

國立臺灣大學生醫電子與資訊學研究所

Graduate Institute of Biomedical Electronics
and Bioinformatics, National Taiwan University





序言 Preface

2019年，隨著本所合聘教師李嗣洵校長榮退、林發暄教授至國外任教，本所師資經歷些微變化。同時，為繼續充實本所師資陣容、拓寬教學研究領域，我們新聘二位新進教師，成為生醫電資所的生力軍。楊東霖助理教授為本校優秀校友，畢業後前往美國進修，取得哥倫比亞大學機械工程學博士學位。學成歸國後，進入中央研究院擔任博士後研究員，並於今年8月返回台大任教。楊教授擁有豐碩的研究經驗及成果，主要研究為運用超高解析光學影像技術，探討次細胞級等重要胞器結構。第二位新聘教師為林冠中兼任助理教授。林教授擁有本校電子工程學研究所博士學位，專業研究領域包含液晶裝置和生物液晶應用、生醫電子裝置的光學積體電路和波導設備應用等。加入本所擔任兼任教授後，支援開授複選必修課應用電學等科目，協助本所之非理工背景學生在跨領域學習之前，墊好基礎知識的基石。二位新教師之專業領域與本所現有教師互補，不僅有助於提升本所國際化程度，亦可增進課程深度、廣度；我們期待二位年輕教師的加入，能為生醫電資所帶來嶄新的氣象及研究氛圍。

身為台灣的龍頭大學院校，臺灣大學應當肩負作為台灣與世界學術交流橋樑的責任。因此我們格外重視研究生們的國際化程度，與本所在國際上的能見度。在學生方面，我們非常鼓勵研究生善用寒暑假，至國外頂尖研究機構交流。故本所自今年度起新設置「短期出國交流研究助學金」，希望透過助學金的支持，讓學生們無後顧之憂地勇敢踏出國門，前往世界各地；並給予他們安心的保障，不致因為經費上的限制而裹足不前。這是身為教育者應有的覺知，也是本所盡己所能為學生爭取到的教育資源。在國際學術交流與成果分享方面，我們今年曾經邀請到美國喬治城大學(Georgetown University)婁世鐘教授、美國加州大學爾灣分校醫學院功能性腫瘤影像中心(Center for Functional Onco-Imaging, University of California Irvine) Dr. Gordon Chen、荷蘭奈梅亨拉德堡德大學(Radboud Universiteit Nijmegen) Nico Karssemeijer教授、日本岐阜大學(Gifu University) Prof. Hiroshi Fujita教授、韓國亞洲大學(Ajou University) Myung Hoon Sunwoo教授、香港中文大學生醫醫學工程系何亦平教授等多位國際知名學者，至本所進行專題演講，分享他們卓越的研究成果。不僅能在一定程度上打開本所的國際知名度，更能藉著與學術界翹楚交流的機會，開拓學生的視野、瞭解最新的研究趨勢。

不僅如此，為有效提升本所在國際上的能見度及影響力，2019年10月，台大生醫電資所與中華民國放射線醫學會共同主辦「AI in Medical Imaging」研討會，特別邀請荷蘭、日本醫學資訊領域傑出國際學人來訪演講。尤其首度訪台的荷蘭講者，參與了多個著名乳房影像AI系統 (R2、Volpara、Qview、Transpara)的研發過程，在會議中帶來醫學AI研發經驗及過程的第一手資訊，使與會者得以瞭解醫學影像AI最新發展現況。此外，會議並結合大世科(TSTI)、百世生醫科技有限公司、太豪生醫股份有限公司、慧與科技(HPE)、輝達公司(NVIDIA)等知名企業，在會議現場直接解說、展示該公司科技應用的最新現況，更得以讓與會者瞭解AI人工智慧、AI醫療影像診斷應用於疾病診療的過程。技術的進步不僅可以讓病患得到更完善的醫療與照顧，更可以在精簡醫療成本的同時增進醫療品質。

適逢人工智慧(AI)浪潮興起，技術突飛猛進；AI技術於醫療體系的技術應用，更是產業界、學術界近年熱門研究話題。各產業不僅積極導入AI技術、對於人才更是需求若渴。而本所結合生醫、電機、資訊的跨領域整合研究方向，符合新世代產業的人才能力需求，使得台大生醫電資所以成為莘莘學子的夢想之地，在大環境中突圍，吸引眾多優秀學子報考，讓本所招生錄取率逐年創新低，維持優異的表現。

去年我曾經提及，本所將加強鼓勵學生修習AI課程、認識專利申請及醫療法規的重要性，以及執行大型產學計畫。這幾項發展重點，我們正在一一實現，台大生醫電資所的學生，確實有高度比例，獲得跟隨指導教授學習、實作最新醫療AI技術的機會；也在產學計畫的執行過程中，獲得實做的知識和能力。

台大生醫電資所創所至今，我們亦步亦趨前進。堅持「應用資電科技，改善人類健康與生活品質」的教育目標，是本所最大特色；這波AI技術的發展，讓我們距離「以科技改善人類健康」的目標更近了一步。如今，我們仍在成長茁壯的道路上，期許本所師生們能把握發展機會，開創更多全新的技術應用領域，為社會培育學用合一的人才，成為帶領科技創新的先鋒。

張瑞峰

2019年12月



序言 Preface

Along with the retirement of the joint professor, President Si-Chen Lee, and the departure of Prof. Fa-Hsuan Lin to teach abroad in 2019, our faculty members have experienced a slight change. In order to continuously broaden the field of research, we have recruited two new faculty members, Prof. T. Tony Yang and Prof. Guan-Jhong Lin, becoming part of our team.

After graduating from National Taiwan University, Prof. T. Tony Yang received his Ph.D. degree in Mechanical Engineering from Columbia University in the United States (US). He continued his postdoctoral training in the Institute of Atomic and Molecular Sciences, Academia Sinica since 2014, and by August this year started teaching at National Taiwan University as an assistant professor. Prof. T. Tony Yang's primary research interest is developing super-resolution microscopy techniques to study centriolar patterns and roles of primary cilia in mammalian cells.

The second new faculty member is Prof. Guan-Jhong Lin, working as an adjunct assistant professor. Prof. Guan-Jhong Lin received his Ph.D. degree in Electronics Engineering from National Taiwan University (NTU) in 2015. His research interests include polymer materials science, an advanced semiconductor package, semiconductor device performance, and next-generation liquid crystal applications. Before he joined NTU, he worked for TSMC and Intel. Now, he is also an adjunct assistant professor and teaches Applied Electricity (I) and (II) at our institute to assist our students who have no engineering background to have a strong basic knowledge before entering cross-interdisciplinary learning.

The fields of expertise of the two new teachers are complementary to our existing teachers. Not only supporting the improvement of our international ranking but also broaden and deepen the scope of our courses; We are looking forward to the participation of the two new young faculty members, which may bring innovative research atmosphere to our graduate institute.

As Taiwan's leading University, National Taiwan University should carry the responsibility of bridging the academic exchanges between Taiwan and the world. Therefore, we pay more attention to the internationalization of our institute.

In terms of students, we encourage graduate students to make good use of Winter and Summer vacations to participate in exchange activities with top research institutions abroad. Hence, we have founded a new Grant this year called "Short-term research exchange abroad Subsidies" to give them assurance not to hold back due to financial constraints. This is what an educator should keep in mind, and is also the best thing we can do to provide the educational resources our students need. In terms of international academic exchange results, we successfully invited well-known international professors including Prof. Shih-Chung Benedict Lo from Radiology and Oncology Department, Georgetown University, Washington, DC, US and Dr. Gordon Chen from Center for Functional Onco-Imaging, University of California Irvine, US, Prof. Nico Karssemeijer from Radboud Universiteit, Nijmegen, Netherlands and Prof. Hiroshi Fujita from Gifu University, Prof. Myung Hoon Sunwoo from Ajou University, and Prof. Yi-Ping He from The Chinese University of Hong Kong Department of Medical and Medical Engineering to give speeches and share their outstanding research results. The academic activities not only would upgrade the international reputation of our institute but will open more opportunities to interact with leading academics, expand students' horizons in understanding the latest research trends.

Furthermore, in order to effectively improve our international visibility and influence, we were in cooperation with The Radiological Society of the Republic of China to hold the "AI in Medical Imaging" conference and invited several distinguished international scholars from the Netherlands and Japan's Biomedical Electronic field. In particular, the Netherlands speaker who involved in various notable AI systems in Breast Imaging R&D (R2, Volpara, Qview, Transpara) gave participants a better understanding of the latest developments in AI medical imaging by sharing first-hand information on AI Medical R&D experiences and process. Moreover, the conference integrates well-known enterprises including Tatung System Technology Inc. (TSTI), Better Life Medical Technology Co., Ltd. TaiHao Medical Inc., Hewlett Packard Enterprise (HPE), NVIDIA to exhibit their latest technology applications, letting the participant have better understanding in Artificial intelligence and AI Application in Medical Imaging Diagnosis to disease diagnosis and treatment. Technology Advancement not only enables patients to get better medical care but can also improve medical quality while reducing medical costs.

As the rising of Artificial Intelligence and rapid technological advancement, the application of AI on Medical system has been a popular discussion topic among the industry and academic sector. Many industries are actively adopting AI technology, and they have higher demands for talent in this field at the same time. Our institute integrates interdisciplinary fields in Biomedical, Electronics, and Informatics research, which correspond with the industry demand. Thus makes our institute a dreamland for students, attracting more outstanding students to apply, results in the decreasing acceptance rate for students each year.

As mentioned in the previous year, our institute strongly encourages students to take AI courses, understand the importance of patent application and medical regulations, as well as the implementation of large-scale projects with industries. We are achieving the development focus one by one. Our students have comparatively higher opportunities to learn through their advisor's guidance, implement the latest Medical AI technology; additionally, gain practical knowledge and skills during the implementation of industry-academia cooperation.

Founded by 2006, we are gradually moving forward. Remain committed to the education goal "Using informatics and technology to improve people's health and life quality" is our major feature. The development of AI technology has brought us one step closer to our goal "Using technology to improve people's health." Nowadays, we are still growing, expecting our professors and students to grasp the development opportunities to open up brand new technological application field, cultivate talents for the society, and becomes a pioneer of new technical fields.



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壹 生醫電子與資訊學研究所簡介

Introduction of BEBI

國立臺灣大學生醫電子與資訊學研究所 (簡稱生醫電資所) 於 2006 年 8 月 1 日正式成立。本所的獨特性在於生物醫學、電機與資訊三大領域的結合，進行生物醫學之前瞻研究及跨領域教學。換言之，生醫電資所的主要使命在於提升跨領域的研究及教學，以因應生物醫學科技的快速發展。這些領域有：生醫電子、分子 / 細胞 / 組織影像、生醫訊號處理、生醫光電、感測器、生醫晶片、電腦輔助診斷、生物資訊學、系統生物學以及醫學資訊學等，為了在此專業領域中追求卓越，並謀求進一步的研究合作，整合來自不同領域的專業是相當必要的。

2006 年 8 月，生醫電資所開始招收博士班，目前每年招收 13 名博士生加入生醫電資所的行列，碩士班也於 2007 年 8 月開始招生，每年有 42 名碩士新生加入。本所有 36 位教師，來自不同領域的背景，包含了電機工程、資訊科學、生物、藥學、生醫工程、醫學以及生命科學。本所的課程設計也提供學生有足夠的跨領域訓練，以迎合生物醫學科技此一領域的挑戰。目前，我們針對重要的生醫問題進行整合性的研究，同時也與生醫電子及生物資訊相關產業合作，及進行跨領域的訓練和教育，我們期待本所持續的成長茁壯，並對生物科技與健康照護領域做出貢獻。

The Graduate Institute of Biomedical Electronics and Bioinformatics (BEBI) at National Taiwan University was formally founded on August 1, 2006. In a way, it is a very unique institute among those in College of Electrical Engineering and Computer Science, National Taiwan University, in that the fields of expertise are diversified but our efforts remain extremely focused. The main mission of the institute is to promote interdisciplinary research and education in respond to the rapid advancement of biotechnology. In this regard, the following areas have been identified as our focus areas which we have been putting our major efforts in: Biomedical Electronics, Molecular/Cellular/Tissue Imaging, Biomedical Signal Processing, Biophotonics, Sensors, Microarray and Next generation sequencing analyses, Computer-Aided Diagnosis, Bioinformatics, Systems Biology and medical Informatics. To excel in these areas and to bring up research synergy, integrative efforts from different disciplines are necessary.

The BEBI institute started the doctoral program in August, 2006 and now we admit 13 new Ph.D. students every year. Our master program started in August, 2007 with 42 new students entering the institute annually. There are 36 faculty members, among those 8 are with primary appointments. As our main mission mandates, our faculty members come from different trainings, including electrical engineering, computer science, biology, pharmacy, biomedical engineering, medicine and life sciences. Our curriculum is also designed to provide students with sufficient cross-disciplinary training to meet the challenges in biotechnology. Currently resources are used to promote integrated research projects aiming at important biomedical problems, collaboration with local industry in biomedical electronics and bioinformatics, as well as multidisciplinary training and education. As a result, research teams have been formed and several integrated program projects are underway. New courses have also been developed and a core lab is also being established to provide students with hands-on training. We look forward to continuing growth and contributions to this exciting field of biotechnology.



貳 研究領域 Research Fields

一、生醫電子組 Biomedical Electronics Group

本組研究主題涵蓋醫學影像、醫療儀器與生醫信號處理、生物晶片與生醫微感測器、生醫光電、生醫系統工程等數個領域。在醫學影像方面，研究重點係針對核磁共振與超音波造影技術，提升影像的品質、速度與功能性，並發展分子影像技術，應用於臨床醫學診斷、治療以及神經認知科學等方面。在醫療儀器與生醫信號處理方面，重點為開發或利用現有的醫療儀器，擷取各種生理訊號，並透過數位信號處理技術，提供醫療人員有效之疾病診斷及生理監測資訊。生物晶片的研究重點包 DNA 微陣列晶片之製程、感測技術與資料分析方法，以及以光電蝕刻技術控制生物分子、細胞及微組織之排列，並將其應用於生物醫學之研究。在生醫微感測器方面，主要為發展表面電漿共振光學檢測技術與利用標準半導體製程方式，進行生物分子的感測，並進一步將檢測元件微小化。在生醫光電領域，發展高解析度光學顯微影像以及各種光譜技術，提供生物分子、細胞與組織的分析、成像與操控工具，進而輔助疾病的診斷與生醫相關的研究。在生醫系統工程領域，結合生物醫學資訊，量化生理現象，透過系統模擬與工程設計，促進生物醫學發展及疾病治療。

Faculty members in this group have diverse research interests including “medical imaging”, “medical instrumentation and biomedical signal processing”, “biochips and biomedical sensors”, “biomedical optics”, and “biomedical systems engineering”. In the area of “medical imaging”, research efforts are focused on magnetic resonance imaging (MRI) and ultrasound imaging techniques. The goals are to improve the quality, acquisition speed and functionality of imaging, as well as to apply these techniques for diagnosis and treatment of disease. In the area of “medical instrumentation and biomedical signal processing”, digital signal processing techniques are used to extract information that is useful for diagnosis or monitoring of physiological status. Research efforts in the area of “biochips and biomedical sensors” are focused on improving the manufacture and detection of DNA and protein microarrays, arranging biomolecules and culture tissue using micro-patterning techniques, development of new data analysis methods for DNA microarrays, and development of miniature biosensors based on surface plasmon resonance (SPR) and nanowire biomolecular sensing devices based on standard CMOS fabrication. The emphasis of research in “biomedical optics” is to use optical microscopy and spectroscopy techniques to detect, image, analyze, and manipulate biological molecules, cells, and tissues. The ultimate goal is to provide information relevant to diagnosis and useful tools for the general biomedical research community. The biomedical systems engineering group integrates biomedical informatics, computer modeling and simulation and systems engineering to quantify and understand the biological and physiological phenomenon. The goal is to advance the biomedical sciences and to improve the understand and treatment of diseases.

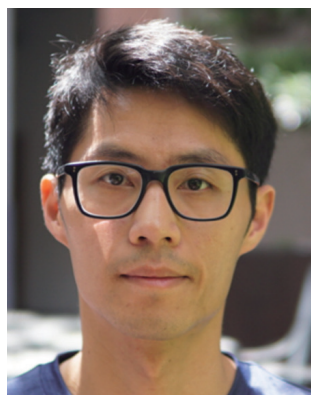
二、生醫資訊組 Bioinformatics Group

本組研究主題為「生醫資料分析與探勘」、「計算系統生物學」、「計算藥物學及化學」以及「醫學資訊系統」。在生醫資料分析與探勘方面，研究重點包括生物晶片（微陣列）和次世代定序資料分析、DNA 與蛋白質序列分析、基因及蛋白質結構與功能分析、生醫資料探勘等。在計算系統生物學方面，研究重點則是針對複雜的生物系統，建構數學分析及模擬計算的模型，以作為分析及模擬尖端生物醫學及生命科學現象的基礎。在計算藥物學及計算化學部分，則針對藥物及疫苗開發所涉及的量子化學計算及化學動力學計算建構新的計算模型以及設計更有效率的演算法。在醫學資訊系統方面，研究主題涵蓋層面極廣，包括醫學資訊應用所涉及的網路、多媒體與資料庫系統，以及平行運算、分散式和即時計算等。

We dedicate our resources to cutting-edge topics such as “biomedical data analysis and mining”, “computational systems biology”, “computational pharmacology and chemistry”, and “medical information systems”. Our major research interests in biomedical data analysis and mining include biochip (microarray) and next generation sequencing data analysis, DNA and protein sequence analysis, gene and protein structure and function analysis, as well as biomedical data mining. In the area of computational systems biology, we focus on developing advanced mathematical models and simulation methods to describe the operations and behaviors of complex biological systems. Our research on computational pharmacology and chemistry aims to design novel computational models and efficient simulation algorithms for quantum chemistry and molecular dynamics to facilitate drugs and vaccine development. In medical information systems, we cover a wide range of topics on developing information technologies for medical applications, including networking, multimedia, database, parallel processing, distributed and real-time computing.

叁 新進教師介紹 New Faculty

楊東霖 助理教授
T. Tony Yang, Assistant Professor



楊東霖助理教授於 2003 年及 2005 年取得臺灣大學機械工程系學士和應用力學所碩士學位後，於 2009 前往美國哥倫比亞大學 (Columbia University) 攻讀機械工程學博士學位，2014 年取得博士學位後，進入中央研究院擔任博士後研究員。楊東霖助理教授於 2019 年 8 月開始擔任台大電機系和生醫電資所合聘教師。主要研究為運用超高解析光學影像技術，探討次細胞級等重要胞器結構，超高解析影像術突破光學繞射極限，能夠觀察各種奈米級胞器微細特徵，如中心粒與主纖毛 (primary cilia)，並與紐約紀念斯隆 - 凱特琳癌症中心 (Memorial Sloan Kettering Cancer Center) 合作，成功發現主纖毛內負責生物訊號與纖毛生長的機制架構和中心遠端附屬物完整形態。其間多次參與國際生物物理和細胞生物會議，並發表多篇國際期刊論文，包括 Nature Communications、Scientific Reports、Biophysical Journal、Developmental Cell、Cell Reports 及 Molecular Biology of the Cell。

楊東霖助理教授的主要研究方向為：

- (1) 超高解析光學影像技術
- (2) 中心粒與其附屬結構 (distal appendages) 三維形態分析
- (3) 細胞主纖毛 (primary cilia) 生長和纖毛功能探討
- (4) 超解析單分子追蹤。

Dr. T. Tony Yang received his bachelor's and master's degree from National Taiwan University in 2003 and 2005 respectively. He received his Ph.D. degree in Mechanical Engineering from Columbia University in the City of New York in 2014. He continued his postdoctoral training in the Institute of Atomic and Molecular Sciences, Academia Sinica since 2014. He joins the Department of Electrical Engineering at National Taiwan University in summer 2019. T. Tony Yang's main research focus is developing super-resolution microscopy techniques to study centriolar patterns and roles of primary cilia in mammalian cells.

His research interests include designing for multiplexed super-resolution imaging systems, super-resolution single particle tracking, primary cilia, centriole architecture, cell imaging, etc.



林冠中 兼任助理教授
Guan-Jhong Lin, Adjunct Assistant Professor



林冠中助理教授於 2015 年獲得國立臺灣大學電子工程博士學位，其研究領域包括高分子材料科學、先進半導體元件封裝、半導體元件性能、與新一代液晶材料的應用。迄今，林博士已發表了 20 多篇的 SCI 論文和 50 多篇的會議論文，並獲得了多項研究論文競賽頭等獎與獎學金的殊榮。值得一提的是，林博士是 2014 年臺灣唯一一位獲頒美國 SPIE 光學和光子學教育獎學金的得獎人。在進入臺大服務前，林博士曾服務於台積電（TSMC），負責白光 LED 零組件的開發與研究。隨後，林博士加入美商英特爾（Intel），致力於高速電路的信號／電源系統完整性的探究與維護。自 2014 年起，林博士加入臺大電機工程學系，負責講授大學部電子學和電路學的實驗課程。現今，林博士同時也加入臺大生醫電子與資訊研究所，擔任兼任助理教授一職，協助講授本所應用電學（I）和（II）的課程。除了研究與教學工作外，林博士也擔任美國光學學會（OSA）和應用物理學期刊（JAP）的審稿人，協助審查國際學術論文。同時，林博士也長期致力於工程數學、微電子學、電路學等基礎學科的課程教學與教材修編的工作，使學生能學以致用，進而達成理論與實務結合的目標。

Guan-Jhong Lin received his Ph.D. degree in Electronics Engineering from National Taiwan University (NTU) in 2015. His research interests include polymer materials science, advanced semiconductor package, semiconductor device performance, and next-generation liquid crystal applications. He received numerous awards (thesis contests and scholarships) and published more than 20 SCI papers and 50 conference papers in his research areas. He was the only recipient of the 2014 SPIE optics and photonics education scholarships in Taiwan. He has been serving as a reviewer focusing on the optoelectronic devices for The Optical Society (OSA) and Journal of Applied Physics (JAP). Before he joined NTU, he worked for TSMC and was responsible for the development of white light-emitting diodes. After that, he joined Intel and focused on the performance and quality design of the signal/power integrity of high-speed devices and servers. Later, he joined the Department of Electronic Engineering, NTU, and has been teaching the experimental courses of electronics and electric circuits since 2014. Now, he is also an adjunct assistant professor and teaches Applied Electricity (I) and (II) at the Graduate Institute of Biomedical Electronics and Bioinformatics, NTU. Besides, he commits to basic science research and teaching, such as engineering mathematics, microelectronics, and electronic circuits.



Graduate Institute of Biomedical
Electronics and Bioinformatics,
National Taiwan University



肆 學術活動 Academic Activities

一、第九屆獎勵研究創新獎 The 9th Research Innovation Awards

本所為鼓勵學生研究創新並提昇本所及本校之國際學術地位，於民國100年通過〈獎勵研究創新辦法〉，每年八月開放所上同學申請。今年度得獎名單由本所招生及學術委員會審議通過後，於108年12月23日（一）由張瑞峰所長在「專題演講」課程進行頒獎。本獎項同時邀請本所老師、學生們共襄盛舉，不僅鼓勵大家積極發表研究成果作出學術貢獻，也鼓勵所上學生勇於在國際的舞台上創新研究。

The Graduate Institute of Biomedical Electronics and Bioinformatics (BEBI) encourages students to be engaged in research innovation and promoting the institute and university international academic position. Since 2011, BEBI has started to reward students with "Research Innovation Award". The Award application opened on August, director Ruey-feng Chang then announced the winners during the seminar held on Dec 23rd, 2019. All faculty members and students are invited to the award ceremony, in order to encourage everyone to actively publish and give contribution to academic research.

There are two types of award given: "Graduate Student Outstanding Research" and "The Best Master and Ph. D Thesis of The Year". This year, the student who received the Graduate Student Outstanding Research awards is Dr. Chen-Tsung Huang; the winner of the Best Master Thesis of the year Award is Tzu-Han LIN; the winner of the Best Ph. D dissertation of the year award is Dr. Yuan-Chia Chu.



