病人的大腦有癲癇發作的傾向。癲癇發作可以分成心因性跟生理性，並且需要在癲癇發作的時候透過腦電波判定，因為要等待癲癇發作，所以需要長期監控並且需要專業人士來判讀。多頻道的腦電波可以用來建立即時的大腦網路。我先用休息時的腦電波建立大腦網路，再用大腦網路來分類心因性跟生理性的癲癇病人。在癲癇病人的大腦網路中，我也發現了小世界網路架。但是小世界網路特徵不足以用來分辨病人是有心因性跟生理性的癲癇發作，所以我接著使用了頻譜分析，來判定左右腦的相似度，並以此找到了分開心因性跟生理性癲癇病人的可能方法。

Electroencephalography (EEG) is a technology for measuring brain neuronal activity and is used to investigate various pathological conditions of the brain. A brain can be viewed as a complex network of neurons. A brain functional network represents quantitative interactions among EEG channels and can be expressed as a graph. Graph theoretical analysis, therefore, can be applied to offer a broader scope to inspect the global functional network characteristics of epileptic brains and can reveal the existence of small-world network structure. In this study, we inspected the interhemispheric power asymmetry (IHPA) of interictal scalp EEG signals recorded from patients with epilepsy and psychogenic nonepileptic events and found significant differences between the two patient groups. Specifically, the degrees of IHPA in the two patient groups differed in signals from the frontal lobe regions in the delta, theta, alpha, and gamma frequency bands.