二、博士班招生說明會

BEBI Introduction to prospective students: College of medicine (2019/09/23, 2019/09/30)

國立臺灣大學生醫電子與資訊學研究所
Graduate Institute of Biomedical Electronics and Bioinformatics National Taiwan University

109學年度碩博士班甄試招生說明會

碩士班		博士班	
招生名額		招生名額	
甲組(主修生醫電子一)	17人	甲組(主修生醫電子)	3人
乙組(主修生醫電子二)	6人	乙組(主修生醫資訊)	2人
丙組(主修生醫資訊)	7人		
報名資格		報名資格	
國內外大學校畢業(含應屆畢業)或合於「入學大學同等學力認定標準」有關碩士班報考資格者		擁有碩士學位者或醫學士學位者畢業後在第一級教學醫院訓練二年以上，並提出相當於碩士論文水準之著作者	

說明會報名日期：即日起至9月30日截止
甄試網路報名日期：9月30日至10月8日

招生說明會各場次資訊

日期	時間	場次	地點
9/23(一)	12:10-13:10	臺灣大學醫學院	基礎醫學大樓四樓405教室
9/30(一)	12:20-13:20	臺灣大學校總區	博理館103教室

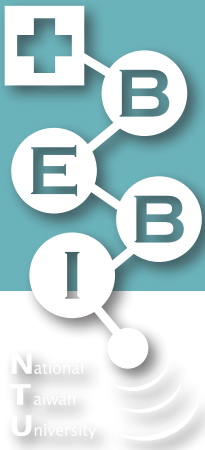
報名網址QR Code



招生說明會採預先報名，詳細說明請至
<http://www.bebi.ntu.edu.tw>



三、碩士班新生說明會 BEBI Introduction to new students: (2019/04/09)



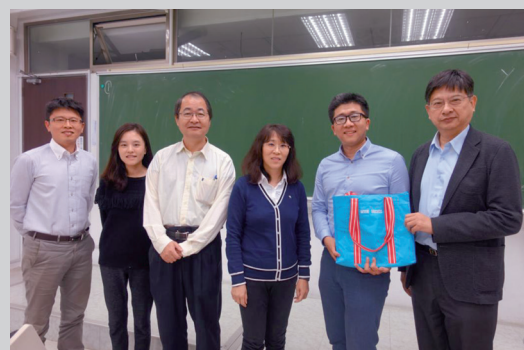
四、演講 Lectures

日期	講者	講題
2019.02.25	清大電機系 孫民教授	Deep Learning and its Biomedical Applications
2019.03.04	台大人工智慧與機器人研究中心 傅立成主任	AI and Robotics - Key to Era of Smart Healthcare
2019.03.11	基龍米克斯 游卓遠董事長	電腦也會選豬仔
2019.03.18	臺大生物產業機電工程學系兼生物 產業自動化中心 顏炳郎主任	Medical Robotics: Opportunities and Challenges
2019.03.25	華威國際科技顧問股份有限公司 李世仁博士	以資本市場角度解析生醫產業趨勢與 公司營運模式
2019.04.01	安盟生技 林群倫執行長	How to make the translational research to successful commercialization in start-up?
2019.04.08	頂尖生技顧問股份有限公司 高敏雄董事長	Validation and Compliance of Computerized GCP Systems and Data
2019.04.22	台大醫院健康管理中心 邱瀚模主任	人工智慧在預防醫學上的潛力與應用
2019.04.29	三軍總醫院放射診斷部 阮春榮博士	電機工程與資訊工程在醫學影像診斷的應用
2019.05.06	錦繡莊國際建設開發公司 陳彩鳳總監	長者居家環境安全
2019.05.13	臺北榮民總醫院 放射線部 郭萬祐主任	臺北榮總醫學影像人工智慧發展實務分享
2019.05.20	超象科技股份有限公司 劉國平董事長	AI、IC design 與醫學影像的結合
2019.06.03	台大小兒遺傳科部 胡務亮醫師	次世代基因定序及生物資訊
2019.09.16	台北市消防隊金華分局 朱春成小隊長	火災預防、災害搶救、案例分享
2019.09.23	國立台灣大學醫學院 倪衍玄院長	Gut Microbiota in Human Diseases

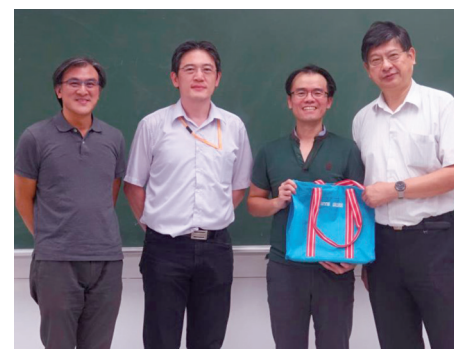
2019.09.30	Arlington Innovation Center, Physics Department, Virginia Tech, Arlington, VA Radiology and Oncology Department, Georgetown University, Washington, DC 婁世鐘教授	Transformation-identical CNN (TI-CNN) and Geared Rotation-identical CNN (GRI- CNN) and Their Variants for Orientation- Independent Pattern Classification
2019.10.07	台大寫作教學中心 江介維講師	學術英文寫作思維
2019.10.14	聯發科技股份有限公司 陳柏諭技術副理	Edge AI and NeuroPilot Platform
2019.10.21	美國加州大學爾灣分校 (UCI) 醫學 院功能性腫瘤影像中心 Dr. Gordon Chen, M.D.	Imaging Breast Density: Established and Emerging Modalities
2019.10.28	Department of Radiology and Nuclear Medicine, Radboud university medical center, Nijmegen Prof. Nico Karssemeijer	AI in breast imaging
2019.11.11	工研院巨量資訊科技中心 馮文生博士	AI Technologies and Applications in Healthcare
2019.11.18	臺大醫院教學部 盛望徽主任	感染性疾病分子檢測新發展
2019.11.25	華碩電腦股份有限公司 吳漢章總經理	人工智慧與醫療數位轉型 -Medical AI 的 系統發展觀
2019.12.02	台大醫院醫研部 陳建煒主任	Data, Ethics, and Methods in Clinical Research, how information technology may help
2019.12.09	仁寶電腦 陳坤松處長	體醫結合，掌握健康時代的商業思維
2019.12.23	臺大醫學教育暨生醫倫理學科 暨研究所 蔡甫昌教授	大數據及 AI 醫療運用的倫理議題



肆 | 學術活動 Academic Activities

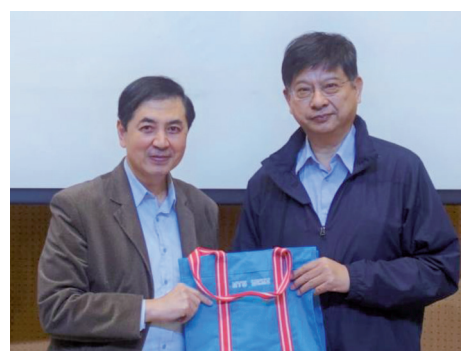


2019.02.25
國立清華大學電機系孫民教授
“Deep Learning and its Biomedical Applications”

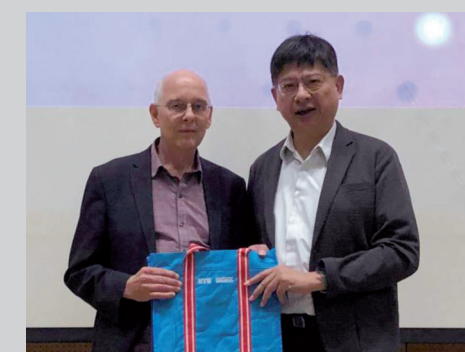


2019.10.14
聯發科技股份有限公司 陳柏諭技術副理
“Edge AI and NeuroPilot Platform”

2019.03.04
台大人工智慧與機器人研究中心 傅立成主任
“AI and Robotics - Key to Era of Smart Healthcare”



2019.10.28
Prof. Nico Karssemeijer, Department of Radiology and
Nuclear Medicine, Radboud university medical center,
Nijmegen
“AI in breast imaging”



2019.09.16
台北市消防隊金華分局 朱春成小隊長
「火災預防、災害搶救、案例分享」



2019.11.11
工研院巨量資訊科技中心 馮文生博士
“AI Technologies and Applications in Healthcare”

2019.09.23
國立台灣大學醫學院 倪衍玄院長
“Gut Microbiota in Human Diseases”



2019.11.18
臺大醫院教學部 盛望徽主任
「感染性疾病分子檢測新發展」





2019.11.25
華碩電腦股份有限公司 吳漢章總經理
「人工智慧與醫療數位轉型-Medical AI的系統發展觀」

五、國立臺灣大學電機資訊學院108年度畢業典禮
2019 Commencement of College of Electrical Engineering and
Computer Science, NTU

2019.12.02
臺大醫院醫研部 陳建煒主任
“Data, Ethics, and Methods in Clinical Research,
how information technology may help”



2019.12.09
仁寶電腦 陳坤松處長
「體醫結合·掌握健康時代的商業思維」



2019.12.23
臺大醫學教育暨生醫倫理學科暨研究所
蔡甫昌教授 「大數據及AI醫療運用的倫理議題」





六、2019/07/04-07/06生醫電子資訊營 Biomedical Electronics Camp on July, 4-6, 2019



2019年臺大生醫電資營於7月04日至7月06日假臺大博理館演講廳舉辦，今年的主題為「新藍海：AI人工智慧化醫療產業大趨勢-醫療資訊的應用、發展、創新與革命」，近年來發展趨勢逐漸朝向人工智慧醫療的資源整合，本活動從介紹台灣新世代智慧醫療作為出發點，透過醫學、電資、業界以及相關法規等不同面向的主題演講進行發想，期望對台灣醫療產業提出更多的發展方向。

本活動分為2階段，營隊系列演講將從不同面向進行探討。

今年我們的專題競賽改採創新形式進行：給予各組一個專業領域的大方向，讓他們根據這個方向發想一個待解決的問題，於提出可行解決辦法的同時，製作出解決的雛型裝置。在活動的最後一天，各組都成功地將他們這三天所發想的解決辦法以及產品原型，以海報方式展現出來，亦獲得了評審們的高評價。

本次活動總計有90位學員報名參加，成員除了本所的新生，同時也有許多電機、生物相關科系的大學生參與。在學員的問卷調查中，非常滿意本次的營隊規劃、願意再參加，也願意推薦給其他人，並對講者的演講都有很高的評價。

明年本所亦將視培養國家未來生醫電子與資訊人才為己任，繼續舉辦生醫電資營。

The 2019 National Taiwan University Biomedical Electronics and Bioinformatics Camp was held from 4th July to 6th July at the Barry Lam Hall in National Taiwan University. The topic this year is “Blue Ocean Strategy: Artificial Intelligence in Medical Industry Mega trends- Application, Development, and revolution in Biomedical Informatics”. In recent year, the development trend has moved toward the integration of Artificial intelligence and Biomedical resources. This activity introduced different topics through series of lectures starting from Taiwan’s new generation of smart health care, followed by Medicine, electrical, industry and related regulation. The goal is to propose Taiwan’s biomedical industry development from more diverse aspects.

The activity was divided into two sections, where we explored the series of lectures from different aspects.

This year we conducted a thematic competition. First, we gave each group the big picture of a professional field, then we let each group to find a problem according to the given topic and come up with the solution and create a prototype device to solve the problem. On the last day of this activity, each group successfully displayed their solutions and prototype thought in form of poster in the past three days, which received high review comments by the spectators.

There were a total of 90 participants attended this activity, some are the freshmen of our institute, other participants are under graduate students from different university all over the country in electrical engineering, biology and other related major. Based on the questioner, the participants are mostly satisfied with the event, willing to participate again and to recommend the event to others, and they also give high review to the lectures. Based on this highly rated feedback, we will continue to hold this camp to take part in the cultivation of future talent next year.

伍 生醫核心實驗室 Biomedical Core Laboratories

永齡生醫工程館—生醫核心實驗室 YongLin Biomedical Engineering Hall

永齡生醫工程館自民國 97 年受鴻海集團郭台銘先生及其所屬之永齡健康基金會之捐贈而開始籌建，目的在於建構一處生醫研究基地，而橫跨生醫、電子、資訊等三領域為一體的本所在積極爭取之下，受有七樓一層。民國 102 年，本所雖已有規劃之雛形，所內也有著建置實驗室的共識，但為妥善運用空間，並務求資源能公平、透明的分配予本所全體師生，我們先於 103 年 6 月成立任務型空間規劃委員會，爭取時間討論規劃，同年 8 月便交由新學年之正式空間規劃委員接力運作，擘畫空間、設立規範，全所共用之「生醫核心實驗室」與「高速運算中心」便在此時集結眾人之心力逐步成形。

歷經數百個日子的醞釀，生醫核心實驗室率先於 104 年暑假動工，終於趕在 104 年 11 月正式落成，得以在新的學年為師生們提供服務。生醫核心實驗室的規劃是以長期提升本所研究能量為指標而建置，所以在儀器規格、實驗室內裝配置以及操作規範上，都是以極為嚴謹的態度進行全盤考量。為顧及所內眾多師生不同的實驗需求，一般生物實驗室所需的儀器設備在此皆甚為齊備，例如：整齊安全的工作檯、排氣櫃、細胞離心機等儀器，我們更在實驗室內部規劃了生物安全等級第二級（BSL2）的區塊，設有細胞培養室、生物安全操作櫃等設備，同時更透過實驗室使用規範控管使用者的安全，藉由嚴格遵守相關規範來保障本所最寶貴的人才資產。

本所自 2006 年成立，一路走來受到諸多資源挹注，因此，生醫核心實驗室不僅提供本所師生申請使用，同時也將秉持最開放的態度接受全校師生的借用，讓有限的資源在共享之下得以發揮最大的價值。我們相信生醫核心實驗室在全所的努力與運作下，將能持續茁壯成為國內生醫研發人才與技術的搖籃之一。

YongLin Biomedical Engineering Hall was constructed in 2008 through the generosity of Mr. Tai-ming Guo from Honghai Corporation and its YongLin Health Foundation, with the goal of building a base for biomedical research. After continuous effort, our department, encompassing backgrounds ranging from biomedical to electronics and IT, has secured the entire seventh floor.

In 2013, although we already had done initial planning and had mutual agreement on setting up laboratories, we formed the “space allocation temporary committee” for detailed discussion of proper utilization of space and equal sharing of the resources among all members in the department. In August of 2014, the “committee of space allocation” took over the work of outlining the partition of space and set up usage clauses. During this period, the Biomedical Core Laboratory and High Performance Computing Center started to take shape.

Hundreds of days in the making, the Biomedical Core Lab was the first to be constructed in the summer of 2015. It was completed in November of the same year, just in time to provide service in the new academic year. The Biomedical Core Lab was designed for long-term use. Thus, the specifications of the equipment and configuration of the lab interior have been handled with the greatest care. To fulfill the different requirements of all types of experiments, all the equipment commonly found in an average biology lab, such as workbenches, exhaust cabinets, and centrifuges, are provided. We also set apart a specific region in the lab for with BSL2-grade safety which contains the cell culture room and biological safe operation cabinet. Strict usage clauses are enforced to ensure the safety of all users.

Ever since the birth of our department in 2006, we have had the luxury of receiving resources from all directions. Therefore, the Biomedical Core Lab will not only serve teachers and students of this department, but also do its best to share such resources with members of the whole school, exercising them to their greatest value. We are confident that this lab will never cease to grow and become one of the greatest sources of biomedical talent.



生醫核心實驗室



陸 實驗室及教師

Laboratories and Faculty

生醫電子組實驗室 Laboratory of Biomedical Electronic Group

實驗室名稱 Name	主持教授 Advising professor	地點 Room
超大型積體電路系統晶片電腦輔助設計實驗室 SOC VLSI-EDA Lab.	陳中平 Chung-Ping Chen	博理館 405 室 Room 405, Barry Lam Hall
醫學影像實驗室 / 磁共振影像頻譜實驗室 / 生醫分子影像核心實驗室 Medical Imaging Lab./Magnetic Resonance Imaging Lab./Biomedical Molecular Imaging Core Lab.	陳志宏 Jyh-Horng Chen	明達館 706 室 Room 706, MingDa Building
放射物理生物實驗室 Radiation Physics and Biology Lab.	成佳憲 Chia-Hsien Cheng	臺大醫院 NTUH
生物晶片研究室 Bioinformatics and Biostatistics Core Lab.	莊曜宇 Eric Y. Chuang	明達館 701 室 Room 701, MingDa Building
光流體生醫系統實驗室 Bio-Optofluidic Systems Lab.	黃念祖 Nien-Tsu Huang	明達館 702 室 Room 702, MingDa Building
醫用磁共振造影研究室 Magnetic Resonance in Medicine Lab.	鍾孝文 Hsiao-Wen Chung	明達館 704 室 Room 704, MingDa Building
電子束暨奈米元件實驗室 E-beam and NanoDevice Lab.	管傑雄 Chieh-Hsiung Kuan	電機二館 426/129 室 Room 426/129, EE 2
細胞行為實驗室 Cell Behavior Lab.	郭柏齡 Po-Ling Kuo	明達館 707 室 Room 707, MingDa Building
統計信號處理實驗室 Statistical Signal Processing Lab.	李枝宏 Ju-Hong Lee	電機二館 553 室 Room 553, EE 2
紅外線元件實驗室 IR Device Lab.	李嗣浚 Si-Chen Lee	電機二館 451 室 Room 451, EE 2

實驗室名稱 Name	主持教授 Advising professor	地點 Room
超音波影像實驗室 Ultrasonic Imaging Lab.	李百祺 Pai-Chi Li	明達館 731 室 Room 731, MingDa Building
內皮細胞分子生物學實驗室 Laboratory of Endothelial Cell Molecular Biology	李心予 Hsin-yu Lee	生命科學館 504 室 Room 504, Life Science Building
生醫晶片系統實驗室 Bio-Electronics-System Technology Lab.	林致廷 Chih-Ting Lin	電機二館 450 室 Room 450, EE 2
醫用微感測器暨系統實驗室 Medical Micro Sensor and System Lab.	林啟萬 Chii-Wann Lin	永齡生醫工程館 526 室 Room 526, YongLin Biomedical Engineering Hall
光學分子影像核心實驗室 Optical Molecular Imaging Core Lab.	孫啟光 Chi-Kuang Sun	電機二館 R406A 室 Room R406A, EE 2
生醫光譜與影像實驗室 Biomedical Optical Spectroscopy and Imaging Lab.	宋孔彬 Kung-Bin Sung	明達館 703 室 Room 703, MingDa Building
中研院生醫所 IBMS RM511	楊泮池 Pan-Chyr Yang	臺大醫院 NTUH
台大醫院第七共同研究室 Laboratory	周迺寬 Nai-Kuan Chou	臺大醫院 NTUH
生醫系統工程實驗室 Biomedical System Engineering Lab.	魏安祺 An-Chi Wei	明達館 705 室 Room 705, MingDa Building
超解析光學影像實驗室 Light Nanoscopy Lab.	楊東霖 T. Tony Yang	明達館 615 室 Room 615, MingDa Building



生醫資訊組實驗室 Laboratory of Bioinformatics Group

實驗室名稱 Name	主持教授 Advising professor	地點 Room
醫學影像處理實驗室 Medical Image Processing Lab.	張瑞峰 Ruey-Feng Chang	德田館 402 室 Room 402,CSIE Building
演算法與計算生物學實驗室 Algorithms and Computational Biology Lab.	趙坤茂 Kun-Mao Chao	德田館 432 室 Room 432,CSIE Building
數位相機與電腦視覺實驗室 Digital camera and Computer Vision Lab.	傅楸善 Chiou-Shann Fuh	德田館 328 室 Room 328,CSIE Building
	黃俊升 Chiun-Sheng Huang	臺大醫院 NTUH
系統生物學研究室 Systems Biology Lab.	阮雪芬 Hsueh-Fen Juan	生命科學館 1105 室 Room 1105,Life Science Building
醫學資訊實驗室 Medical Informatics Lab.	賴飛熊 Fei-pei Lai	德田館 346 室 Room 346, CSIE Building
分子生醫資訊實驗室 Molecular Biomedical Informatics Lab.	歐陽彥正 Yen-Jen Oyang	德田館 410 室 Room 410, CSIE Building
臨床－生物醫學工程－產業融合實驗室 Merger Laboratory for Clinical Sciences, Biomedical Engineering and Industry	孫維仁 Wei-Zen Sun	臺大醫院 NTUH
計算分子設計與代謝體學實驗室 Computataional Molecular Design and Metabolomics Lab.	曾宇鳳 Y. Jane Tseng	德田館 403 室 Room 403,CSIE Building



陳中平 教授
Chung-Ping Chen, Professor

國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學電機工程學系教授
國立臺灣大學電子工程學研究所教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics/
Department of Electrical Engineering, National Taiwan University/
Graduate Institute of Electronics and Engineering

超大型積體電路系統晶片電腦輔助設計實驗室
SOC VLSI-EDA Lab.

自 2003 年成立至今，本實驗室一向是一個不斷追求創新及擴展知識的一個的國際化研究團隊，其研究領域包括了生醫電子，電腦輔助設計及數位 IC 設計實驗室，其研究重點在於針對電路實體設計及時序之最佳化以及線路模擬，及在針對製造時所產生之製程移之影響及解決方案。最近，我們又極力發展生醫 MRI 及 PEI 影像及血管模擬以及半導體光學製程之模擬之最佳化。在 IC 設計方面，我們主力在發展在高速低功率之微處理機所須之電路。本實驗室目前的研究方向主要可分為九大領域。

- 生醫 MRI, PET 影像處理
- 生醫行動生理檢測系統
- 蛋白質摺疊分析
- 可製造性設計
- 數位電路之最佳化
- 統計型時序分析
- 高效能電路設計
- 半導體光學製程影像之模擬與處理
- 電力線通訊系統

Established in 2003, BIO-EDA-VLSI Lab has been relentlessly pursuing new challenges and enrich knowledge in the field of EDA, VLSI circuit design, and BIO/Optical Microlithography Image Simulation and Processing. The focus of our research field include the following 9 major projects:

- Biomedical MRI,PET Imaging processing
- The transmission and analysis of Bio-signal
- Protein folding
- Digital Circuit Optimization
- Design for Manufacturabiliy
- Statistical Static Timing Analysis
- High Performance Circuit Design
- BIO and Optical Microlithography Imaging Simulation and Processing
- Power Line Communication system



主要研究領域 Major Research Areas

生醫及半導體光學製程影像處理、微處理機設計、VLSI 電腦輔助設計、微波通訊線路設計、電力線通訊系統、生醫行動生理檢測系統

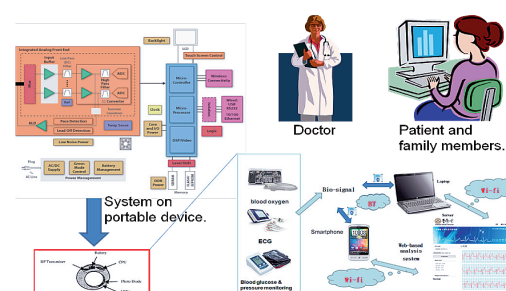
BIO/Optical Microlithography Image Processing, VLSI CAD, Microprocessor Design, RF Mix/Signal Circuit Design, Power Line Communication system, The transmission and analysis of Bio-signal

研究計畫 Research Projects

1. 次微米下之高速電路及低耗電最佳化
Deep-Sub-Micron High-speed Low Power Optimization
2. 動態邏輯加法器設計及自動化
Domino Adder Design and Automa
3. 次微米級干涉週期量測之診斷演算法
Efficient and Accurate Optical Scatterometry Diagnosis of Grating Variation Based on Segmented Moment Matching and Singular Value Decomposition Method
4. 行動式無線癲癇症預測雲端系統
Mobile Wireless Epilepsy Seizure Prediction System with Cloud Computation Method
5. 連續性個人化健康照護整合平台子計畫三
6. Telecare platform with portable biomedical system applied in Smartphone

■ 研究計畫 -

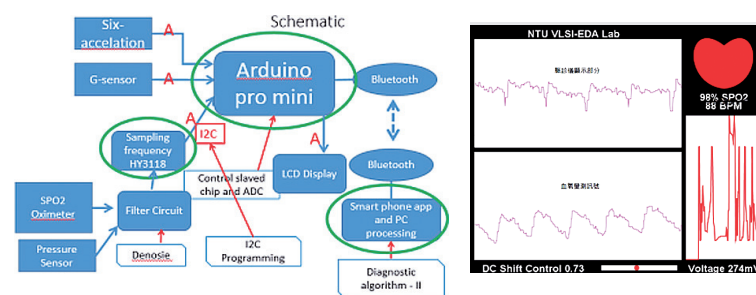
連續性個人化健康照護整合平台子計畫三之代表圖：



■ 研究計畫 -

Telecare platform with portable biomedical system applied in Smartphone :

結合藍芽晶片傳送至智慧型手機，做圖形化的顯示。



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國立臺灣大學電機工程學系教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics/
Department of Electrical Engineering, National Taiwan University

醫學影像實驗室

Medical Imaging Lab.

醫學影像實驗室目前位於臺灣大學明達館七樓。負責人為陳志宏 (Jyh-Horng Chen) 教授。主要研究方向為核磁共振造影 (MRI)，包含功能性大腦影像之突破、新一代 MRI 成像之研究及生醫分子影像，並藉由生物、醫學、工程的結合於醫學影像學所造就的優勢，進行「個人化醫學」之努力。

在電機一館及電機二館分別設有 MRI/MRS 實驗室，設置 Bruker 3.0 Tesla MRI，以及動物用 Bruker 7.0 Tesla MRI；於永齡生醫工程館設有 MRI 及 MEG；並在生醫分子影像研究中心底下成立生醫分子影像核心實驗室。平時提供校園內學術單位做研究，以及本實驗室研究造影技術之用。



電機一館 Bruker 3.0 Tesla MR



核磁共振影像頻譜實驗室

Magnetic Resonance Imaging Lab.

本實驗室於 1999 年成立，以提供有效、可靠的成像技術及訓練課程予各研究領域之研究學者，心理學家、生理學家、動物學家，可藉由磁振光譜影像之重建方式，為未來之基因蛋白體研究、動物病變模型之評估，提供微細且精確的訊息，以成為臺灣的 MRI 研究及人才培訓資源中心。另一方面，本實驗室亦從事新技術之研發，期能突破現有磁振造影 (MRI) 之成像速度限制，提升磁共振影幅系統成像能力及臺灣在磁共振領域之國際知名度，並藉由國內現有 MR 研究資源合作，以跨學科之研究，使人文、科學、醫學、工程等不同學科得以匯整激盪，並創造 21 世紀之新學門科學，建立一個世界級之核磁共振卓越中心。主要研究方向包括：大腦功能性磁振造影、擴散磁振造影、MR 線圈設計、MRI 成像最佳化技術、超快速平行擷取 MRI 系統、小動物生理病理研究、分子影像。

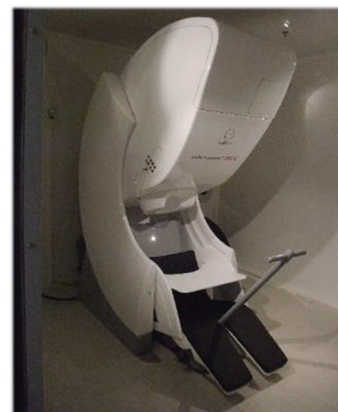
The laboratory will apply the existing MRI / MRS techniques to interdisciplinary research, including school of humanity, psychology, medicine, engineering, agriculture and food science. Its object is to combine experts indifferent areas to generate, hopefully, some new academic areas in 21 century. This laboratory is supported by National Taiwan University (NTU) as well as Instrumentation Center of National Science Council (NSC) in Taiwan.



電機一館 Bruker 3.0 Tesla MR



電機二館動物用 Bruker 7.0 Tesla



永齡生醫工程館 MEG

MRI/MEG

團隊於 2015 年爭取科技部 2 億 1 千萬「心智科學大型研究設備建置及共同使用服務計畫」，建置 MRI/MEG 儀器於台大生醫工程館，服務全國學者，研究人文社會科學領域之腦功能相關議題。並成立「身體、心靈與文化整合影像研究中心」(Imaging Center for Integrated Body, Mind and Culture Research)，以期結合人文與社會科學；自然與生命科學、工程與醫衛科學等方面之人才及知識，探討人類的大腦、心智、環境與文化彼此間如何進行雙向互動，以追求對千古謎題——「心靈與身體」關係——的進一步瞭解。



永齡生醫工程館西門子 3T Prisma MRI

The team won 210 million funding from the Ministry of Science and Technology in 2015 for the "Installation and Operation of Core Facility in Mind Science: An Initiative for Integrated Research on Brain, Mind and Culture" project. The funding is used in establishing MRI / MEG instrument in the NTUYongLin Biomedical Engineering Center, open to all researchers in the country, so as to facilitate research in brain function related issues among the humanities and social sciences faculties.

生醫分子影像核心實驗室

Biomedical Molecular Imaging Core Lab.

此核心實驗室位於台大生物科技館，結合磁共振 (MR) 分子影像、光學分子影像 (Optical molecular imaging) 及超音波分子影像 (Ultrasonic molecular imaging) 此外，為使活體中特定的分子成像，除了要有上述高分辨率、敏感、快速的成像技術，還具備合成具有高親和力的分子探針及具有特異標定之顯影劑。

本核心實驗室主要目標之一為提供分子醫學影像之量測與生物體之醫學成像技術研究服務予臺灣大學醫學院區內從事生物醫學、基礎醫學與臨床醫學研究人員，此外，本實驗室致力發展新型醫學影像之顯影劑開發，並結合分子生物之技術，開發新式具特異標定功能之奈米粒子。

This core combined MR molecular imaging, optical molecular imaging and ultrasonic molecular imaging, thence, besides above mentioned properties, high spatial resolution, sensitivity and fast imaging technology, it has the ability to synthesize high affinity molecular probe and specific-targeting contrast agent, and then in vivo specific molecular imaging will be obtained.

Our primary aim for this Biomedical molecular imaging Core is to provide research services to all the investigators within NTU medical campus, and conducting methodological research related to biomedical molecular imaging is our secondary aim. On the other hand, we also develop the novel contrast agents which have specific targeting function for disease model.

陸 | 實驗室及教師 Laboratories and Faculty

主要研究領域 Major Research Areas

核磁共振影像、醫學工程

Magnetic Resonance Image, Functional MRI, Molecular imaging, Man Machine interface, Medical Engineering

研究計畫 Research Projects

1. 超高靈敏度磁共振造影暨高溫超導量子干涉元件之多模態動物癌症診斷平台 -- 超高時空解析度之磁化率定量影像：多模態動物癌症診斷技術開發
2. 探索功能性磁共振造影之神經生理機制：負活化血氧相依與功能性聯結
3. “自覺記憶衰退” 對認知功能無缺損的中、老年人之大腦功能性和結構性變化的影響—顳葉內側次結構之高解析度磁共振造影研究
4. 心智科學大型研究設備共同使用服務計畫—身體、心靈與文化整合影像研究中心

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成佳憲 教授

Chia-Hsien Cheng, Professor

國立臺灣大學生醫電子與資訊學研究所合聘教授
 國立臺灣大學醫學院腫瘤醫學研究所教授
 國立臺灣大學醫學院臨床醫學研究所合聘教授
 國立臺灣大學醫學院附設醫院腫瘤醫學部放射腫瘤科主治醫師

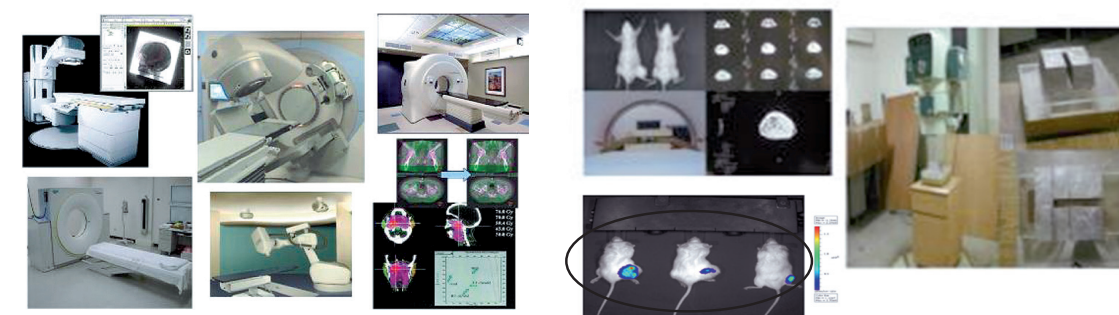
Professor, Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University/
 Graduate Institute of Oncology, National Taiwan University College of Medicine, Graduate Institute of Clinical Medicine, National Taiwan University College of Medicine/
 Attending Physician, Division of Radiation Oncology, Department of Oncology, National Taiwan University Hospital

放射物理生物實驗室

Radiation Physics and Biology Lab.

本實驗室由成佳憲教授於 2002 年起隨同整建臺大醫院腫瘤醫學部放射腫瘤科時設立，主要從事放射治療物理學與放射生物學相關研究，目前以設備技術物理與腫瘤放射治療轉譯醫學等領域為研究重點。本實驗室在影像導引放射治療領域與肝癌放射治療領域已產出許多具體貢獻。本實驗室之成員來自臺大醫院腫瘤醫學部放射腫瘤科醫學物理師、放射師及放射生物醫學領域研究人員，多年來亦積極與國內外單位進行合作。

The laboratory for radiation physics and biology was established by Jason Chia-Hsien Cheng, M.D., M.S., Ph.D., with the reconstruction of Division of Radiation Oncology, Department of Oncology, National Taiwan University Hospital. The main research directions are radiation physics related to equipment and technique, as well as translational medicine of radiation oncology. Our research team has been contributing significantly the progress in image-guided radiation therapy and radiotherapy to hepatocellular carcinoma. The team members of our laboratory include the radiation physicists, radiation technologists, and radiation biologists from Division of Radiation Oncology. The laboratory also has the collaboration with the other research teams in Taiwan and in the other countries.





陸 | 實驗室及教師 Laboratories and Faculty

主要研究領域 Major Research Areas

放射腫瘤學、放射物理學、放射生物學、癌症轉譯醫學
Radiation Oncology, Radiation Physics, Radiation Biology, Cancer Translational Medicine

研究計畫 Research Projects

1. 食道鱗狀細胞癌病人接受前導放射化學治療及食道切除手術後達成病
Serum transforming growth factor- β 1 change after neoadjuvant chemoradiotherapy is associated with postoperative pulmonary complications in esophageal cancer patients undergoing combined modality therapy
2. 組蛋白去乙酰酶 6 在不同 p53 類型肝癌細胞放射敏感性及 DNA 損傷的前導研究
A pilot study on the role HDAC6 in radiosensitization and DNA damage in hepatocellular carcinoma cells with different p53 statuses
3. IL-6-STIMI 交互作用影響腫瘤放射治療抗性
4. 探討抑制組蛋白去乙酰酶調控去氧核糖核酸修復蛋白質小泛素修飾於肝癌放射增敏作用機制
Molecular mechanism of radiosensitization by HDAC inhibition mediated SUMOylation of DNA repair proteins in hepatocellular carcinoma



莊曜宇 教授
Eric Y. Chuang, Professor

國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學電機工程學系教授
國立臺灣大學生命科學系教授
國立臺灣大學流行病學與預防醫學研究所教授
國立臺灣大學生命科學院與中央研究院合辦-基因體與系統生物學學位學程教授
國立臺灣大學生醫電資所與中央研究院合辦-生物資訊學國際研究生學位學程教授
國立臺灣大學腫瘤醫學研究所教授
國立臺灣大學醫療器材研發中心副主任
國立臺灣大學基因體暨精準醫學研究中心-生物資訊暨生物統計核心實驗室主持人
中央研究院基因體中心特聘研究員
財團法人工業技術研究院生醫與醫材研究所副所長

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, Department of Electrical Engineering/ Department of Life Science/
Graduate Institute of Epidemiology and Preventive Medicine/ Genome and Systems
Biology Degree Program, College of Life Science/ Graduate Institute of Oncology,
National Taiwan University/ Taiwan International Graduate Program
Deputy Director, Research and Development Center for Medical Devices, National
Taiwan University
Principal Investigator, Bioinformatics and Biostatistics Core Lab, NTU Center of
Genomic and Precision Medicine
Joint Appointment Research Fellow / Genomics Research Center, Academia Sinica
Deputy General Director, Biomedical Technology and Device Research Laboratories,
Industrial Technology Research Institute, Hsinchu, Taiwan

生物晶片實驗室 Microarray Lab.

本研究室研究是以基因體學探討癌症形成機制為主軸。近年來基因晶片(DNA microarray)與次世代定序(Next-Generation Sequencing)已經被廣泛應用在同時觀察大量的基因表現，為研究特定基因調控極為方便、快速與可靠的方法。因此研究室的研究方向乃致力於增進基因晶片與次世代定序技術在生物醫學領域上的應用，研究範疇涵蓋晶片製備技術、影像擷取與分析、次世代定序資料分析、生物資訊學、應用工具與資料庫系統開發，以及利用基因晶片分析與次世代定序技術來解析致癌基因複雜的調控關係，探討基因表現或基因突變與細胞反應的關連。長遠的目標為藉由基因體研究找尋特定的癌症分子指標，將來作為癌症治療與診斷的標的。

The focus of our laboratory is using genomic approaches to investigate the mechanisms of carcinogenesis. DNA microarray and Next-Generation Sequencing (NGS) have been applied widely in simultaneously monitoring a large quantity of gene expression patterns and served as a convenient, quick, and reliable method to investigate specific gene regulation. Therefore, our lab devotes to the application of microarray and NGS technologies in the biomedical field. Interests in our laboratory include microarray fabrication, image capture and analysis, NGS data analysis, bioinformatics, development of application tools and database systems, and application of those techniques to identify the complicated regulatory mechanisms of cancer related genes, as well as the correlation between gene expression or gene mutation and cellular response. Our long-term goals are via genomic study to identify specific cancer molecules as biomarkers for the targets of cancer therapy and diagnosis.

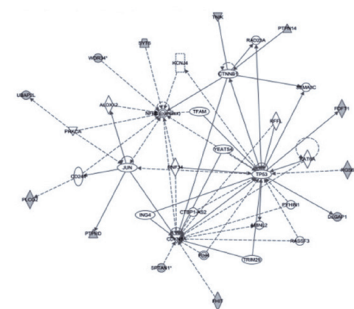
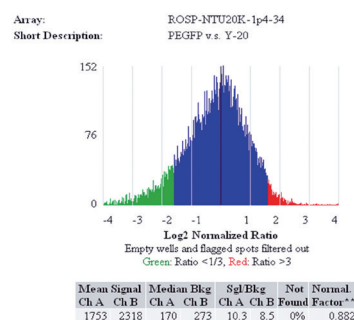
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NTUH (West site) laboratory Building B1 /
Department of Radiation Oncology

主要研究領域 Major Research Areas

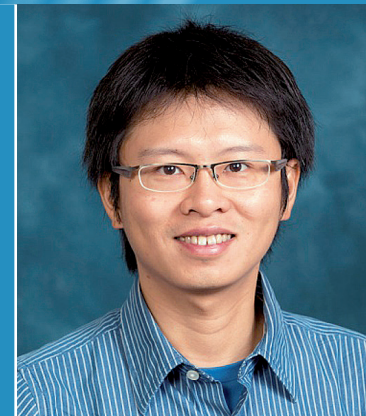
生物晶片、次世代定序、生物資訊、癌症生物、輻射生物、精準醫學
Biochip, Next-Generation Sequencing, Bioinformatics, Cancer Biology, Radiation Biology, Precision Medicine

研究計畫 Research Projects

1. 利用體學方法進行六輕附近居民暴露空氣污染物之風險評估 (財團法人國家衛生研究院)
Risk assessment of pollutants by omics approaches in people living near No. 6 Naphtha Cracking Plant
2. 食道癌合併多重癌症特徵及多面向生物標誌之探討 -- 利用總體基因組定序分析菌相探討食道癌合併多重癌症的菌相特徵與有潛力的生物標記 (科技部)
Metagenomic sequencing analysis to identify potential biomarkers in synchronous multiple primary cancers with esophageal squamous cell carcinoma
3. 探討 Semaphorin 6A 引發之免疫效果及其在肺癌免疫療法上之應用 (科技部)
Characterization of SEMA6A-derived immunity and its potential applications of immunotherapy in lung cancer, project period
4. 再生醫學科技發展計畫 - 幹細胞組織工程於氣管再生醫學之應用 (科技部)
Application of stem cell and tissue engineering in regenerative medicine of the trachea
5. 利用整合性基因群分析與舊藥新用策略尋找各乳癌亞型之最佳治療藥物 (財團法人國家衛生研究院)
Utilize Gene Set Analysis to Reposition Putative Drugs for Breast Cancer with Modulated Responses
6. 優勢重點領域拔尖計畫 - 基因體醫學研究中心 - 生物資訊暨生物統計核心實驗室 (邁向頂尖大學計畫)
Bioinformatics and Biostatistics Core Facility
7. 研究 SEMA6A 在肺癌所扮演的角色及探討其基因多型性在台灣地區非吸菸女性肺癌的重要性 (科技部)
To investigate the roles of SEMA6A in lung tumorigenesis and susceptibility-associated SNPs of SEMA6A in non-smoking female lung cancer
8. 覆氧時 NDRG1 受非編碼核糖核酸調控之機轉研究 (科技部)
Investigation of regulatory mechanism of NDRG1 by non-coding RNA upon reoxygenation



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黃念祖 副教授

Nien-Tsu Huang, Associate Professor

國立臺灣大學生醫電子與資訊學研究所副教授
國立臺灣大學電機工程學系副教授

Associate Professor, Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University
Associate Professor, Department of Electrical Engineering, National Taiwan University

光流體生醫系統實驗室

Bio-Optofluidic Systems Lab.

光流體生醫系統實驗室為黃念祖博士成立於 2013 年，隸屬於國立台灣大學電機工程學系和生醫電子與資訊學研究所。本實驗室主要研究為發展整合型微流體生物晶片 (Lab-on-Chip)，其晶片將微型化電子、光學、機械及流體等元件進行生醫領域相關應用，如細胞生物學、藥物篩選、快速疾病檢測，並期許將來能使用醫療資源較為匱乏環境之定點照護功能 (Point-of-care)。

Bio-Optofluidic System Lab is in the department of Electrical Engineering and the graduate institute of Biomedical Electronic and Bioinformatics at National Taiwan University, Taipei, Taiwan. Our lab is focusing on developing integrated electrical, optical and mechanical miniaturized fluidics and sensors for biological applications, such as cellular biology, drug screening, and disease diagnosis.

主要研究領域 Major Research Areas

生醫微機電、光微流道系統、微系統細胞操控、生醫感測、奈微米製造技術
Bio-MEMS, Optical-MEMS, Microfluidics, Bio-sensing, Cell Manipulation in Microenvironment, Micro/Nano Fabrication Techniques.

研究計畫 Research Projects

1. 研發整合微流道系統之超高解析度顯微鏡進行細胞主纖毛之力學與化學刺激反應研究
Determining mechanical and chemical stimulation responses of primary cilia with an integrated microfluidics-superresolution platform, sponsored by 國立臺灣大學與中央研究院, N.T. \$1,800,000, 2017/01/01-2018/12/31.

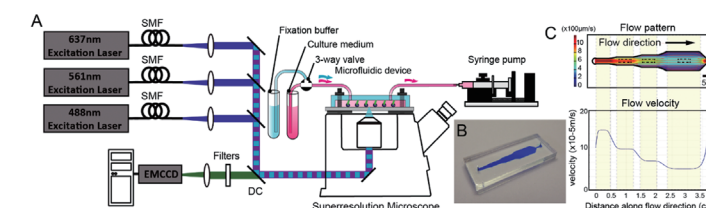


Fig. 1 The microfluidic platform to observe cilia mechano-response under various flow conditions



2. 整合奈米電漿子感測技術之多功能微流道系統開發與應用

The development of a multifunctional microfluidic integrated nanoplasmonic sensing platform, sponsored by 科技部 106-2221-E-002-058-MY3, N.T. \$ 3,158,000, 2017/08/01-2020/07/31.

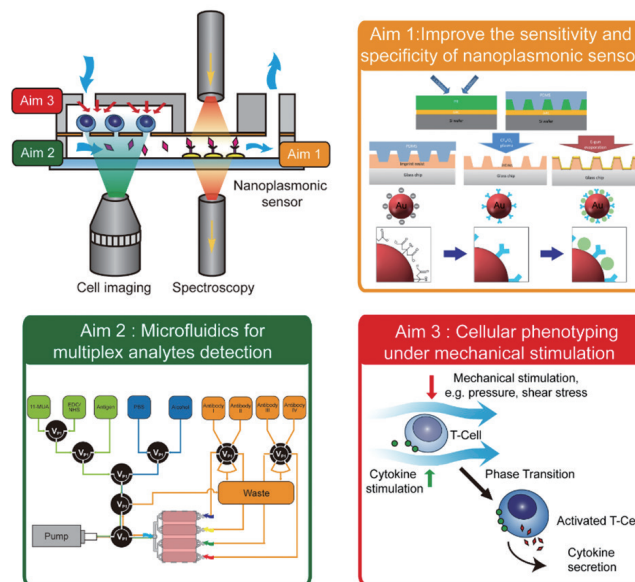


Fig. 2 The large-area nanoplasmonic sensor integrating automated microfluidic control system for a rapid and multi-parallel cytokine detection

3. 開發可進行快速全血處理及生化分子感測之多功能微流道系統

Developing a multi-functional microfluidic platform for rapid whole blood processing and simultaneous detection of multiple biomarkers', sponsored by 國立臺灣大學高教深耕計畫, N.T.\$ 2,680,000, 2018/06/01-2020/12/31.

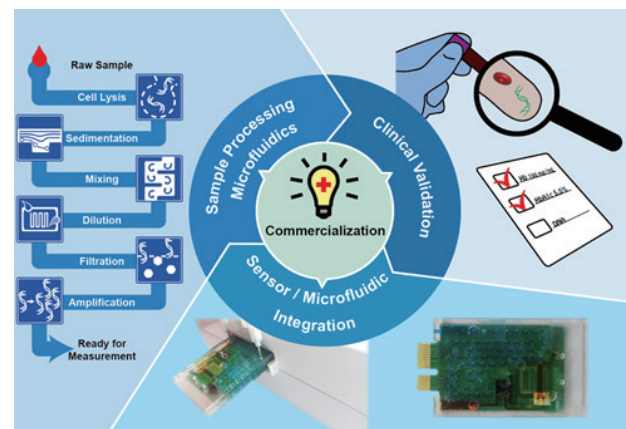


Fig. 3 Schematic of the project scope, including three major parts: whole blood processing modules, sensor/microfluidics integration and clinical validation

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鍾孝文 特聘教授

Hsiao-Wen Chung, Distinguished Professor

國立臺灣大學生醫電子與資訊學研究所特聘教授
國立臺灣大學電機工程學系教授

Distinguished Professor, Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University
Department of Electrical Engineering, National Taiwan University

醫用磁共振造影研究室

Magnetic Resonance in Medicine Lab.

成立於 2000 年 7 月，指導教授為鍾孝文教授，目前計有博士班研究生 6 名，碩士班研究生 3 名。博士班畢業生 29 名，碩士班畢業生 21 名。

Founded in July 2000. Supervisor: Prof. Hsiao-Wen Chung. This lab currently has 6 Ph.D. students and 3 M.S. student, plus 29 Ph.D. graduates and 21 M.S. graduates.





主要研究領域 Major Research Areas

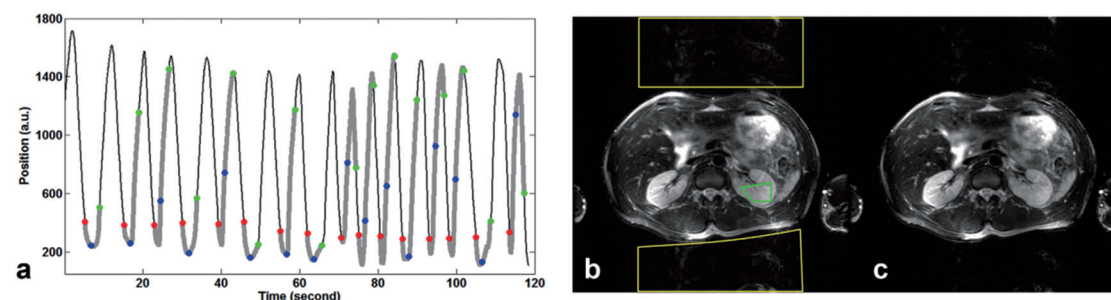
醫用磁振造影
Biomedical magnetic resonance imaging

研究計畫 Research Projects

1. 數據分享式螺旋槳多 b 值擴散磁振造影
Data sharing Propeller diffusion MR imaging with multiple b-values
補助單位：行政院科技部工程司
計畫期間：2015/8/1 ~ 2018/7/31
2. 自由呼吸式腹部主動脈動態磁振造影：使用加速式黑血快速自旋迴訊
Free breathing black-blood cine MRI of the abdominal aorta using accelerated fast spin-echo
補助單位：行政院科技部工程司
計畫期間：2016/8/1 ~ 2019/7/31

■ 代表圖及中英文說明：
使用快速自旋迴訊的自動呼吸校正技術：(a) 為呼吸狀態下之腹腔起伏位置，彩色點為不同切面的觸發點。
(b) 與 (c) 為其中一張影像切面使用二維傅立葉轉換與實驗群所提之疊代演算法重建結果比較。

Experimental results of respiratory-triggered abdominal fast spin-echo imaging: (a) shows the respiratory waveforms, with red, blue and green dots representing trigger points of three different slices. (b) and (c) are representative images of one slice reconstructed with 2D Fourier transform and an iterative method developed in our laboratory, respectively.



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Chieh-Hsiung Kuan, Professor

國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學電子工程學研究所教授
國立臺灣大學電機工程學系教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics/
Graduate Institute of Electronics Engineering/ Department of Electrical Engineering, National Taiwan University

電子束暨奈米元件實驗室

E-beam and Nano Device Lab.

- 電子束微影製程與電子束顯微鏡實驗室
(Direct-Writing Electron Beam Lithography System Lab., Scanning Electron Microscope Lab.)
- 聚焦離子束實驗室 (Focus Ion Beam Lab.)
- 微拉曼 / 光激發光光譜實驗室 (Micro-Raman/PL Spectral Lab.)
- 紅外線光譜實驗室 (Infrared Spectral Lab.)



Focus Ion Beam -FIB, 聚焦離子束設備



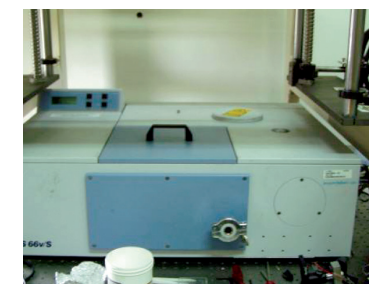
電子束微影系統(100KeV高加速電壓)



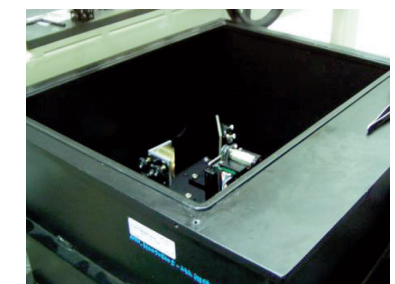
電子束微影系統(50KeV中加速電壓)



電子束顯微鏡與微影系統
(5KeV低加速電壓)

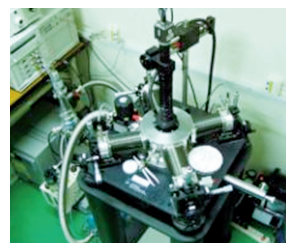


Bruker FTIR 紅外線光譜儀及變角度反射模組





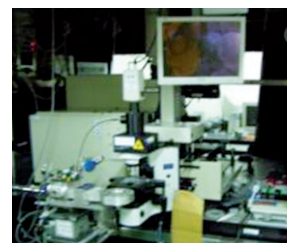
陸 | 實驗室及教師 Laboratories and Faculty



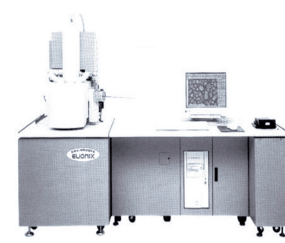
電晶體特性曲線實驗器



FTIR 紅外線光譜儀



T 64000微光譜量測系統
(含XY平面定位掃描功能)



電子束顯微鏡系統
(5KeV低加速電壓)

主要研究領域 Major Research Areas

紅外線光偵測器、發光二極體、太陽能電池、電子束微影技術、生醫元件、量子點元件、電子元件雜訊分析、光學模擬、聚焦離子束系統
Optoelectronic Device, E-beam Lithography, Noise Measurement, Bio-medical Chip, Quantum-dot Device, Optics simulation, Focused-ion-beam System

研究計畫 Research Projects

- 發展電子束微影技術與聚焦離子束技術於製作三維微結構
Development of eBeam Lithography technology and Focused-ion Beam technology for Three-dimensional Nano-fabrication
- 共振式太陽能電池 Resonant Solar Cell
- 發展奈米結構增強光偵測與光發射
Development of nano-structures to enhance light detection and emission
- 矽鍺量子點奈米級記憶元件及陣列之製作與研究
Nano-scale SiGe quantum-dot memory and array
- 可低偏高溫操作且正向頂面入射的超晶格紅外線偵測器及陣列的研發
Development of the Superlattice Infrared Photodetector and Array for Low-Bias High-Temperature Operation and Top Normal Incidence of Light
- 光譜與電性量測於基因篩選之應用
Application of spectrum and electrical signal measurements on gene screening
- 窄頻紅外線光源與偵測器及其在植物與神經細胞上的應用
- 離子的高敏感度交流電性量測並以紅外線頻譜作輔助分析 (2/3)
High-sensitivity AC electrical signal measurement and infrared spectrum assistant analysis originated from ions
- 整合雙能障超晶格及量子井紅外線偵測器以達到高偵測率高響應及高溫操作
Integration of double-barrier superlattice and quantum well infrared photodetectors for advantages of high detectivity, high responsivity, and high-temperature operation
- 平面型寬頻消色差超穎透鏡
Broadband achromatic optical metasurface devices

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細胞行為實驗室

Cell Behavior Lab.

本實驗室主要研究細胞物理學、力學生物學的基礎原理以及相關臨床運用。力學生物學為一新興的跨領域學科，主要探討與力學訊息相關的生物反應。力學訊息目前被認為與多種生理及病理過程有強烈相關，包括組織生成、傷口癒合、血管新生、動脈硬化、心肌肥大、以及腫瘤進展等。因為相對僅能靠擴散方式作用的化學物質而言，力學訊號的作用範圍更遠，傳遞速度也較快。因此在大範圍組織整合過程，包括組織發育、修補、以及退化、惡化，光學訊號可能扮演了具有相當決定性的角色。我們特別對壓力對生物體的影響、生物體如何利用力學訊息通訊、並互相調節功能、以及改造周遭力學環境有興趣。我們研究重點是同質細胞間的自我聚合及功能整合，以及異質細胞間的空間協調。我們的短期目標是發展出能精確測量、並調控細胞與細胞間、以及與介質間力學通訊的實驗平台。遠程目標則是促進吾人對異質細胞間在各種生理、病理狀態下的交互作用，並對組織老化及再生的治療方針上有所啟益。目前本實驗室的研究主題為

- 壓力在細胞生理學以及生物物理學的角色
- 利用生物微機電技術製作可供研究細胞間通訊、以及多重物理因子對細胞生理影響肢體外實驗平台
- 建立可監控細胞與環境力學互動之三維體外實驗平台，並探討該平台在臨床上如藥物篩檢等應用
- 建立臨床上可用於監測及治療緻密結締組織，如肌腱及韌帶，力學功能失常時之非侵入性工具及技術

Mechanobiology is a new field focusing on understanding how living organisms generate, sense, and respond to various mechanical stimuli, which are believed to play a key role in numerous physiological and pathological processes, such as tissue development, tissue repairing, atherosclerosis, cardiac hypertrophy, and cancer progression. My researches primarily focus on the fundamental mechanisms and clinical applications of mechanobiology. Specifically, we investigate the effects of hydrostatic pressure and environmental elasticity on cell physiology, how cells remodel the mechanical properties of their environment, and develop tools quantitatively evaluate the mechanics of cell-matrix interactions. Our previous achievements and ongoing projects include

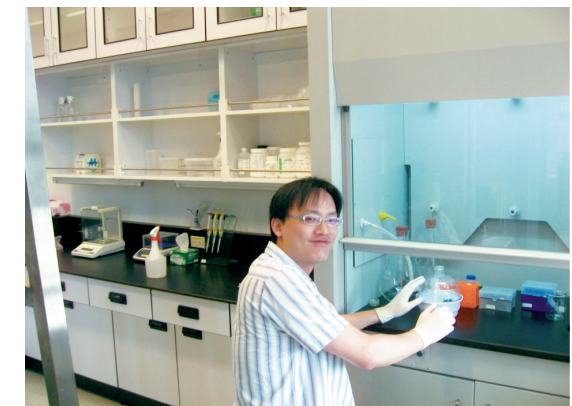


主要研究領域 Major Research Areas

生物物理、力學生物學、生物力學、組織工程、醫用超音波
Biophysics, Mechanobiology, Biomechanics, Tissue engineering, Medical ultrasound

研究計畫 Research Projects

1. 靜水壓力對肌母細胞型態及分化影響
2. 智慧型非侵入陣列式血流監控系統晶片 -- 子計畫六：以非侵入陣列式系統晶片監控頸動脈血流動力—力學模型及臨床評估
3. 經濟部政策型科專計畫：診斷超音波系統關鍵技術開發 3 年計畫—影像核心平台基礎技術開發
4. 用於肌腱治療之超音波剪力影像
5. 萌芽個案計畫 – 三維細胞培養系統與影像觀測技術
6. 三維折射率活細胞顯微術
7. 適用多波影像之三維細胞培養支架開發
8. 物理性刺激對細胞運動影響的定量研究
9. 肝硬化動物模式替代方案 – 小鼠肝臟星狀細胞之多孔道微流培養系統
10. 使用剪力波彈性影像之三維體外肺癌力學生物學研究系統之開發
11. 萌芽個案計畫 – 用於三維細胞培養系統之剪力波彈性量測設備之設計驗證、樣機製作與應用推廣
12. 剪力波斷層掃描影像儀：技術創新與治療應用 (重點主題 :C3) - 子計畫二：組織纖維化—組織間質流體壓力與組織彈性之體外模型



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統計信號處理實驗室

Statistical Signal Processing Lab.

本實驗室由李枝宏教授負責成立於 1986 年，主要研究領域為數位信號處理之理論與技術研發，近年來也積極進行應用數位信號處理之理論與技術於生醫領域之相關研究，包含：

1. 由國立臺灣大學醫學院骨科部提供人體膝關節病變與運動傷害所產生之振動訊號，應用相關信號處理理論研發建立此振動訊號之數學模型的技術，以協助臨床上分析診斷人體膝關節病變與運動傷害之型態與種類，以期提供醫生進行正確且必要醫療措施所需之資訊。
2. 由國立臺灣大學獸醫學系提供馬匹膝關節病變與老化所產生之振動訊號，應用相關信號處理理論研發建立此振動訊號之數學模型的技術，以協助臨床上分析診斷馬匹膝關節病變與老化之型態與種類，以期提供獸醫生進行正確且必要醫療措施所需之資訊。
3. 由國立臺灣大學醫學院牙科部提供人體顫顎關節病變所產生之振動訊號，應用相關信號處理理論研發建立此振動訊號之數學模型的技術，以協助臨床上分析診斷人體顫顎關節病變之型態與種類，以期提供醫生進行正確且必要醫療措施所需之資訊。目前進行的研究希望利用此特性進而更精確的找出膝關節振動訊號的特徵，進而發展實用簡單方便的非侵襲性關節診斷系統。

I. Basic Digital Signal Processing:

- (1) Techniques for the Design and Implementation of 1-D and 2-D FIR and IIR Digital Filters.
- (2) Techniques for Design and Implementation of 1-D and 2-D FIR and IIR Digital Filter Banks (Multi-rate Digital Signal Processing)

II. Statistical Digital Signal Processing:

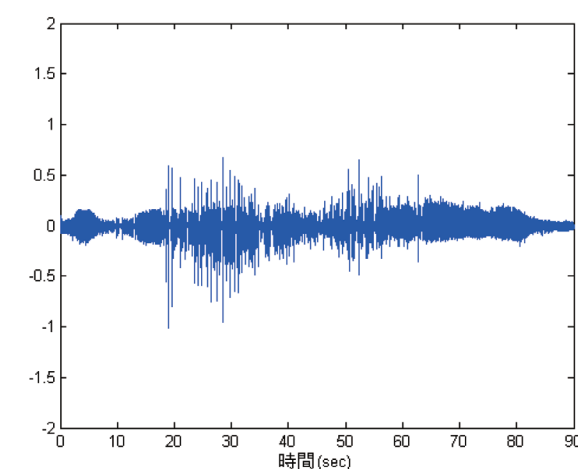
- (1) Adaptive Signal Processing for Array Signals
- (2) Adaptive Array Beamforming Under Random Mismatches
- (3) Adaptive Array Bearing Estimation Under Random Mismatches
- (4) Adaptive Beamforming Using 2-D Circular Array for Wireless CDMA Systems
- (5) Adaptive Minimum Bit Error Rate Beamforming Assisted Receiver for Wireless Communications
- (6) Adaptive Signal Processing Techniques for Smart Antennas with Applications in Wireless and Mobile Communications

III. Processing and Analysis of Biomedical Signals:

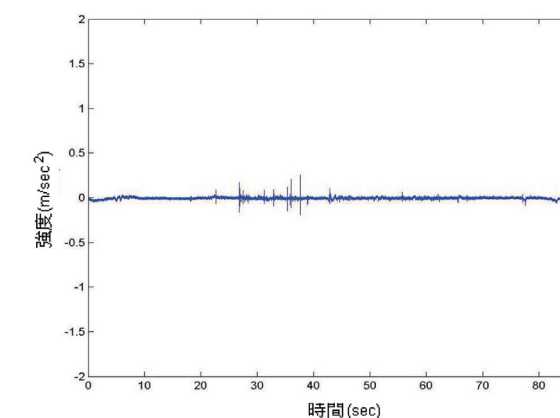
Analysis and Processing of Joint Vibration Signals for the Diagnosis of Cartilage Pathology

- (1) Signal Processing Techniques for Vibration Signals of Human Knee Joints
- (2) Signal Processing Techniques for Vibration Signals of Equine Knee Joints
- (3) Signal Processing Techniques for Vibration Signals of Human temporomandibular joints

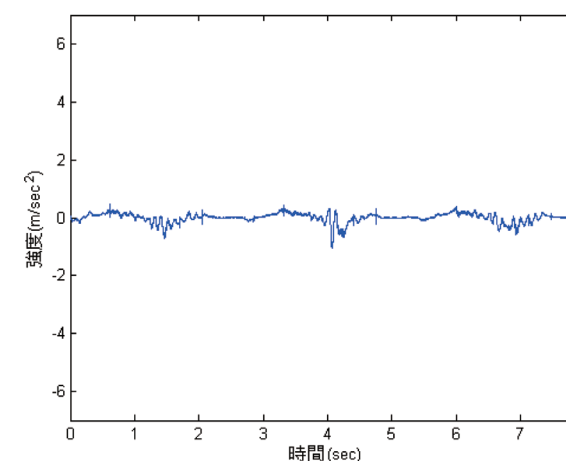
Goal of this research: To conduct research on Vibration Arthrometry (VAM) and provide the public a noninvasive, accurate tool (Expert Systems) for the diagnosis of joint disorders in clinical medicine.



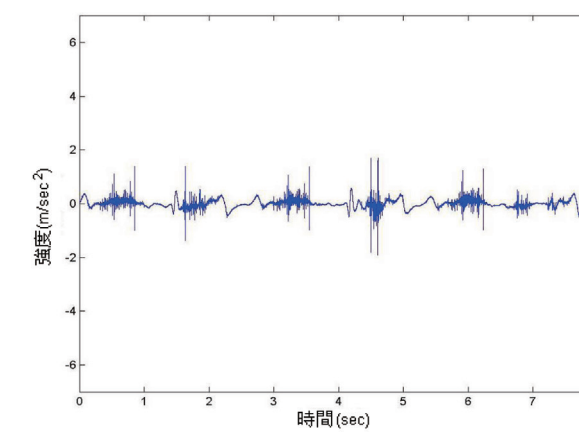
(A) 正常著膝關節在慢速擺動下所產生的振動訊號
(Physiological Patellofemoral Crepitus; PPC)



(B) 非正常著膝關節在慢速擺動下所產生的振動訊號
(Physiological Patellofemoral Crepitus; PPC)



(C) 正常著膝關節在快速擺動下所產生的振動訊號
(Vibration Arthrometry; VAM)



(D) 非正常著膝關節在快速擺動下所產生的振動訊號
(Vibration Arthrometry; VAM)



主要研究領域 Major Research Areas

數位信號處理、智慧型天線與無線通訊信號處理、生醫信號處理、數位影像處理
Digital Signal Processing, Signal Processing for Smart Antennas and Wireless Communications, Biomedical Signal Processing, Digital Image Processing

研究計畫 Research Projects

1. 應用於視訊信號處理之二維副頻帶濾波器組之設計 (Design of Two-Dimensional Subband Filter Banks with Applications to Video Signal Processing), 行政院國家科學委員會, NSC 97-2221-E-002-116-MY3, NT\$650000.00, 2008/8 ~ 2011/7.
2. 應用於通訊環境下可適性陣列信號處理理論與技術之研究 (Theory and Techniques for Adaptive Array Signal Processing Under Communication Environments), 行政院國家科學委員會, NSC 97-2221-E-002-174-MY3, NT\$890000.00, 2008/8 ~ 2011/7.

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紅外線元件實驗室

IR Device Laboratory

本實驗室開發之多波段熱輻射紅外光源 (圖一), 俱有偏極化、窄頻寬、可調變多波長之特性。窄頻紅外光源成功地應用在觀察紅外光對植物生長基因表現, 和影響癌細胞生長變化的研究。善用窄頻紅外光源, 我們可研究動植物細胞持續受到特定波段紅外光照射時, 其成長型態、基因表現, 以及所有蛋白質表現的增減變化。近期已將窄頻多波長紅外光源應用於氣體 (酒精) 偵測系統 (圖二), 成功達成不同濃度酒精之雙波長偵測 (圖三)。

研究成果發現 4~5 μm 紅外光照射大腸桿菌 24 小時, 可刺激外膜蛋白 (OmpA, OmpF) 表現量, 增強新陳代謝和菌落生長, 結果如同圖四所示。阿拉伯芥經過 3~5 μm 窄頻紅外光照射 72 小時後, 分析 GASA4、CHS、RbcS、NPQ4 和 PSAK 基因, 發現不同波段窄頻紅外光可影響生長型態和基因表現。照射 3~5 μm 寬頻紅外光 48 小時的肺腺癌細胞 A549, 生長受到明顯抑制, 細胞明顯膨大和停滯於細胞週期 G2 與 M, 結果如同圖五所示。3~5 μm 窄頻紅外光照射子宮頸癌細胞 HeLa 48 小時, 可破壞粒線體膜電位和增加細胞凋亡, 加強化療藥物 Paclitaxel 的療效。除了癌症治療的應用外, 近期窄頻紅外光結合免疫治療的策略在致病細菌 (鉤端螺旋體) 上可以增強在低濃度病菌下本來微弱的免疫反應, 在窄頻紅外線照射下可以馬上使宿主細胞察覺附近有病原體存在迅速募集單核細胞、T 細胞免疫細胞前來滅菌, 此方法可以克服目前濫用抗生素產生的抗藥性與超級細菌之問題 (圖四)。

本實驗室近期最大的突破性研究為結合紅外線技術在嗅覺上的新發現, 此一新理論可以補強傳統上嗅覺形狀理論與振動理論上不足的缺點, 此成果兼具工程與生活應用以及尖端科學研究之意義 (圖五)。

Our lab has developed the multi-wavelength thermal emitter with narrow bandwidth, polarization, tunable wavelength characteristics, as shown in Fig. 1. It has been applied to investigate the effects of IR radiation on plant growth and cancer cell physiology. Furthermore, narrow band IR emitters can be used to compare growth morphology, gene and protein expression under specific wavelengths of IR radiation. The IR light source was also applied in a NDIR gas (alcohol) detection system, as shown in Fig. 2. Dual-wavelength detection of different concentrations of alcohol has been successfully achieved, as shown in Fig. 3.

The 3~5 μm IR radiation can induce cell dilation and G2 /M cell cycle arrest in lung cancer A549 cells at 48 hour. Moreover, we found that the narrow band infrared radiation with peak wavelengths of 3, 4, and 5 μm for 48 hours can damage mitochondrial membrane potential and cellular apoptosis to enhance the effectiveness of paclitaxel treatment on cervical cancer HeLa cells. In addition the significant impact on cancer cell by mid-infrared (MIR) radiation, the effects of narrow band MIR on immune reaction and infectious disease are still unknown. Recently, an enhanced innate immune response was observed through the interaction between Leptospiral outer membrane protein (LipL32) and toll-like receptor 2 (TLR2). A specific phenomenon that narrow band MIR can amplify the signal of weak immune response by enhancing sensitivity of the interaction between antigen and receptor was observed (Fig. 4).



Narrow bandwidth infrared light sources with specific wavelengths were utilized to illuminate and excite molecular bond oscillation of the odorant molecules. This study also supported the hypothesis of the "spin residual information theory" that the olfactory perception is aroused by the "residual spin information" of infrared photons left near the odor and receptor molecular bonding sites which absorbed or emitted the infrared photons (Fig. 5).

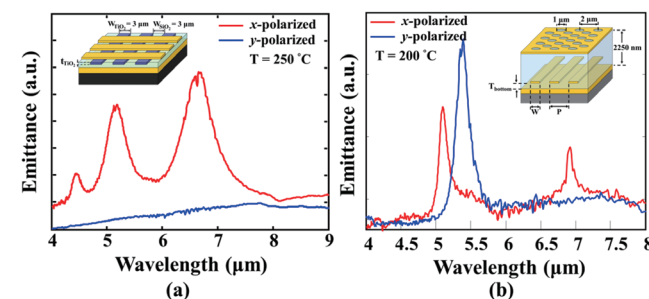


圖 1 多波長且具偏極化特性之 (a) 侷域電漿子型和 (b) 波導型窄頻熱輻射紅外光發射器與其發光頻譜

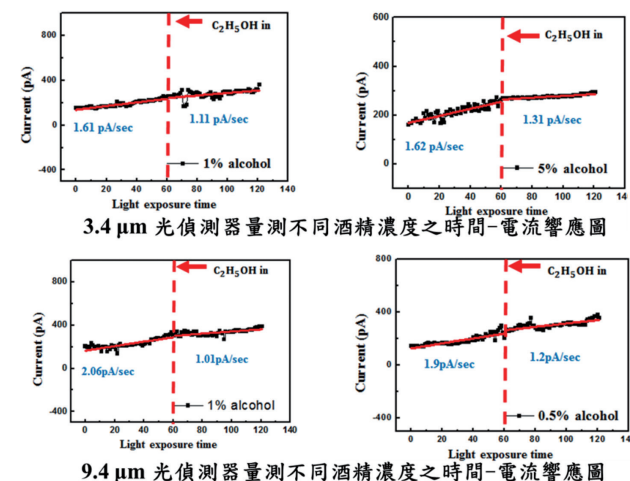


圖 3 氣體偵測系統對待測目標物 (酒精) 所得之量測結果

■ 研究成果：

1. 多波段紅外光源與偵測器成功應用於氣體 (酒精) 偵測系統。
2. 窄頻中紅外光成功應用於細胞免疫治療及時讓宿主偵測到病菌存在並進行消滅動作，此方法有助於免疫治療發展以取代抗生素治療伴隨抗藥性問題。
3. 窄頻中紅外光成功發展隨意調控氣味之突破。

研究計畫 Research Projects

1. 前瞻技術產學合作計畫 - 7-5nm 半導體技術節點研究 (5/5)
Pathfinding for 7-5nm Semiconductor Technology Nodes

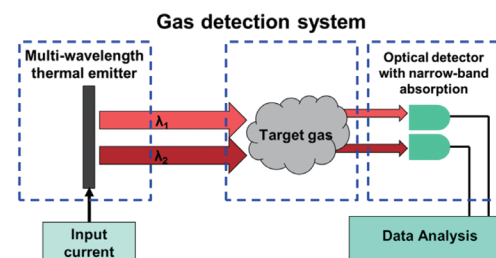


圖 2 氣體 (酒精) 偵測系統結構示意圖

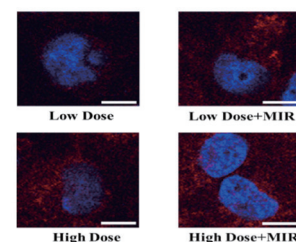


圖 4 低濃度病菌感染於螢光顯微鏡觀察發現窄頻中紅外光可增強免疫反應

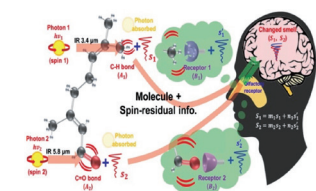


圖 5 特殊波長中紅外光可以任意調控氣味分子味道

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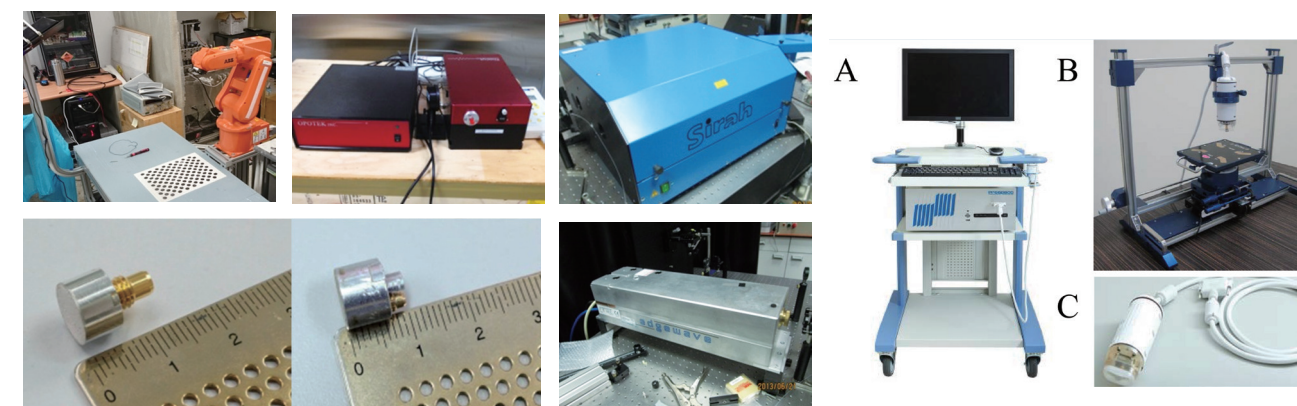
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Distinguished Professor, Department of Electrical Engineering and Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University
Adjunct PI, National Health Research Institutes

超音波影像實驗室

Ultrasonic Imaging Lab.

本實驗室由李百祺教授成立於 1997 年，主要從事醫學電子與影像物理相關研究，目前以生醫超音波技術與光聲影像等領域為研究重點。本實驗室在上述領域已產出許多具體貢獻並在全世界有很高之能見度。此外，本實驗室之成員來自電子、資訊、工程、生命科學及醫學等各領域，多年來亦積極與國內外單位進行合作，合作夥伴包括產、研、學各界，領域更涵蓋基礎科學、工程技術與臨床研究。跨界整合研究資源，致力前瞻生醫科技研究，提升健康與醫療品質，是本實驗室之成立宗旨與具體目標。

Ultrasonic Imaging Laboratory was founded by Professor Pai-Chi Li in 1997, with the main research focus in biomedical electronics and imaging physics. In the past few years, we have conducted a number of research projects in biomedical ultrasound and photoacoustic imaging. We have also made several critical contributions and are now one of the most visible research laboratories in this field in the world. Members of the lab come from various backgrounds, including electronics, informatics, engineering, life sciences and medicine. We have also been actively collaborating with research labs throughout the world, covering industry, research institutes and universities, from basic sciences, engineering to clinical research. Integrating multi-disciplinary research efforts, exploring advanced biomedical technologies, and improving healthcare quality is the mission of this lab.





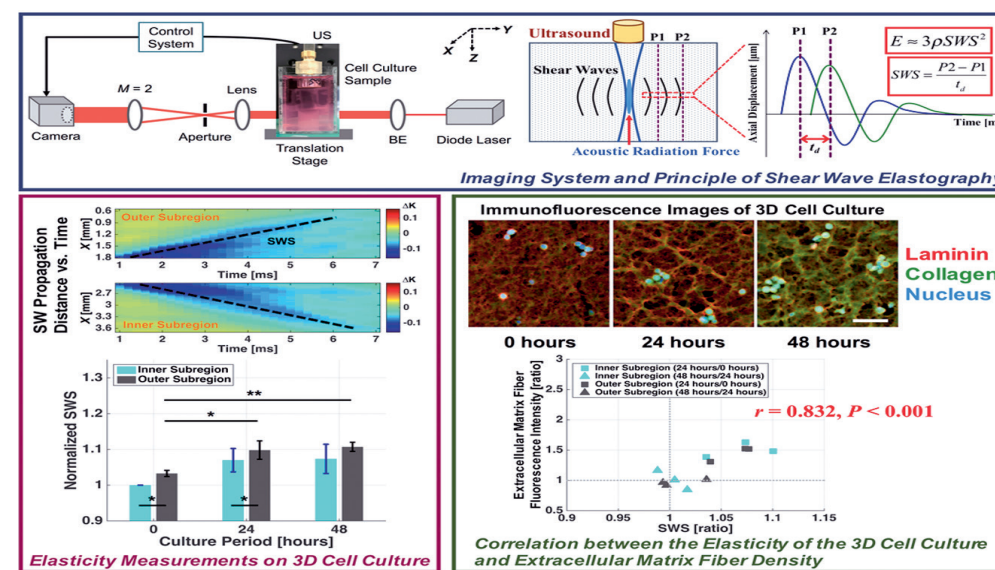
主要研究領域 Major Research Areas

生物醫學工程、超音波影像、生醫光聲影像
Biomedical Engineering, Ultrasound Imaging, Biomedical Photoacoustics

研究計畫 Research Projects

1. 光學式彈性成像技術開發與三維細胞研究應用
Optical Shear Wave Elasticity Imaging and Applications to 3D Cell Studies
2. 高階診斷超音波系統商品化與事業化計畫
Development and integration of high-end diagnostic ultrasound systems
3. 發展微流道三維細胞培養系統以進行運用金奈米液滴之光熱治療研究
Microfluidic 3D cell culture systems for studying photothermal therapy using gold nanodroplets
4. 高教深耕計畫特色領域研究中心—電子科技整合研究中心子計畫二【阻塞性睡眠呼吸中止症之影像與分子診斷】
5. 使用漏溢聲波之超音波介入引導
Ultrasound Guided Interventions Using Leaky Acoustic Waves
6. 高解析度超音波掃描系統之測試物件開發

■ 研究計畫 - 光學式彈性成像技術開發與三維細胞研究應用 Optical Shear Wave Elasticity Imaging and Applications to 3D Cell Studies 之代表圖及說明：



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Lab.: 明達館 731 (MD-731)



李心予 教授
Hsinyu Lee, Professor

國立臺灣大學生醫電子與資訊學研究所 教授
國立臺灣大學電機工程學系 教授
國立臺灣大學生命科學系 教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University
Professor, Department of Electrical Engineering, National Taiwan University
Professor, Department of Life Science, National Taiwan University

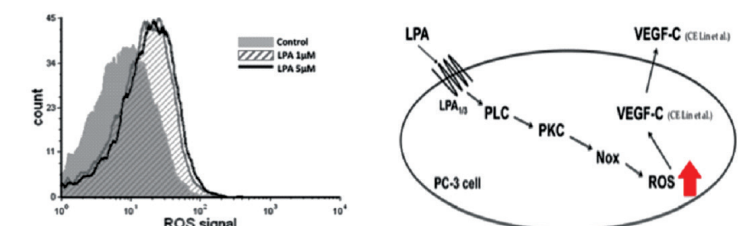
內皮細胞分子生物學實驗室

Laboratory of Endothelial Cell Molecular Biology

Research on Lysophospholipids

Lysophosphatidic acid (LPA) and sphingosine 1-phosphate (S1P) are two low molecular weight lysophospholipids (LPLs) highly enriched in serum. They are derived from enzymatic cleavage of membrane phospholipids. Through the efforts of my laboratory, we have demonstrated that LPLs enhance endothelial cell proliferation, migration and secretion of proteases. These observations strongly suggested that LPLs are regulators for vessel formation. In addition, LPLs also enhance ICAM-1 expression, CD31 phosphorylation and IL-8, MCP-1 secretion from endothelial cells through activating specific G-protein coupled receptors. These results suggested that LPLs are important regulators for inflammation processes. Our most recent findings suggested that LPA is also an important regulator for lymphatic vessel development. These results strongly suggested that LPA might be an important regulator for cancer metastasis. LPLs are also demonstrated by our laboratory to be important regulators for tumor development and cancer cell survival. Therefore, we expanded our research to LPL biology in different cancer models.

■ 右圖說明：
Lysophosphatidic acid induces reactive oxygen species generation by activating protein kinase C in PC-3 human prostate cancer cells
Biochem Biophys Res Commun. 2014. 440(4):564-9



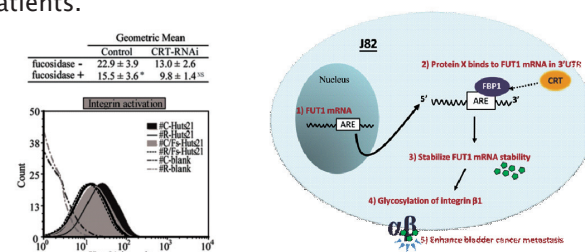


Research on Cancer cell biology

Through collaboration with colleagues at NTU hospital, we extended our research to identify neuroblastoma and hepatoma related cancer markers and exploring their potential roles in tumor formation. Calreticulin (CRT) was therefore identified as an important target. Based on these observations, we further explore the roles of CRT in bladder tumor development. Our results demonstrated that alteration of CRT levels affected cell adhesion and metastasis in bladder cancer. Furthermore, we observed that CRT regulated cell adhesion through modifying $\alpha 1,2$ -linked glycan on $\beta 1$ -integrin, which was catalyzed by fucosyltransferase 1 (FUT1). Most importantly, we made a novel finding that higher levels of fucosylation catalyzed by FUT-1 directly activate $\beta 1$ -integrin. Moreover, mechanistic investigation demonstrated that CRT affected FUT1 levels through regulating mRNA stability. Our results may provide a potential clinical treatment strategy for bladder cancer patients.

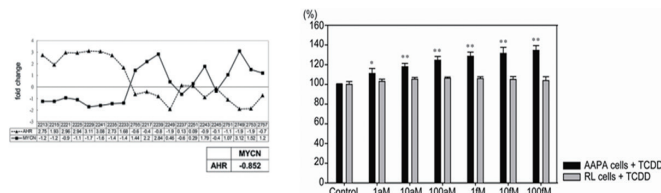
■ 右圖說明：

Calreticulin activates $\beta 1$ integrin via fucosylation by fucosyltransferase 1 in J82 human bladder cancer cells
Biochem J. 2014 May 15;460(1):69–78



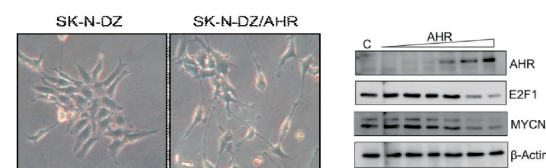
■ 右圖說明：

Aryl Hydrocarbon Receptor Down-regulates MYCN Expression and Promotes Cell Differentiation of Neuroblastoma PLoS One. 2014 Feb 21;9(2):e88795.



Dioxin detection systems and bioassay development

In the past ten years, our laboratory has intensively exploring the possibility of developing more sensitive and low cost bioassay for dioxin like compounds. Two assays, including FRET and BRET based dioxin detection systems were developed.



■ 上圖說明：

Establishment of a cell-free bioassay for detecting dioxin-like compounds
Toxicol Mech Methods. 2013 Jul;23(6):464–70

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林致廷 教授
Chih-Ting Lin, Professor

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國立臺灣大學電機工程學系 教授
國立臺灣大學電子工程學研究所 教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University
Professor, Department of Electrical Engineering, National Taiwan University
Professor, Graduate Institute of Electronics Engineering, National Taiwan University

生醫晶片技術實驗室

CMOS Biotechnology Lab.

本實驗室成立於 2006 年，主要研究方向為電子生醫晶片技術相關研究，目前以生物分子檢測技術、微細胞監測晶片技術、軟性電子材料與無線感測器網路系統等領域為研究重點。進一步的說明，整合現今蓬勃發展的奈微米製程科技與傳統生物科學知識，可以發展出極具應用及發展潛力之關鍵性跨領域技術，因此，本實驗室致力於開發不同之生醫電子應用晶片與系統，期能在相關領域獲得良好之成果與能見度。本實驗室之成員來自電機系、機械系及醫工等工程相關領域，以此為基礎，積極與生醫相關領域學者進行合作，合作領域及研究範疇涵蓋基礎科學、工程技術與臨床研究等。

A series of bio-chemical molecular sensors can be developed by utilizing nano-scale electrical devices. Based on the superior fabrication facilities and skills in Complementary Metal-Oxide-Semiconductor (CMOS) and Nano/Micro Electro-Mechanical System (N/MEMS), moreover, micro protein sensor arrays technologies and living cell monitoring systems are also envisioned to be an exciting research direction. In summary, our research is aiming at developing innovative and integrated systems for nano/bio research fields.





主要研究領域 Major Research Areas

奈微米生物機電系統、生物晶片、生物分子量測技術、奈米製程技術、生物微感測器、軟性噴墨電子技術
Bio-NEMS, Bio-Chip, Nano fabrication, Biomolecular Detection Technology, Inkjet Printing Organic Electronics

研究計畫 Research Projects

1. 有機電子噴墨技術與標準半導體電子製程技術整合之異質三維系統晶片架構之研發 (NSC 101-2628-E-002-022-MY3)
2. 噴墨式高介電質有機材料之開發及應用元件之研發 (MOST 104-2628-E-002-014-MY3)
3. 低維度奈米結構於固液界面之表面位能檢測技術之研發與應用 (MOST 105-2221-E-002-232-MY3)

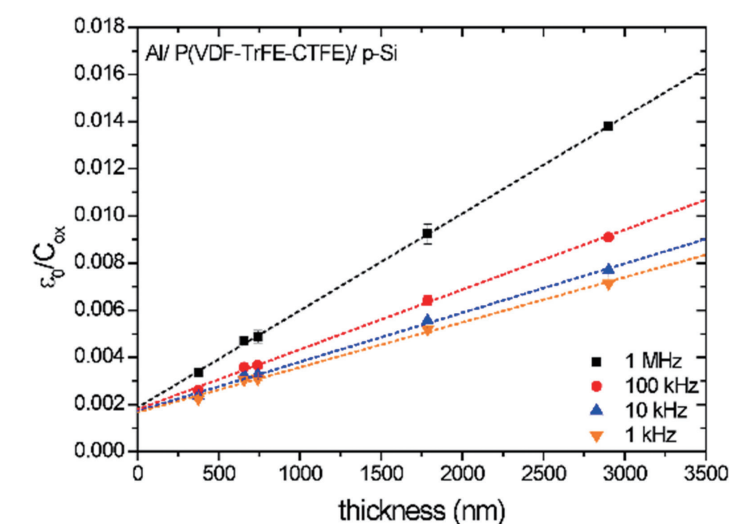
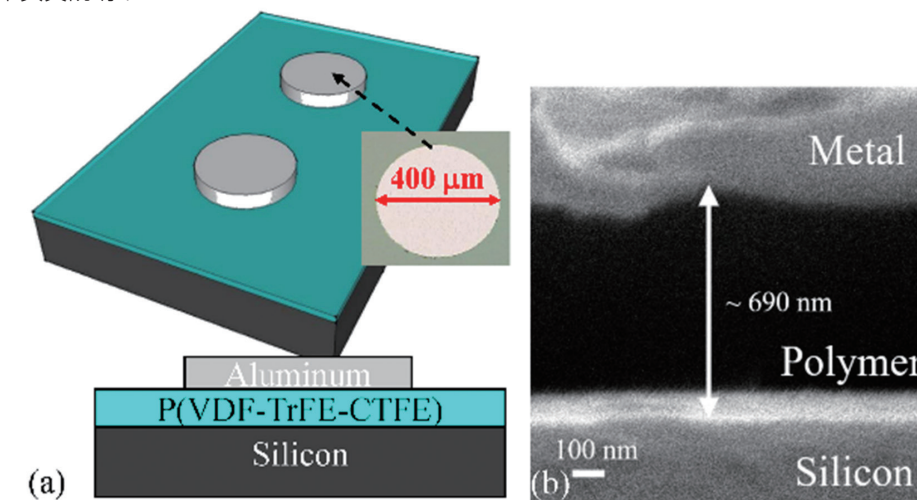
■ 研究計畫：噴墨式高介電質有機材料之開發及應用元件之研發
補助單位：行政院科技部
計畫期間：2015/08/01 - 2018/07/31

介電質材料 (dielectric material) 由於可以用於控制或儲存電荷與能量，並且也是電子產品或電力系統中關鍵的材料，如場效電子元件特性除了與基本半導體材料有關之外，最重要的即為介電質材料，亦即一個理想的場效電晶體需要擁有高的電流調變能力 (on/off ratio) 與較佳的次臨限擺幅，可利用高介電常數可以提升有機薄膜電晶體之電流調變能力及次臨限擺幅。因此，利用 P(VDF-TrFE-CTFE) 做為閘極絕緣材料用以改善閘極對於汲極電流的調變能力對於未來有機薄膜電晶體的發展是一個可行方向。本研究計畫目的在整合自製自動化有機材料噴墨系統、電子電路系統設計與奈微米有機材料元件的製作能力，以可噴印式高介電質有機材料研發為基礎，利用整合性自動化有機噴墨系統於可撓式基板上發展具低成本及高性能之有機薄膜元件，用以因應未來可撓性有機電子產業的需求與應用。

Project title: The development of inkjet printable devices based on P(VDF-TrFE-CTFE)
Supported by: Ministry of Science and Technology
Project period: 2015/08/01 - 2018/07/31

Dielectric material is one of the most important materials in electronics because it can be used to control and storage charges and electrical potential. This project aims to develop an inkjet-printable high-k dielectric material, P(VDF-TrFE-CTFE), for different kinds of organic field-effect devices, such as transistor and memory. To achieve this goal, this project integrates a self-construct inkjet-printing system, micro/nano fabrication technologies, and semiconductor device designs to implement a series of inkjet-printing, low-cost, and high-performance organic thin film devices on flexible substrates for future applications in flexible organic electronics. Within three years, this project aims to achieve 1. Inkjet-printable high-k dielectrics for organic thin film devices; 2. An inkjet-printing flexible non-volatile memory device based on the developed high-k dielectrics; 3. An inkjet-printing logic circuit implemented with a flexible substrate; 4. Implement a flexible-integrated circuit based on the developed inkjet-printing materials and technologies.

代表圖及中英文說明：



左圖為 PVDF-TrFE-CTFE 有機高介電材料電子顯微鏡照片；右圖為介電特性對材料厚度與頻率的作圖。

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Lab. : 電機二館 450 (EE2-450)



林啟萬 教授

Chii-Wann Lin, Professor

國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學醫學工程研究所教授
國立臺灣大學電機工程學系教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics/
Graduate Institute of Biomedical Engineering/
Department of Electrical Engineering, National Taiwan University

醫用微感測器暨系統實驗室

Medical Micro Sensor and System Lab.

本實驗室致力於配合醫療儀器認證與驗證法規之推動與精神體現，以微機電技術與光學感測方式進行生醫奈微米微感測器元件與系統整合之研究與應用－包括表面電漿共振 (surface plasmon resonance) 原理，表面電漿子感測器設計、微型系統整合、軟硬體介面溝通，主旨在於發展快速、便利、正確、與人性化醫用感測儀器，以促進個人化醫學 (personalized medicine) 與電子化醫療 (e-health) 之研究與產業發展。

We have devoted to apply microfabrication technologies and optical sensing mechanisms to develop nano/micro sensors and integrated system for the medical applications with compliance of medical device regulations and standards. Our research currently focus on the theoretical development for novel Surface Plasmon Resonance (SPR) devices, design of SPR nano/micro sensor, bioplasmatics, and the heterogeneous integration of micro-system from hardware to software. The aim is to develop the fast diagnosis, easy to use, and user-friendly medical devices toward the success of personalized medicine and e-health.



2015 年校友回娘家參訪新實驗室

主要研究領域 Major Research Areas

生物微感測器與系統、生醫晶片、生醫光電、類神經網路、醫材法規
Bioelectronics, Biomedical Micro sensors and System, Biochip, Biomedical Optics, Artificial Neural Networks, Regulatory Affairs

研究計畫 Research Projects (103學年度：1030801-1050731)

1. 針對大腸腫瘤及淋巴結轉移的早期發現和清除的光電醫學診斷與治療關鍵問題研究 102-2218-E-002 -014-MY3
2. 無線充電高頻脈衝電刺激貼片於腕隧道症候群之應用研發 102-2320-B-002 -040 -MY2
3. 國立臺灣大學萌芽創業推廣計畫－拋棄式表面電漿子共振晶片原型開發與前臨床驗證 103-2812-8-002-003-
4. 以軟體鎖相偵測與智慧手機實現無所不在的表面電漿子共振生物感測平台 MOST 105-2221-E-002 -016 -MY3

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陸 | 實驗室及教師 Laboratories and Faculty

孫啟光 教授

Chi-Kuang Sun, Distinguished Professor



國立臺灣大學生醫分子影像研究中心 核心實驗室召集人
國立臺灣大學生醫電子與資訊學研究所 特聘教授
國立臺灣大學光電工程學研究所 特聘教授
國立臺灣大學電機工程學系 特聘教授
國立臺灣大學醫療器材與影像研究所 教授
中央研究院應用科學研究中心 合聘研究員
中央研究院物理研究所 合聘研究員

Head of Core Laboratory, Molecular Imaging Center, National Taiwan University
Distinguished Professor, Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University.
Distinguished Professor, Graduate Institute of Photonics and Optoelectronics, National Taiwan University.
Distinguished Professor, Department of Electrical Engineering, National Taiwan University.
Professor, Institute of Medical Device and Imaging, National Taiwan University
Adjunct Research Fellow, Research Center for Applied Sciences, Academia Sinica.
Adjunct Research Fellow, Institute of Physics, Academia Sinica.

光學分子影像核心實驗室

Optical Molecular Imaging Core Lab.

本實驗室在致力於發展非侵入式光學顯微分子影像術，以於臨床受試者或活體動物體內取得三維深層次微米解析之次細胞級影像。所發展之獨特技術包含倍頻顯微術、超解析雙光子顯微術、雙光子聲光顯微術等。所發展的技術，可於臨床受試者皮膚與黏膜內，在無傷害且不須染色切片的情況下，直接取得病理切片級的光學顯微影像（稱之為光學虛擬切片影像），並將此技術應用於腦神經連結影像、早期癌症檢測、次微米活體臨床神經影像、與術前、術中、術後之臨床即時檢測、手術邊緣鑑定與療效追蹤。

主要研究領域 Major Research Areas

主要研究領域 Major Research Areas：

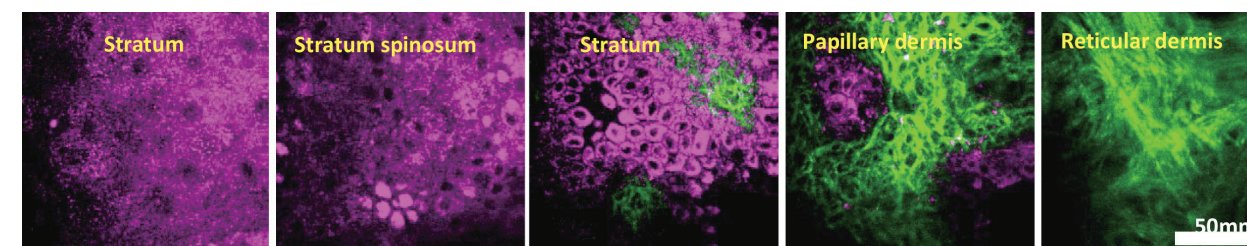
非侵入式光學臨床影像、虛擬光學切片病理影像、與超解析神經影像

Non-invasive optical microscopy for clinical imaging, virtual biopsy imaging for histopathological diagnosis, super-resolution neuron imaging

研究計畫 Research Projects

1. 以光學方式觀察神經痛小鼠及病人的傷害性神經變化 (2/4): 科技部
Visualize nociceptor changes in neuropathic mice and human patients
2. 發展先進倍頻顯微術以用於皮膚色素疾患之治療評估 (2/3): 科技部
Advanced harmonic generation microscopy for treatment assessment of cutaneous pigmentary disorder
3. 以飛秒光纖光源建構大腦深層顯微影像平台 (1/3): 科技部
Deep brain nonlinear imaging platform with femtosecond fiber-optic based light source

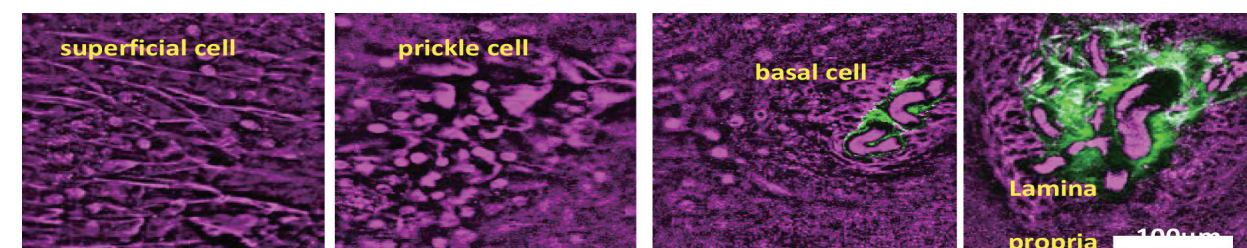
■ 代表圖及中英文說明 -1：



In vivo HGM images of human skin

In vivo harmonic generation microscopic images of human skin, taken at different depths.
於人體活體皮膚不同深度所取得之倍頻式光學虛擬切片影像。

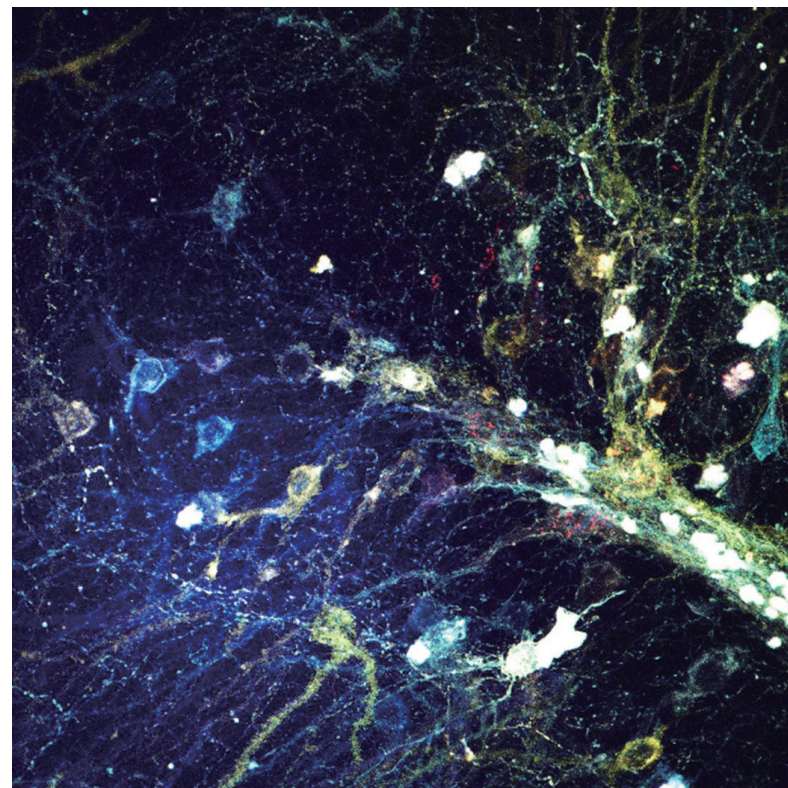
■ 代表圖及中英文說明 -2：



In vivo harmonic generation microscopic images of human oral mucosa, taken at different depths.
於人體活體口腔黏膜不同深度所取得之倍頻式光學虛擬切片影像。



■ 代表圖及中英文說明 -3 :



Neurons surrounding the dentate gyrus of the mouse were infected by the Brainbow AAV and randomly expressed multiple fluorescent proteins. We apply this technique to reveal the detail morphological details of each distinct neuron in the interested region.

圍繞在小鼠海馬體齒狀迴的神經元，以 brainbow AAV 病毒感染，隨機表現不同顏色的螢光蛋白，以彰顯個別神經的細微結構。

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宋孔彬 副教授
Kung-Bin Sung, Associate Professor

國立臺灣大學生醫電子與資訊學研究所副教授
國立臺灣大學電機工程學系副教授

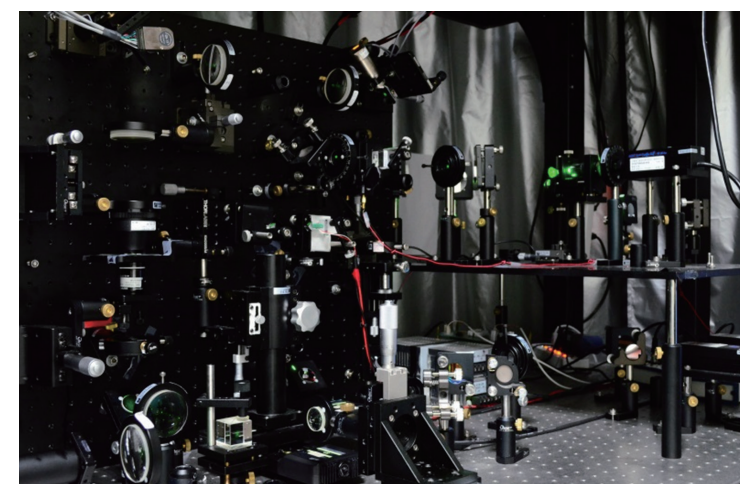
Associate Professor, Graduate Institute of Biomedical Electronics and Bioinformatics,
National Taiwan University
Associate Professor, Department of Electrical Engineering, National Taiwan University

生醫光譜與影像實驗室

Biomedical Optical Spectroscopy and Imaging Lab.

我們實驗室目前的研究重點是以光學方法來觀察生物組織、細胞與分子，主要分為各種光譜的偵測分析以及光學影像系統的開發，以期對生物醫學領域的研究有所助益，並開發新的輔助醫學診斷的工具。長期的目標是發展可應用於活體的工具，協助疾病如上皮癌前病變之診斷，以及生理狀況的長期監測。

Current research in our laboratory is focused on pushing forward optical spectroscopy and microscopy technologies and utilizing these methods to aid biomedical research and develop new diagnostic tools. The long-term objectives are to develop in-vivo tools for diagnosing disease such as epithelial precancers and monitoring physiological status.



陸 | 實驗室及教師 Laboratories and Faculty

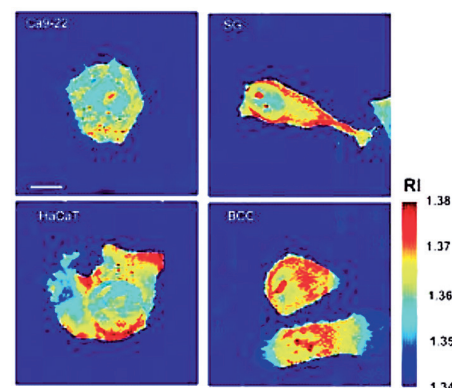
主要研究領域 Major Research Areas

生醫光電、生醫工程
Biomedical Optics, Biomedical engineering

研究計畫 Research Projects

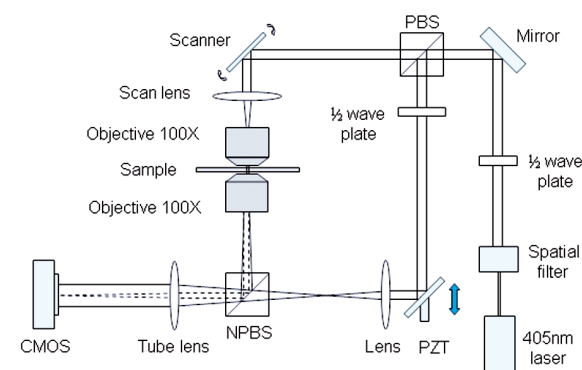
1. 以光學虛擬切片分子影像從事早期疾病診斷 (共同主持人)
Advanced Optical Virtual Biopsy for Early Disease Diagnosis (co-PI)
2. 三維折射率活細胞顯微術 (主持人)
Three-dimensional refractive-index microscopy for live cell imaging (PI)
3. 非侵入性高光譜顯微影像系統進行食道癌域理論之光學定量分析 (共同主持人)
Optical quantification of field carcinogenesis in the esophagus with a non-invasive hyperspectral imaging system (co-PI)
4. 針對大腸腫瘤及淋巴結轉移的早期發現和清除的光電醫學診斷與治療關鍵問題研究 (共同主持人)
Integrated optoelectronic approaches for early diagnosis and precision treatment of metastasis colorectal cancer and lymph node (co-PI)
5. 創新非侵入式中央靜脈血氧飽和濃度儀 (共同主持人)
Innovation and noninvasive central venous oximetry (co-PI)
6. 以背向散射光譜進行活體白血球計數 (主持人)
In vivo White Blood Cell Count with Backscattering Spectroscopy(PI)
7. 手持式偵測皮膚組成系統之開發 (主持人)

■ 研究計畫：三維折射率活細胞顯微術 (Three-dimensional refractive-index microscopy for live cell imaging, Supported by: Ministry of Science and Technology) 之代表圖及中英文說明：



上圖為本計畫所建構的光學相位斷層掃描系統，利用此系統可以得到細胞的三維折射率的分布，下圖為四種不同細胞株 (CA9-22, BCC, HaCaT 及 SG) 於聚焦平面之折射率分布。圖中白色線代表 10 μm 。

The figure at the top shows a schematic diagram of an optical tomographic phase microscope developed in this project. We have used this novel technique to acquire three-dimensional distributions of refractive index of living cells. The four figures at the bottom show refractive index images of four cell lines at the focal plane.



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Pan-Chyr Yang, Distinguished Professor

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中研院生醫所

IBMS RM511

我們主要研究工作有下列四方面 (1) 找尋國人肺癌之危險基因。 (2) 建立體外癌轉移模式，全基因體搜尋癌轉移相關基因。 (3) 發現新的癌轉移基因及機轉做為診斷及治療標的。 (4) 研究癌細胞與周邊微環境之交互作用，特別是發炎細胞與癌細胞的互動。我們以 cDNA 基因微陣列研究基因之調控，訊息傳遞及功能。在基因流行病學研究我們已找到數個國人肺癌之危險基因，我們更以自己建立之肺腺癌之細胞株，利用侵襲篩選之細胞培養方式，篩選出高侵襲能力之子細胞株，並在老鼠實驗動物模式證明高侵襲肺癌細胞株也同時具有高轉移能力，利用以一體外模式及 cDNA 微陣列，我們可以全基因體找尋癌轉移之相關基因，在含 9600 基因之微陣列中我們找到近 600 個基因與肺癌轉移有關，我們將利用這些基因製成癌轉移檢測晶片推廣至臨床使用。同時在這些癌轉移相關基因中，我們發現新的抑癌轉移基因及促癌轉移基因如 Collapsin Response Mediator Protein-1 (CRMP-1) · LCRMP-1 · HLJ1 及 Slug 等。這些基因在癌轉移之分子調控機制為目前主要研究之重點，且此類新的癌轉移相關蛋白也成為治療主要標誌分子，我們也用基因微陣列之研究模式，剖析這些基因之下游基因。最近，我們正著重於研究這些新的癌轉移相關蛋白之訊息傳遞途徑及功能和蛋白交互作用機制。

Our research teams are interested in studying the molecular pathogenesis of lung cancer in Taiwan and mechanisms of cancer metastasis. We focus on four aspects: (1) identification of novel risk genes for lung cancer in Taiwan, (2) molecular signature for prognostic prediction and personalized therapy of lung cancer, (3) identify novel genes and mechanisms involved in cancer metastasis for potential diagnosis and treatment targets, and (4) interaction of cancer cells and microenvironments, especially the cross talks between cancer cells and microenvironment inflammatory cells. Our team has identified several candidate risk genes for lung cancer. Cancer metastasis is a complicated process that may involve numerous genetic changes. To identify invasion/metastasis associated genes, we used DNA microarray and invasion/metastasis lung cancer cell line model and identified a panel of genes associated with



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lung cancer metastasis. We also developed gene expression signature and microRNA signature that can predict survival and metastasis of lung cancer patients. These molecular signatures may be helpful for personalized therapy of lung cancer patients. We have also identified novel invasion/metastasis suppressor genes such as collapsin response mediator protein-1 (CRMP-1), long form CRMP, HLJ-1 and invasion promoting gene slug. Currently, we are investigating the molecular mechanisms and signaling pathways and protein interaction maps of these novel metastasis related genes.

主要研究領域 Major Research Areas

基因體醫學、細胞生物學、轉譯醫學
Genomic medicine, Cell Biology, Translational Medicine

研究計畫 Research Projects

1. 探討 HIPK2 與 Slug 在致癌性及癌轉移的角色
HIPK2 regulates slug-mediated tumorigenesis and metastasis
2. 研究促癌轉移基因 Slug 在細胞週期扮演的角色
The invasion promoter Slug is a novel cell cycle regulator
3. 整合性功能基因體學核心實驗室 II
Integrated Core Facility for Functional Genomics (II)
4. 多功能轉錄因子 YY1 和肺癌生成關係之探討
Multifunctional Transcription Factor YY1 and Lung Cancer Progression
5. 整合性功能基因體學核心實驗室 I
Integrated Core Facility for Functional Genomics (I)
6. 癌轉移之外基因調控
Epigenetic Control of Cancer Metastasis



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Nai-Kuan Chou, Clinical Associate Professor



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國立臺灣大學醫院附設醫院器官勸募小組召集人

Clinical Associate professor of Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University
Clinical Associate professor of surgery, National Taiwan University, College of Medicine
Director of Intensive Care Unit of Department of Surgery, National Taiwan University Hospital
Convener m of Organ Procurement Organization, National Taiwan University Hospital

臺大醫院第七共同研究室

Laboratory

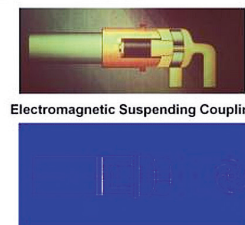
實驗室結合研究團隊的各實驗室，成員如下：應力所邵耀華教授、電機系汪重光教授、獸醫系徐久忠教授、高分子所謝國煌教授、包舜華博士、戴浩志醫師、王碩盟醫師、劉亮廷醫師

1. 小動物實驗模型
2. 醫療儀器、訊號分析處理
3. 超音波影像處理
4. 實驗室儀器：雙向心臟血管用 X 光射影系統、多頻道生理記錄分析系統 (Polygraphy)、Injector、Autoinjector、多頻道心理生理電腦化記錄分析儀 (EP recording)、CARTO、電氣生理刺激器、血管內導線壓力儀器 (PressureWire)、OCT、電燒機、血管內超音波 (i-LAB)、血液凝固測試儀 (ACT)、波士頓科技羅塔培特控制台系統、IABP、電擊器、血中含氧測定儀、非侵入式自動血壓計、微量點滴控制器 (Syringe pump)、人工心律調整器、血氧飽合濃度監視器、血壓血氧 ECG 監視器、電刀機、點滴幫浦、耳溫槍、血糖機、JJ 電燒機等等。

Laboratory animals, animal models of heart failure and arteriosclerosis, establishes computerized database for laboratory animal science and assists in various experiments, disease diagnosis, and health monitoring.



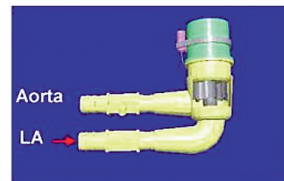
Implantable Impeller Tai Ta VAD



Electromagnetic Suspending Coupling

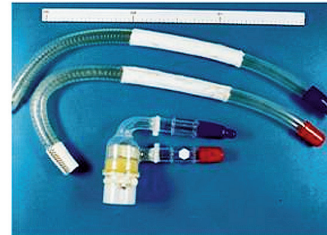
Chou NK, Wang SS, Chu SH, et al. Artif Organs 2001;25(8):603-5

Tai Ta VAD



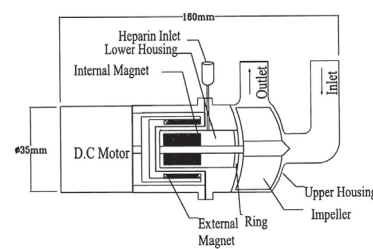
Chou NK, Wang SS, Chu SH, et al. Artif Organs 2001;25(8):603-5

Tai Ta LVAD



Chou NK, Wang SS, Chu SH, et al. Artif Organs 2001;25(8):603-5

Cross Section View of Tai Ta LVAD Pump



Chou NK, Wang SS, Chu SH, et al. Artif Organs 2001;25(8):603-5

Tai Ta LVAD Performance Enhancement

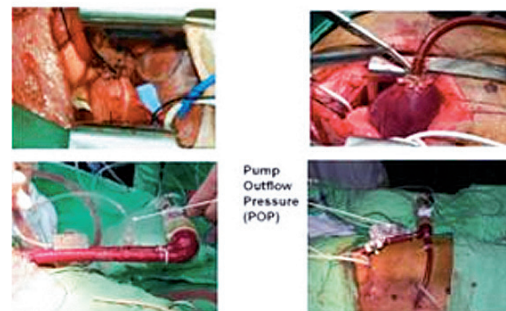
- Pro-Engineering Drafting Design (CNC Manufacture)
- Effects of Size and Geometry



Schematic Diagram of All Monitoring Systems in the Canine LVAD Experiment



Inlet Tube on LV Apex



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生醫系統工程實驗室

Biomedical System Engineering Lab.

線粒體是細胞的能量工廠，線粒體也在細胞中扮演了其他重要的角色，例如調節細胞凋亡與維持離子平衡。也因此線粒體功能與許多重要的疾病與生理現象有密切的關係，像是心臟疾病、神經退化疾病、糖尿病、癌症以及多種代謝疾病都與線粒體的功能都有關聯。

本實驗室的研究方向為整合計算模擬與實驗，用系統生物學的角度來了解細胞能量的供應與需求。研究方法以發展線粒體計算模型為基礎，並由直接的實驗測量來驗證，透過緊密的理論與實驗的配合，提供線粒體如何影響正常和病變的能量狀態的全面了解。該模型可被用於優化治療的設計，以達到最大的保護作用。開發線粒體模型，可在未來提供更全面的細胞、器官模型及藥物設計的基礎。

Mitochondria, the powerhouse of the cell, are organelles found in most types of cells. In addition to being the main site of energy production, mitochondria also play important roles in regulating ion homeostasis, and apoptosis. Mitochondrial dysfunction is related to rare inborn errors of metabolism, and some of the most common human diseases, such as cardiac vascular disease, diabetes, neurodegeneration, and cancer. Because of their important roles in basic biology and clinical medicine, mitochondria are an excellent model for systems biology.

The objective of our lab is to apply recent advances in systemic and quantitative methods to characterize the properties of crucial ion transporters in mitochondria, examine their functional roles in the mitochondrial ion circuits, and develop computational model of mitochondrial ion dynamics and energetics. The goal is to elucidate the roles of mitochondrial ion transport in energy supply and demand matching, integrated cell function, and the progression of disease. The model may ultimately be used to optimize the design of therapeutic agents in order to maximize protective effects.

主要研究領域 Major Research Areas

線粒體、生物能量與代謝、系統生物學、生物系統模型建構模擬

Mitochondria, bioenergetics and metabolism, systems biology, modeling and simulation of biological systems

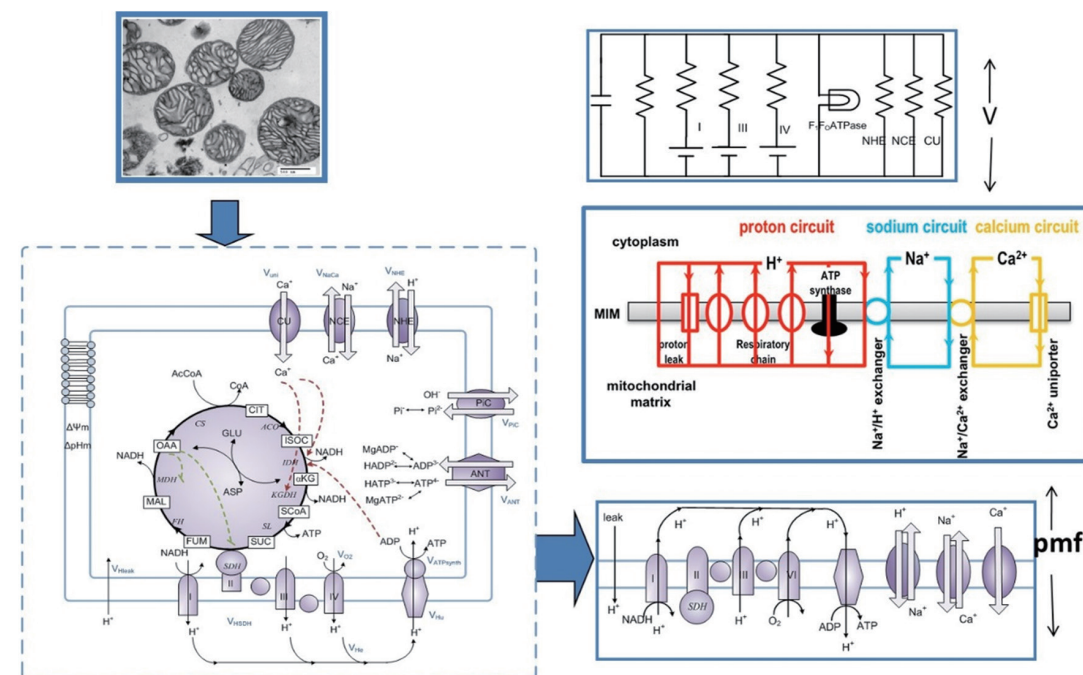


研究計畫 Research Projects

1. 【研發細胞線粒體的計算模型】

Developing mitochondrial computational model in the cell to elucidate the interplay between ion balance, mitochondrial energy state, and redox status

研發細胞線粒體的計算模型，整合能量代謝，離子調節，與氧化還原。



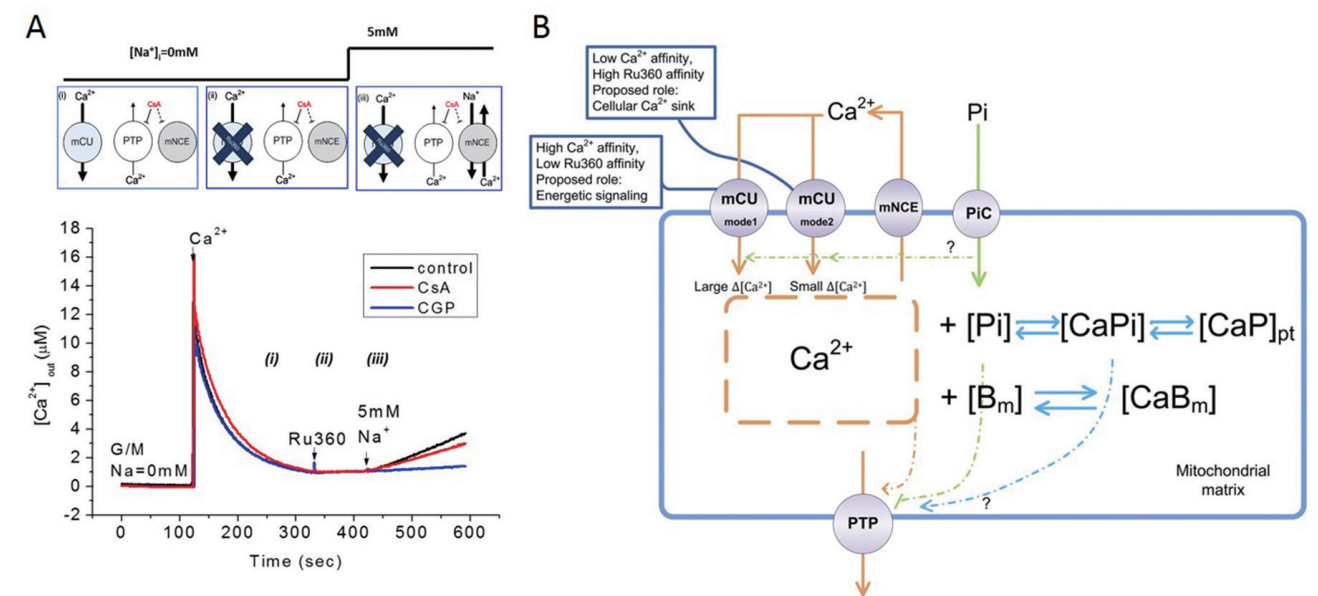
圖一 線粒體系統和電路模型之類比

Figure 1. Mitochondrial ion circuit as an analog of an electrical circuit: By making analogies between the complex mitochondrial system and a simple electrical circuit model, we will have a better understanding of the interactions between ion dynamics and energetics in a unique and intuitive manner.

2. 【心肌細胞線粒體鈣離子調節之研究】

Study of mitochondrial calcium regulation in cardiac myocytes

研究線心肌細胞粒體鈣離子處理和緩衝。



圖二 線粒體鈣離子調節

Figure 2. (A) Mitochondrial calcium influx and efflux measurements (B) Summary of the mechanisms governing mitochondrial Ca^{2+} dynamics.

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Professor, Department of Computer Science and Information Engineering/
Graduate Institute of Networking and Multimedia, National Taiwan University

醫學影像處理實驗室

Medical Image Processing Lab.

乳癌是近年來已全球化的婦女死亡的主要原因，如果可以及早查出腫瘤的存在，乳癌治癒的機會將大增不少。在臨床上，電腦輔助診斷系統 (CAD) 可以幫助醫師分辨惡性和良性的乳房腫瘤，如果電腦輔助診斷系統可以提供更高的準確率便可以大幅減少乳房切片檢查的需求。從 1998 年開始，我們致力於發展超音波電腦輔助診斷系統，也有了不錯的研究經驗與成果，成果計有 2D/3D 超音波、彩色超音波、PC-based 超音波、彈性超音波及自動超音波的電腦診斷系統。合作研究單位有美國芝加哥大學、美國 U-Systems 超音波公司，並與韓國漢城大學醫院、日本獨協大學醫院、台大醫院、台北榮總醫師均有密切合作研究。

In recent years, the breast cancer is globally the main causes of death for women. If a cancer can be found out earlier, the curability of the breast cancer will increase greatly. Clinically, the computer-aided diagnosis (CAD) systems can help physicians to differentiate the benign and malignant tumors. If the computer-aided diagnosis systems have higher accuracy, the demand of the breast biopsy can be reduced. Since 1998, we are devoted to develop the ultrasound (US) CAD systems including 2D/3D US, color Doppler US, color elastography, PC-based US, and automated US. The laboratory also collaborates with The University of Chicago and U-systems Inc., USA. We closely collaborate with physicians from Seoul National University Hospital, Dokkyo Medical University Hospital, National Taiwan University Hospital, and Taipei Veterans General Hospital.

主要研究領域 Major Research Areas

醫學影像電腦輔助診斷、影像視訊處理、多媒體系統及通訊

Medical Image Computer Aided Diagnosis, Image Processing, Multimedia Systems and Communication

研究計畫 Research Projects

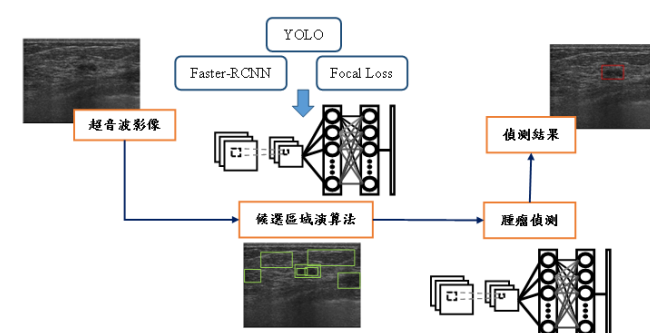
1. 應用深度學習於自動乳房超音波電腦輔助偵測與診斷 (AI 創新研究中心專案研究計畫)
Automated Breast Ultrasound Computer-aided Detection and Diagnosis Using Deep Learning

■ 研究計畫：應用深度學習於自動乳房超音波電腦輔助偵測與診斷
補助單位：行政院科技部
計畫期間：2018/01/01 ~ 2021/12/31

乳房超音波是常用來發現及早期診斷腫瘤良惡性的檢測方法，雖然全乳房自動超音波 (ABUS) 已被用於臨床上的檢測，但大量的影像資訊導致醫師需耗費更多專注力與時間閱片。電腦輔助系統不僅可以偵測腫瘤位置並可提供量化後腫瘤特徵資訊給醫師作為診斷基礎的工具以減少診斷時間及錯誤。如果電腦輔助系統可架設於雲端，將可不必花費鉅資購買及維護硬軟體設備即可將影像資料上傳儲存於雲端系統，同時更可利用雲端系統強大的運算能力進行更複雜的電腦輔助偵測與診斷運算。近年來，由於深度學習與雲端計算技術的發展，使得雲端機器上部署深度學習模型的應用程式是一種重要且熱門趨勢，因此，本計畫提出在雲端上提供電腦輔助系統服務，醫生可隨時隨地在任一電腦透過雲端服務立即同時取得腫瘤影像及相關診斷資訊。本計畫將以深度卷積類神經網路架構開發系統，共分四年完成，第一年完成 Two-stage ABUS 腫瘤偵測系統與 2-D 超音波雲端診斷系統。第二年改進 ABUS 腫瘤偵測系統、開發全卷積網路 (FCN) 的 ABUS 腫瘤切割系統以及 Two-stage 2-D 雲端腫瘤偵測系統。第三年建立 ABUS 紋理以及形狀類神經網路擷取特徵並開發診斷系統，同時開發 2-D 雲端腫瘤切割系統。第四年增加生物標記診斷系統，完成 ABUS 與 2-D 電腦輔助系統並部署在雲端上。

Project title: Automated Breast Ultrasound Computer-aided Detection and Diagnosis Using Deep Learning
Supported by: Ministry of Science and Technology
Project period: 2018/01/01 ~ 2021/12/31

Breast ultrasound is the common examination for tumor detection and classification in early stage. Although the automated whole breast ultrasound (ABUS) had been used for examination in clinic, the physician might spend more vigor and time for reviewing several thousand ultrasound images for a patient. Computer-aided system is a useful tool that provides the quantitative features about a tumor for the physician to determine a tumor as benign or malignant. If the computer-aided diagnosis system can become a cloud system, a lot of money can be saved for purchasing and maintaining the computer hardware and software. Not only the medical images could be uploaded and stored in the cloud system but also more sophisticated computer-aided diagnosis system could be implemented based on the high cloud-based computing power. Recently, due to the development of deep learning and cloud computation, it is an important trend that the systems of object detection and pattern recognition are developed based on the deep learning and deployed on the cloud server. Therefore, in this project, the computer-aided systems based on the deep learning is proposed and will be deployed on the cloud server for physician to obtain the tumor image and diagnosis information at any computer. This project will be finished in the following four years and all systems are designed based on the deep learning architecture. In the first year, the two-stage ABUS tumor detection system and 2-D ultrasound cloud tumor diagnosis system will be designed and accomplished. In the second year, we will improve the ABUS tumor detection system, develop the fully convolution network (FCN) ABUS tumor segmentation system, and two-stage 2-D cloud tumor detection system. In the third year, the ABUS texture and shape convolution neural network will be constructed for feature extraction and develop the diagnosis system. In the same time, the 2-D cloud tumor segmentation system will be developed. Finally, in the last year, the information of biomarkers will be added for designing the biomarker prediction system. In additional, the system of detection, segmentation, and diagnosis in ABUS and 2-D ultrasound will be combined respectively as a computer-aided system and deployed in the cloud.



全自動乳房超音波腫瘤偵測系統
Automated Breast Ultrasound Tumor Detection System

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超解析光學影像實驗室

Light Nanoscopy Lab

超解析光學影像實驗室成立於 2019 年秋，隸屬於國立台灣大學電機工程學系與生醫電子與資訊學研究所，實驗室計畫主持人為楊東霖博士。實驗室主要研究領域除了運用超解析光學顯微鏡，了解複雜的細胞與胞器結構並回答生物問題，亦致力於新穎超解析細胞影像技術發展，透過提升解析能力、多色影像方法、影像擷取速度與影像分析方法，提供生醫研究科學所需超高解析、無繞射限制的影像資訊。

The Light Nanoscopy Lab (LNL) was started in the fall of 2019 in the Department of Electrical Engineering and the Graduate Institute of Biomedical Electronic and Bioinformatics at National Taiwan University, Taipei, Taiwan. The principal investigator is Dr. T. Tony Yang. The research at LNL focuses on providing super-resolution feature discrimination to answer biological questions and developing imaging platforms for studying proteins localization and molecular distribution in subcellular domains and organelles at the nanoscopic scale. Through pushing super-resolution limit, developing novel multicolor imaging strategy, and facilitating image acquisition and image analysis, LNL provides biological and biomedical studies on fundamental science with diffraction-unlimited image information.

主要研究領域 Major Research Areas

- (1) 超高解析光學影像技術
- (2) 中心粒與其附屬結構 (distal appendages) 三維形態分析
- (3) 細胞主纖毛 (primary cilia) 生長和纖毛功能探討
- (4) 超解析單分子追蹤。

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演算法與計算生物學實驗室

Algorithms and Computational Biology Lab.

演算法與計算生物學實驗室創立於 2002 年 8 月。我們的研究主軸為「序列」與「樹狀結構」主題相關的演算法設計，以及利用這些演算法為基礎的生物資訊軟體工具開發，可說是「計算理論為體，生物資訊為用」。在過去幾年裡，我們的研究主軸是關於序列及樹狀結構上的有效演算法設計與分析。在序列方面，包括生物序列分析，如：單套體預測問題、標記 SNP、複製數目變異問題、各種不同評分準則等，以及數列分析，如：最大總和區段問題、最大平均區段問題、不同條件的最佳化問題等。在樹狀結構方面，包括樹的建構問題，如：演化樹建構、最小繞線代價伸張樹問題等，以及樹的探索問題，如：樹邊分割問題、樹的查詢問題、樹邊置換問題等。這是非常有樂趣及成果的研究歷程，我們最終的目標是開發更多關於序列及樹狀結構的基本性質，並充分運用它們來設計解決這方面計算難題的實用演算法。

The Algorithms and Computational Biology Laboratory was established in August, 2002. We are interested in all aspects of the design and analysis of combinatorial algorithms. In particular, we solve algorithmic problems arising in computational molecular biology and networking. For the past few years, we have been mostly focused on the design and analysis of efficient algorithms for analyzing sequences and trees. For sequences, we mainly work on problems related to biological sequence analysis (haplotype vs. genotype; tag SNPs; copy number variations; variant scoring schemes), and numerical sequence analysis (maximum-sum segments; maximum-average segments; other maximization criteria). For trees, we mainly work on some tree construction problems (evolutionary trees; minimum routing cost spanning trees), and tree exploring problems (tree edge partition; tree querying; swap edges). This has been a joyful and fruitful journey to us. Our ultimate goal is to reveal more properties related to sequences and trees, and fully utilize them to design practical algorithms for solving hard problems in that line of investigation.



陸 | 實驗室及教師 Laboratories and Faculty

主要研究領域 Major Research Areas

計算生物學及生物資訊學、演算法、套裝軟體
Computational Biology and Bioinformatics, Algorithms, Software Tools

研究計畫 Research Projects

1. 大眾化配對問題的延伸研究及其演算法設計 (104-2221-E-002-046-MY3)
2. 用於辨識布林網路特徵的新演算法 (103-2221-E-002-157-MY3)



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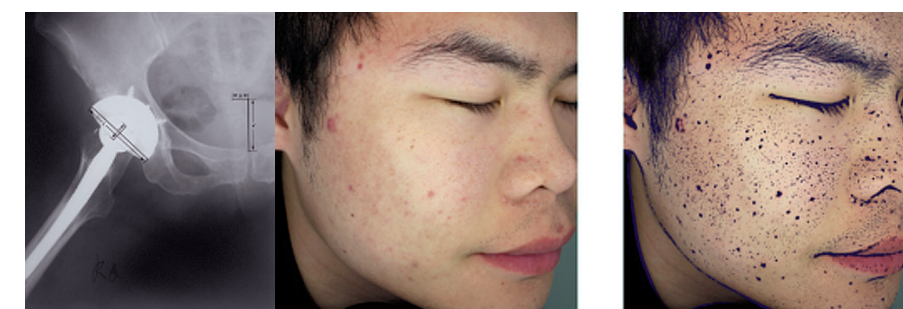
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數位相機與電腦視覺實驗室

Digital Camera and Computer Vision Lab.

本實驗室由傅楸善教授成立於2003年，主要從事數位相機與電腦視覺相關研究。歷年來已執行多項研究計畫，目前以生醫數位相機、影像處理與自動光學檢測等領域為研究重點。本實驗室在上述領域已產出許多具體貢獻並在全世界有很高之能見度。此外，本實驗室之成員來自電子、資訊及醫學等各領域，多年來亦積極與國內外單位進行合作，合作夥伴包括產、研、學各界，例如：光寶科技、源浩科技、德律科技等。提升數位相機與自動光學檢測技術及其生醫應用，是本實驗室之成立宗旨與具體目標。

Digital Camera and Computer Vision Laboratory was founded by Professor Chiou-Shann Fuh in 2003, with the main research focus in digital camera and computer vision. In the past few years, we have conducted a number of research projects in digital image processing and automatic optical inspection. We have also made several critical contributions and are now one of the most visible research laboratories in this field in the world. Members of the laboratory come from various backgrounds, including electronics, informatics, and medicine. We have also been actively collaborating with research laboratories throughout the world, covering industry, research institutes, and universities, from basic sciences, engineering to clinical research, such as Liteon, Egis Technology, Lumens Digital Optics, Delta Electronics, D8AI, and TRI. Integrating multi-disciplinary research efforts, exploring advanced digital camera with biomedical applications, and automatic optical inspection are the mission of this laboratory.





主要研究領域 Major Research Areas

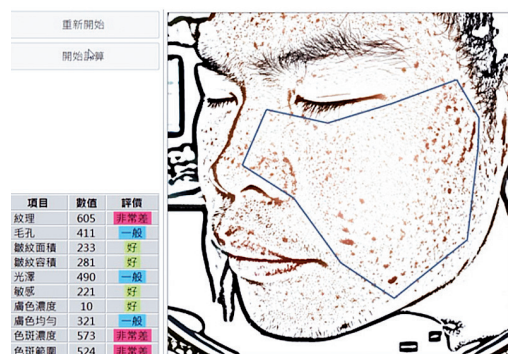
數位相機、電腦視覺、自動光學檢測、數位影像處理
Digital Camera, Computer Vision, Automatic Optical Inspection, Digital Image Processing

研究計畫 Research Projects

1. 用 X 光重建錫球三維空間形狀與瑕疵檢測：二維重建，三維重建，加速計算
3D Solder Shape Reconstruction and Defect Inspection with X-Ray Images: 2D Reconstruction, 3D Reconstruction, Computation Acceleration
 2. 數位相機之影像處理：高動態範圍影像，行人偵測，性別與年齡估計
Image Processing for Digital Cameras: High Dynamic Range Image, Pedestrian Detection, Gender and Age Estimation
 3. 數位相機之影像處理：降低雜訊，光線補償，臉色改善
Image Processing for Digital Cameras: Noise Reduction, Light Compensation, Facial Color Enhancement
- Project title: 3D Solder Shape Reconstruction and Defect Inspection with X-Ray Images: 2D Reconstruction, 3D Reconstruction, Computation Acceleration Supported by: Ministry of Science and Technology Project period: 2015/08/01 ~ 2018/07/31

This is a three-year project to use computer vision and digital image processing methods and X-ray images for 2D reconstruction, 3D reconstruction, defect inspection, and computation acceleration research. We will study the best X-ray camera, light source, environment, distance, angle, and solder ball reconstruction and defect inspection algorithms and computation acceleration. In the first year, we will research algorithms and programs for 2D reconstruction and defect inspection such as open circuit, short circuit, too small solder ball, insufficient solder, or too much solder. After 2D reconstruction, in the second year, we will research 3D reconstruction and defect inspection with different X-ray camera and light source distances and angles. We aim to inspect defects of multiple-layer ball grid array and circuit boards with package on package and land grid array. After 3D reconstruction and defect inspection, due to enormous computation, we will research to accelerate computation with graphical processing units or streaming SIMD extension 4 instruction set. We aim to break Japanese and German patent and technology barriers in these three aspects and enhance Taiwan's international competitiveness and market shares on semiconductor inspection equipment such as AOI, AXI, and SPI.

代表圖及中英文說明：Human Face Feature Detection and Analysis 人臉特徵偵測與分析



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Professor and Chairman, Department of Surgery, National Taiwan University College of Medicine and National Taiwan University Hospital
Director, Breast Care Center, National Taiwan University Hospital

主要研究領域 Major Research Areas

乳房外科、乳房超音波檢查、腫瘤外科、分子流行病學
Breast Surgery, Breast Ultrasound, Surgical Oncology, Molecular Epidemiology

研究計畫 Research Projects

一、轉譯醫學研究 Translational Medicine Research

1. 針對亞洲年輕婦女急速增加 luminal type 乳癌發展新穎治療標的與生物標記 - (總計畫與子計畫一)
以多平臺全基因微陣列方法去分析及發現不同臨床生物表現之同 Luminal A 型態乳癌的特別基因特徵
2. 驗證乳癌復發基因套組的臨床應用
3. 探討乳癌患者復發的機轉：聚焦於腫瘤內異質性，監測液態生物檢體之生物標記和尋找可能的治療方法
4. 多基因表現套組驗證於未接受輔助性化學治療乳癌病人復發之回溯性研究
5. 乳癌預後與全基因體關聯分析之回溯性流行病學研究
6. 探討 MAP3K1 和其搭檔 MAP2K4 之基因突變，變異性和蛋白質表現在管腔細胞型乳癌的分子致病機轉的意義

二、乳房超音波及其他影像檢查研究 Breast Ultrasound and Other Imaging Screening Research

1. 自動乳房超音波之電腦輔助診斷
2. 以乳房超音波及乳房攝影術進行台灣 40-49 歲婦女乳癌篩檢隨機試驗。
3. 乳房超音波電腦輔助診斷系統雲端平台建置及影像評估
4. 乳房超音波篩檢的標準化及品質控制

三、其他研究計畫 Other Research

1. 臺灣乳癌臨床試驗合作聯盟 (Taiwan Breast Cancer Consortium)



四、臨床試驗 Clinical Trial (2014~ present on-going)

1. Kristine：一個隨機分配、多中心、開放性、雙組的第三期試驗，比較 trastuzumab emtansine 併用 pertuzumab 與化學療法併用 trastuzumab 及 pertuzumab 做為 HER2 陽性乳癌患者之前置輔助療法。
2. Kaitlin：一個隨機分配、多中心、開放性的第三期試驗，比較使用 anthracyclines 後併用 trastuzumab、pertuzumab 及 taxane 與使用 anthracyclines 後併用 trastuzumab emtansine 及 pertuzumab 作為可手術切除的 HER2 陽性原發性乳癌患者之術後輔助治療。
3. BMN 673：一項第 3 期、開放性、隨機分配、平行、雙組、多中心試驗，比較 BMN 673 與醫師選用之藥物用於罹患局部晚期及 / 或轉移性乳癌，且過去接受過不超過 2 種轉移性疾病化學治療之生殖細胞 BRCA 突變患者的效果。
4. PPD_GO29227：一項以 AKT 抑制劑 Ipatasertib (GDC-0068) 與 Paclitaxel 併用，作為轉移性三重陰性乳癌病患第一線治療的隨機分配、第二期、多中心、安慰劑對照試驗。
5. AZ_OlympiAD：一個第三期、開放性、隨機、對照的多中心試驗，針對先天性 BRCA1/2 突變的轉移性乳癌患者，評估 Olaparib 之單一療法相較於醫師選用之化療的療效與安全性。
6. AZ_OlympiA：一個隨機、雙盲、平行組別、安慰劑對照的多中心第三期試驗，針對具有先天性 BRCA1/2 突變與高風險 HER2 陰性，且已完成明確的局部治療與前置輔助性 (neoadjuvant) 或輔助性化療的原發性乳癌患者，評估 olaparib 相較於安慰劑作為輔助療法之療效與安全性。
7. Abbvie：一項針對患有初期三重陰性乳癌 (TNBC) 受試者，以評估增添 Veliparib 加 Carboplatin 於標準前導性化療相較於增添 Carboplatin 至標準前導性化療相較於標準前導性化療的安全性與療效之隨機分配、安慰劑對照、雙盲、第 3 期試驗。
8. JPBL：一項隨機分配、雙盲、安慰劑對照的第 3 期試驗，使用 fulvestrant 搭配 LY2835219 (一種 CDK4/6 抑制劑) 或單獨使用 fulvestrant 治療荷爾蒙受體陽性、HER2 陰性的局部晚期或轉移性乳癌女性患者。
9. JPBm：一項隨機分配、雙盲、安慰劑對照的第 3 期試驗，使用非類固醇類芳香環轉胺酶抑制劑 (Anastrozole 或 Letrozole) 合併 LY2835219 (一種 CDK4/6 抑制劑) 或合併安慰劑，治療荷爾蒙受體陽性、HER2 陰性的局部復發或轉移性乳癌停經女性患者且此疾病未曾接受過全身性治療。
10. Pfizer：一項多中心、隨機分配、雙盲之第三期臨床試驗，以 Palbociclib (口服 CDK 4/6 抑制劑) 併用 letrozole，比對安慰劑併用 letrozole，治療具 ER (+)、HER2 (-) 晚期乳癌且不曾接受過治療之亞洲停經女性患者。
11. NeoTRIPaPDL1 使用 PDL1 抗體併用白蛋白結合型紫杉醇 (Nab-paclitaxel) 及佳鉑帝靜脈注射液 (Carboplatin) 作為前導性療法，治療局部晚期三陰性乳癌病患。
12. CO40016 一項雙盲、安慰劑對照、隨機分配、第三期試驗，研究 IPATASERTIB 併用 PACLITAXEL 治療用於 PIK3CA/AKT1/PTEN 變異、局部晚期或轉移性的三陰性乳癌或激素受體陽性、HER2 陰性乳癌病患。
13. WO39391/BIG 16-05 一項第三期、多中心、隨機分配、開放標示試驗，在可手術之三陰性乳癌患者中，比較 ATEZOLIZUMAB (抗 -PD-L1 抗體) 併用以 ANTHRACYCLINE/TAXANE 類為主的輔助性化療與單獨的化學治療。

14. DS8201-A-U302 一項第三期、多中心、隨機、開放標示、活性藥物對照在曾接受 trastuzumab 和 taxane 治療的 HER2 陽性、無法切除和 / 或轉移性乳癌受試者，比較 DS-8201a (一種抗 HER2 抗體藥物複合體) 和 ado-trastuzumab emtansine (T-DM1) 的試驗。
15. OBI-822 一項以 adagloxad simolenin (OBI 822) /OBI 821 治療高風險早期三陰性乳癌患者 (定義為接受前導性化療後有殘餘侵襲性疾病，或有 ≥ 4 處腋下淋巴結呈陽性) 的第三期、隨機分配、雙盲、安慰劑對照試驗。
16. EGC-002 一項隨機分配、多中心、雙盲設計的第 3 期試驗，評估 EG12014 (EirGenix Trastuzumab) 相較於 Herceptin® 作為 HER2 陽性早期乳癌病人進行含 Anthracycline/Paclitaxel 全身性治療時的前輔助治療的療效及安全性。
17. MK-3475-756 一項以 Pembrolizumab 或安慰劑併用前導性化學療法和輔助性內分泌療法，治療高風險早期雌激素受體陽性、第 2 型人類表皮生長因子受體陰性 (ER+ /HER2-) 乳癌的隨機分配、雙盲、第三期臨床試驗 (KEYNOTE-756)
18. TRIO033 / NATALEE 一項針對荷爾蒙受體陽性、HER2 陰性的早期乳癌患者，評估 ribociclib 加上內分泌療法作為輔助治療的療效與安全性之第三期、多中心、隨機分配、開放性試驗 (以 Ribociclib 作為新輔助治療的試驗)。
19. TBCC-ARO DCIS 針對經乳房保留手術後之低風險和雌激素受體陽性乳腺導管原位癌去比較輔助放射線治療和低劑量泰莫西芬治療的一項國際開放標記隨機非劣性試驗

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系統生物學研究室

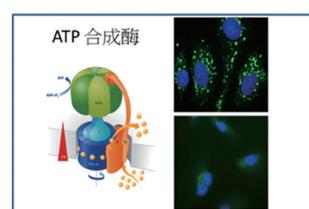
Systems Biology Lab.

本研究室主要以系統生物學探討藥物在癌細胞的作用機制，內容包括運用各種體學資料進行各蛋白質間交互作用的預測和建構、基因網絡的模擬和建構，及非編碼核酸於其調控的蛋白質間交互作用及網路關係，期望進一步達到開發新藥的目地。主要的目標是利用系統生物學研究法來研究藥物誘導下胃癌、乳癌、肺癌及神經母細胞瘤細胞的分子作用機制；同時，利用系統生物學和合成生物學研究法開發新的治療方法。

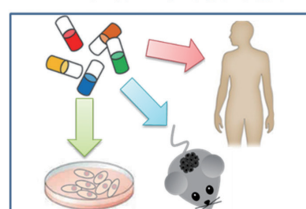
The main research in our lab is to apply systems and synthetic biology for drug discovery. We discover novel drugs for cancer therapy and investigate the molecular mechanism of drugs in cancer cells.

MicroRNAs and long non-coding RNAs (lncRNAs) are non-coding RNA molecules which play a key role in post-transcriptional regulation of mRNAs. A non-coding RNA can affect many downstream targets which in turn form a complicated network. Our lab has characterized the roles of non-coding RNAs in the regulation of cellular networks and revealed that non-coding RNA-regulated network could be used as a novel therapeutic target for cancer as well as other diseases such as neurological and cardiovascular diseases.

• 癌症相關研究



• 癌症藥物開發



主要研究領域 Major Research Areas

系統生物學、生物資訊、癌症研究、藥物開發

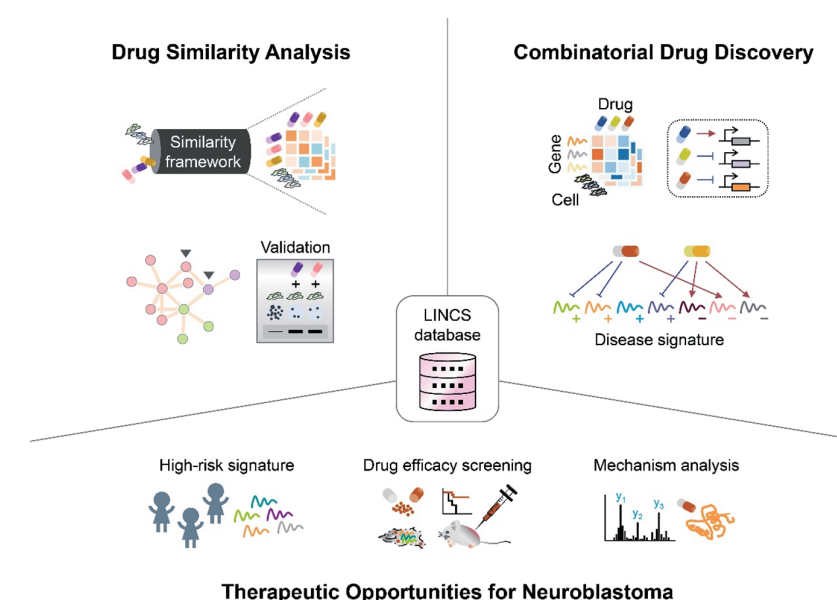
Systems Biology, Bioinformatics, Cancer research, Drug discovery

研究計畫 Research Projects

1. 以基因表現巨量數據尋找高危險群神經母細胞瘤之新穎組合治療策略
Expression-based combinatorial therapeutic discovery in high-risk neuroblastoma
2. 以蛋白體學技術探討受異位表達 ATP 合成酶運送影響之磷酸化與乙酰化交互作用動態變化
Elucidating the interplay of phosphorylation and acetylation dynamics in ectopic ATP synthase trafficking by proteomics approaches
3. 以蛋白體學探討 ATP 合成酶如何透過胞外囊泡進行細胞與細胞間的溝通
Role of ectopic ATP synthase in cell-cell communications mediated by extracellular vesicles
4. 以系統生物學探索神經母細胞瘤中重要的長鏈非編碼核糖核酸
Systems biology approach for key lncRNAs in neuroblastoma

■ 研究計畫 - 以基因表現巨量數據尋找高危險群神經母細胞瘤之新穎組合治療策略

Expression-based combinatorial therapeutic discovery in high-risk neuroblastoma 之代表圖及中英文說明：



My research team has developed a series of computational and systems-biology approaches to identify new therapeutic opportunities for combinatorial drug discovery and repurposing in oncology.

我們研究團隊運用美國國家衛生研究院所資助 LINC 計劃藥物擾動基因表現圖譜之公開巨量資料，開發一系列計算生物與系統生物學分析方法，成功地找到具有新用潛力之已上市藥以及新穎癌症組合藥物治療。

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陸 | 實驗室及教師 Laboratories and Faculty



賴飛羆 教授

Fei-Pei Lai, Professor

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國立臺灣大學醫療器材與醫學影像研究所教授
國立臺灣大學資訊工程學系教授
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Professor, Graduate Institute of Biomedical Electronics and Bioinformatics/
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Engineering/Department of Computer Science & Information Engineering,
National Taiwan University

醫學資訊實驗室

Medical Informatics Lab.

本實驗室成立於 1987 年，由賴飛羆教授所領導的研究群所組成。賴教授指導畢業的學生已有 30 餘名博士生及 120 餘名碩士生。目前實驗室成員包括博士班 10 餘人及碩士班 10 餘人。實驗室創立初期以研究計算機結構及低功率系統晶片設計為主，近年來改以醫療資訊系統、遠距照護、醫學資料探勘及資訊安全等領域為主要研究方向。

主要研究領域 Major Research Areas

醫學資訊 Medical Informatics

研究計畫 Research Projects

1. 臺大醫神 – 精準醫療人工智慧輔助決策系統

健康是人類目前最關心的議題。近年來醫學的蓬勃發展，除了大量的治療方式及藥物被開發出來之外，基因與疾病的關係也逐漸被瞭解。精準醫療，也就是提供每一個病患最佳的醫療計畫已不是夢想。然而醫藥知識的遽增卻也帶來解讀資訊的龐大負擔，因此 AI 便成為加值醫療產業的新希望。本計畫目標為研發一個「精準醫療 AI 輔助決策系統」，共包含四大工作項目：（1）電子病歷及醫學數據分析處理；（2）基因資訊庫與相關疾病之診斷與治療；（3）醫療期刊書籍文件資訊擷取；（4）精準醫療人工智慧開發。計畫將整合臺大醫院完整的電子病歷，涵蓋醫療、護理、檢驗、影像及復健等資料，並蒐集建立 10,000 名病患生活型態及環境因素的大數據庫；臺大基因醫學團隊將以 AI 技術探討基因結合遺傳疾病、癌症、藥物代謝及敏感、與多因子罕見疾病；臺大資訊工程團隊將以資料探勘及機器深度學習等技術，建立大數據知識網路，並研發進化基因相關疾病、肺癌、肝癌及敗血症之人工智慧決策輔助系統，再逐漸應用到所有的病人身上。分工明確且相互合作的研究團隊將致力完成本計畫。計畫成果具有國際級的高度醫學應用及學術研究價值，可顯著提升人民健康福祉，並建立起具有國際競爭力之醫療 AI 產業。

2. 智慧型傷口管理日誌 - 以人工智慧開發傷口感染及傷口癒合自動判讀為例

慢性傷口病患常不良於行，需耗費大量人力及時間成本才得以回診。考量現行傷口照護缺乏現代化資通訊技術的輔助，本計畫以臨床實務情境為主要研究場域，旨在研發智慧型傷口管理日誌手機應用程式，並整合多項資通訊及醫學影像技術。期望藉由行動醫療及智慧監測的前瞻創新應用，提供高品質且完備的智慧化傷口照護，並達到持續追蹤慢性傷口癒合狀況的目標，讓病患本身、其照護者及臨床人員皆可受惠於此。手機程式主要包含兩大功能：記錄管理、傷口感染及傷口癒合自動判讀功能。慢性傷口病患可以利用手機程式進行慢性傷口管理，包含記錄傷口照片、症狀及問卷評估等。同時藉由不同時期所拍攝的傷口照片，透過深度學習和時序影像分析，輔以傷口監測評分指標，提供慢性傷口癒合情形及風險等級之整體評估，如傷口有辨識到紅、腫、瘻管或感染等不正常癒合之異常情形，可即時發送訊息通知和啟動緊急照護配套方案，以達到遠距監測和及早介入處置之目的。本計畫以資通訊技術加值醫療產業服務，可有效解決社會健康照護需求及臨床實務困境，減少病患就醫成本並提高醫療水準，具有高度醫學應用及學術研究價值，未來亦可結合各式健康雲服務，應用於長期照護等不同型態的照護機構，進而創造外部連結效益及醫療商業模式。

3. 結合多功能居家照護 ERICA 系統與基層醫療體系，建構個人化的居家照護模式，以減輕族群老化對個人與社會的衝擊

本計畫是以獨居老人為照顧目標，包括全時或部分時段獨居的老人。計畫的特點，在開發作業平台與運作架構，結合現代科技、網際網路及基層醫療體系，以受顧者為中心，兼顧人性考量、人際互動與社會連接，建構全時性、及時性、互動性的居家照顧模式，使受雇者能維持獨立自主的生活模式、與照顧者間能建立持久、信賴的互動機制，使照顧者具有成就感。而基層醫師能善盡醫療責任並藉由多元化的醫療作業模式，減輕充作壓力。此照顧模式具有廣泛的運用能力與擴展性，可以促進醫療科技的發展，也可減輕相關家屬負擔，增進其工作能力與生活品質。本計畫在研究過程將從生理、心理、社會（BPS）層面，探討獨居老人在日常生活的需求項目，開發運作平台與適用器材建立照護整合師 care manager, CM 的角色專長探討基層醫療的全時照護機制及與其他照護系統的整合模式，本計畫所需的運作成本有限，可以創造廣大的效益，具有永續經營的特點。開發運作平台與適用器材建立照護整合師 care manager 的角色專長探討基層醫療的全時照護機制及與其他照護系統的整合模式，本計畫所需的運作成本有限，可以創造廣大的效益，具有永續經營的特點。

4. 科技化與資訊化皮膚保存庫

皮膚是人體當中最大的器官，包裹在身體的表層，扮演著保護人體的重要角色。對於大面積嚴重的皮膚傷害，必須及早清創移除壞死組織，也必須給予傷口適當的覆蓋保護，使用捐贈者的皮膚（大體皮膚），仍舊是最理想的生物性敷料。因此，設置皮膚組織保存庫，處理及保存大體皮膚，在治療大面積皮膚傷害，就顯得非常重要了。近幾年來，台灣發生數起重大爆炸意外事件，造成大量大面積受傷病患，於是提升國內皮膚保存庫品質的計畫，有其必要性。為維持本院皮膚保存庫，進而提升品質至歐洲皮庫般完善，以及研發生物性人工皮膚的技術，可以成為邁向亞洲一流醫學中心的條件。本計畫預定深入研究皮膚保存方法，整合資訊系統，建置科技化與資訊化皮膚保存庫，計畫內容包含建置高規格之大體皮膚保存流程、提供高品質與安全之大體皮膚、進行大體皮膚研究、研發生物性人工皮膚、建置出入庫資訊管理系統、建置登錄系統（網路版）、整合捐贈者及受贈者電子病歷、與申請與通過衛生福利部皮膚保存庫認證。因此，在健全皮膚保存庫的架構下，提供量足質精的大體皮膚，造福更多大面積皮膚傷害的病患。

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分子生醫資訊實驗室

Molecular Biomedical Informatics Lab.

分子生醫資訊實驗室專注於設計先進的機器學習演算法以應用於生物醫學的研究上。近幾年，本實驗室與臨床醫師合作，將創新的機器學習演算法運用於臨床資料庫的分析上。主要的成果包括：

- (1) 發現手術中麻醉藥的使用與罹患失智症的相關性；
- (2) 發現長期服用安眠藥與罹患失智症的相關性；
- (3) 發現婦女罹患子宮內膜異位與偏頭痛的相關性；
- (4) 發現 4 個與精神分裂症相關的基因。

The Molecular Biomedical Informatics (MBI) laboratory focuses on design of advanced machine learning algorithms for biomedical applications. During the past few years, the MBI team has been collaborating with clinical physicians to conduct analyses on large medical databases. The main results include:

1. identified the risk of suffering dementia for patients who received anesthesia in surgery;
2. identified the risk of suffering dementia for insomnia patients who were long-term users of hypnotics;
3. identified the risk of suffering migraines for women with Endometriosis;
4. identified 4 genes that are associated with schizophrenia.

主要研究領域 Major Research Areas

生醫資訊學、機器學習 Biomedical informatics, Machine Learning

研究計畫 Research Projects

應用巨量資料探勘與地理空間資訊分析技術針對緊急救護服務之醫療資源管理、配置與未來規劃進行整體研究計畫 -- 應用巨量資料探勘方法分析緊急救護時間、空間、與醫療資訊之研究。

An integrated study on applying massive data mining and geographic information technologies to analyze the resource management, allocation, and future planning of Emergency Medical Service

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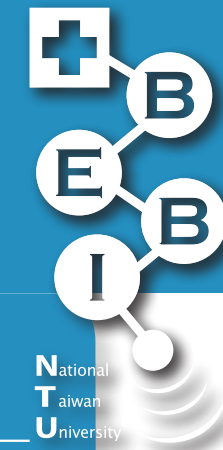
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臨床—生物醫學工程-產業融合實驗室

Merger Laboratory for Clinical Sciences, Biomedical
Engineering and Industry

本融合實驗室由孫維仁教授成立於 1992 年，主要工作是從臨床服務的病患需求觀點，來提供醫療儀器與資訊處理之相關整合研究和產品研發。九〇年代開始，是以病患自控式鎮痛儀 (Patient-Controlled Analgesia, PCA) 導入數位化和無線化技術為主軸的急性疼痛服務提升，開發出 i-Pain® 整合平台，並已和領先全球品牌進行緊密的結合。○三年經歷 SARS 氣管插管爆發群聚感染的致命性災難時，本融合實驗室針對非感染性醫材的迫切市場需求，研發出可拋式內視鏡 Sunscope®，獲得經濟部學界科專和產業的贊助，朝向全球商業市場邁進。三位一體的融合實驗室成立的宗旨就是要：敞開各專業的藩籬，主動並積極的邀集跨領域人才進行多元腦力激盪，讓一切研發終極目標導向臨床應用，通過醫師嚴格的臨床驗證，確保病患實際需求獲得超值滿足，以吸引產業關注和早期資本投入。

In 1992, Professor Wei-Zen Sun founded the merger laboratory in National Taiwan University Hospital. Based on the unmet demand from patient's perspective, we have successfully provided innovative development of medical devices and informatics through synergistic interaction among clinician, and biomedical engineer, and entrepreneur. We started by integrating the digital and wireless technology with conventional PCA pump (patient-controlled analgesia) to transform into an update web-based platform, i-Pain®. This product is currently adopted by a global leader brand and served as the major service module in Asia. In 2003, as SARS outbreak through non-protected endotracheal intubation, we developed the most advanced intubation device with disposable visual tube. This design totally eliminates the risk of air-borne lethal infection by avoiding close contact with patient's airway. This innovative product, Sunscope®, has won a first prized award and is currently supported by government grant and industry investment. Collectively, we establish this merger laboratory to trigger brainstorming among multidisciplinary specialties and to make sure that the cross-reaction of



陸 | 實驗室及教師 Laboratories and Faculty

respective domain knowledge is taken place under the goal: to put forth any helpful effort and technology in synergy, to assess the product under critical assessment of clinicians, to bring in industry investment and commercial distribution for patient welfare.

主要研究領域 Major Research Areas

臨床與生物醫學工程與產業整合、疼痛醫學、麻醉醫學、緊急醫療
Integration of Clinical Science, Biomedical Engineering and Industry; Pain Medicine; Anesthesiology; Emergent Medical Service

研究計畫 Research Projects

1. *i-Pain*® (美商赫士睿公司技術轉移, Hospira, USA)
2. 輸液幫浦研發 (經濟部學界科專委託計畫)
3. 應用巨量資料探勘、地理空間資訊分析技術與實證醫學針對我國緊急救護服務之醫療資源配置、管理與未來規劃進行整體研究計畫 (科技部委託計畫)
4. 基於生命之鏈週期探討智慧型穿戴式裝置之臨床應用—以急重症及術後照護為例 (科技部委託計畫)

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國立臺灣大學藥物研發暨跨領域轉譯醫學與生醫工程國際研究生博士學位學程教授
國立臺灣大學化學生物學暨分子生物物理學國際研究生博士學位學程教授
國立臺灣大學基因體醫學研究中心-代謝體核心實驗室主持人

Chairman, Asia SPARK Regional Committee
Global SPARK executive committee
Director, Drug Research Center, National Taiwan University
Director, SPARK Taiwan
Associate Director, The Neurobiology and Cognitive Science Center, National Taiwan University
Professor, Graduate Institute of Biomedical Electronics and Bioinformatics/
Department of Computer Science and Information Engineering/School of pharmacy/ Genome and Systems Biology Degree Program, College of Life Science,/ International Graduate Program of Drug Discovery, Interdisciplinary Translational Medicine and Biomedical Engineering/ Chemical Biology and Molecular Biophysics Program, National Taiwan University
Principal Investigator, Metabolomics Core Lab, NTU Center of Genomic Medicine

計算分子設計與代謝體學實驗室 Computataional Molecular Design and Metabolomics Lab.

本實驗室是一個跨領域的實驗室，研究的方向有兩個主軸，一是以分子結構為中心探討分子結構與活體、活性、毒性之關係，包括計算化學用在藥物設計、計算毒理學、化學資訊、生物資訊及代謝體學等，本實驗室應用物理化學、數值分析及資訊統計的技術來解決各種生物、化學及醫學方面的問題。目前主要的研究包括：

1. 發展新的計算化學方法做為藥物篩選，化學結構資訊比對，臨床前藥物吸收、分佈、代謝及毒性之分析及新藥設計。
2. 應用代謝體之化學結構光譜找尋臨床上用來做為診斷、病程及癒後生物指標之結構及新藥設計。

Bioinformatics and Cheminformatics Laboratory is a multidisciplinary lab. There are two main research themes in this lab. First and the major one is to analyze molecular structures such as drugs, endogenous molecules, proteins, and relate the structure for their pattern with biological activities, toxicities, and biological systems in the field of computational chemistry, computational toxicology, bioinformatics, cheminformatics, and metabonomics.



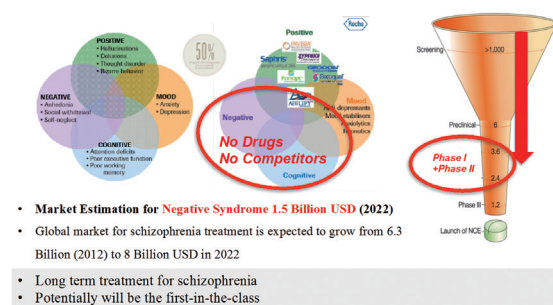
主要研究領域 Major Research Areas

計算化學及計算毒理學、生物資訊學、新藥開發、代謝體學
Computational Chemistry and Toxicology, Drug Discovery, Bioinformatics, and Metabolomics

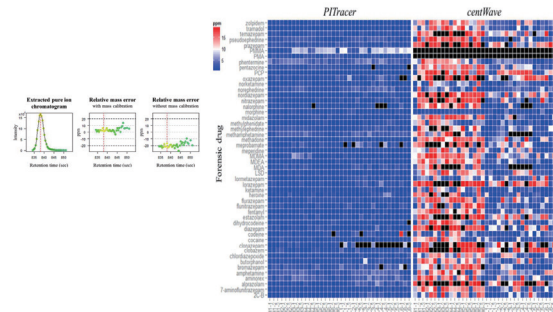
研究計畫 Research Projects

1. 價創計畫：新型治療思覺失調症藥物 RS-D7 之臨床前安全試驗
2. 補助學者提昇國際影響力【積極參與美國化學學會學術議程委員及藥物開發研討會主席以拓展國際新藥開發視野 (3/3)】
3. 核心研究群計畫【神經退化疾患之腦腸軸表現型與特定 NMDA 受體調節藥物之藥物動力學分析】
4. 建構及發展藥物代謝動力學特徵及毒性人工智慧預測篩選平台
5. 學術研究生涯發展計畫 - 深耕型研究計畫【腸胃道微生物及其相互作用對於思覺失調症與雙極性憂鬱症患者腦腸軸之作用】

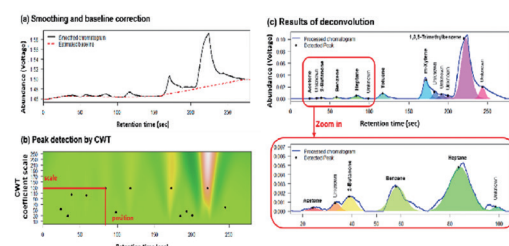
Schizophrenia New Drug Discovery



A pure ion chromatogram extraction algorithm for metabolite identification



A portable GC system for lung cancer-associated biomarkers detection

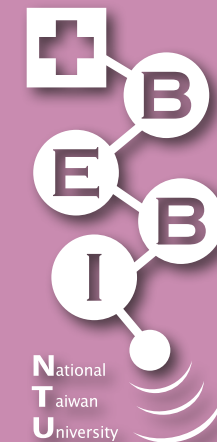


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柒 發表論文 Publications



陳志宏教授 Jyh-Horng Chen, Professor

學術期刊論文 Journal articles

1. Ai-Ling Hsu, Ping Hou, Jason M. Johnson, Changwei W. Wu, Kyle R. Noll, Sujit S. Prabhu, Sherise D. Ferguson, Vinodh A. Kumar, Donald F. Schomer, John D. Hazle1, Jyh-Horng Chen* and Ho-Ling Liu*, "IClinfMRI Software for Integrating functional MRI Techniques in Presurgical Mapping and Clinical Studies", Frontiers in Neuroinformatics, Mar 2018, doi.org/10.3389/fninf.2018.00011

研討會論文 Conference & proceeding papers

1. Po-Wei Cheng, Edzer L. Wu, Tun Jao, Tzi-Dar Chiueh, Jyh-Horng Chen," Middle Cerebral Artery distinctness improvement in MR imaging using High-Resolution SE-WB technique" ,Organization for Human Brain Mapping, Rome, Italy, (2019) (Poster).
2. Po-Wei Cheng, Edzer L. Wu, Chun-Chieh Yu, Chia-Hao Su, Tzi-Dar Chiueh, Jyh-Horng Chen, " Enhancement of Spatial/ Temporal Resolution Using Single-frequency Excitation Wideband MRI (SE-WMRI) implementation on 9.4T MRI", World Molecular Imaging Congress,Washington State, Seattle, (2018) (Poster).
3. Hong-Yi Wu, Chih-Mao Huang, Jyh-Horng Chen, Changwei W. Wu, "Creativity Performance Reflected on the Activation of Divergent Thinking and Connectivity of Inferior Frontal Gyrus", Annual Meeting of International Society for Magnetic Resonance in Medicine, Paris, France, (2018) (Poster).
4. Ai-Ling Hsu, Ping Hou, Jason M Johnson, Changwei W Wu, Kyle R Noll, Sujit S Prabhu, Sherise D Ferguson, Vinodh A Kumar, Donald F Schomer, John D Hazle, Jyh-Horng Chen, Ho-Ling Liu, "A software package designed to integrate advanced fMRI methods for presurgical mapping and clinical studies (IClinfMRI)", Annual Meeting of International Society for Magnetic Resonance in Medicine, Paris, France, (2018) (Poster).
5. Ai-Ling Hsu, Jason M Johnson, Kyle R Noll, Sujit S Prabhu, Sherise D Ferguson, Donald F Schomer, Jyh-Horng Chen, Ho-Ling Liu, "Combining regional homogeneity and Meta-analysis to improve preoperative language mapping with resting-state functional MRI", Annual Meeting of International Society for Magnetic Resonance in Medicine, Paris, France, (2018) (Poster).

成佳憲教授 Chia-Hsien Cheng, Professor

學術期刊論文 Journal articles

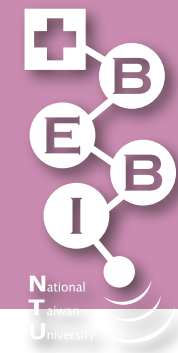
1. Lu SL, Hsu FM, Tsai CL, Lee JM, Huang PM, Hsu CH, Lin CC, Chang YL, Hsieh MS, Cheng JC*. Improved prognosis with induction chemotherapy in pathological complete responders after trimodality treatment for esophageal squamous cell carcinoma: Hypothesis generating for adjuvant treatment. European Journal of Surgical Oncology 45:1498-1504, 2019 (SCI)
2. Tsai CL, Liu WL, Hsu FM, Yang PS, Yen RF, Tzen KY, Cheng AL, Chen PJ, Cheng JC*. Targeting histone deacetylase 4/ Ubc9 impairs DNA repair for radiosensitization of hepatocellular carcinoma cells. Hepatology 67:586-599, 2018 (SCI)
3. Huang TC, Lin CC, Wu YC, Cheng JC, Lee JM, Wang HP, Huang PM, Hsu FM, Yeh KH, Cheng AL, Tzen KY, Hsu CH. Phase II study of metabolic response to one-cycle chemotherapy in patients with locally advanced esophageal squamous cell carcinoma. Journal of the Formosan Medical Association 118; 1024-1030, 2019 (SCI)
4. Lin YC, Wang YJ, Cheng JC, Lin YH. Contactless monitoring of pulse rate and eye movement for uveal melanoma patients undergoing radiation therapy. IEEE Transactions and Measurements 68:474-482, 2019 (SCI)

5. Yang WC, Xiao F, Shih JY, Ho CC, Chen YF, Tseng HM, Chen KY, Liao WY, Yu CJ, Yang JC, Kuo SH, Cheng JC, Yang PC, Hsu FM. Epidermal growth factor receptor mutation predicts favorable outcomes in non-small cell lung cancer patients with brain metastases treated with stereotactic radiosurgery. Radiotherapy and Oncology 126; 368-374, 2018 (SCI)
6. Guo JC, Lin CC, Huang TC, Huang PM, Kuo HY, Chang CH, Wang CC, Cheng JC, Yeh KH, Hsu CH, Lee JM. Number of resected lymph nodes and survival of patients with locally advanced esophageal squamous cell carcinoma receiving preoperative chemoradiotherapy. Anticancer Research 38;1569-1577, 2018 (SCI)
7. Huang PM, Hsu FM, Lin CC, Hsu CH, Cheng JC, Lee JM. Do we need to add postoperative radiotherapy in patients undergoing trimodality therapy for esophageal squamous cell carcinoma with positive lymph nodes disease? Digestive Surgery 35;104-110, 2018 (SCI)

莊曜宇教授 Eric Y. Chuang, Professor

學術期刊論文 Journal articles

1. Y.F. Lee, C.Y. Lee, L.C. Lai, M.H. Tsai, T.P. Lu, E.Y. Chuang*, CellExpress: a comprehensive microarray-based cancer cell line and clinical sample gene expression analysis online system, DATABASE-OXFORD
2. S.H. Huang, Y.S. Chang, J.M. Jimmy Juang, K.W. Chang, M.H. Tsai, T.P. Lu, L.C. Lai, E.Y. Chuang, N.T. Huang, An automated microfluidic DNA microarray platform for genetic variant detection in inherited arrhythmic diseases, ANALYST
3. T.H. Hsiao, Y.H. Chen, H.I. Chen, Y.C. Chiu, E.Y. Chuang*, Y. Chen, Utilizing Cancer–Functional Gene set–Compound Networks to Identify Putative Drugs for Breast Cancer, COMB CHEM HIGH T SCR
4. H.C. Lin, C.C. Yeh, L.Y. Chao, M.H. Tsai, H.H. Chen, E.Y. Chuang, L.C. Lai, The hypoxia-responsive lncRNA NDRG-OT1 promotes NDRG1 degradation via ubiquitin-mediated proteolysis in breast cancer cells, ONCOTARGET
5. C.Y. Lee, P.H. Hsieh, L.M. Chiang, A. Chattopadhyay, K.Y. Li, Y.F. Lee, T.P. Lu, L.C. Lai, E.C. Lin, H. Lee, S.T. Ding, M.H. Tsai, C.Y. Chen, E.Y. Chuang*, Whole-Genome De Novo Sequencing Reveals Unique Genes that Contributed to the Adaptive Evolution of the Mikado Pheasant, GIGASCIENCE
6. C.Y. Shen, Y.C. Chang, L.H. Chen, W.C. Lin, Y.H. Lee, S.T. Yeh, H.K. Chen, W. Fang, C.P. Hsu, J.M. Lee, T.P. Lu, P.W. Hsiao, L.C. Lai, M.H. Tsai, E.Y. Chuang*, The extracellular SEMA domain attenuates intracellular apoptotic signaling of semaphorin 6A in lung cancer cells, ONCOGENESIS
7. W.C. Lin, L.H. Chen, Y.C. Hsieh, P.W. Yang, L.C. Lai, E.Y. Chuang, J.M. Lee, M.H. Tsai, miR-338-5p inhibits cell proliferation, colony formation, migration, and cisplatin resistance in esophageal squamous cancer cells by targeting FERMT2, CARCINOGENESIS
8. C.S. Hsieh, C.T. Tsai, Y.H. Chen, S.N. Chang, J.J. Hwang, E.Y. Chuang*, I.H. Wu, Global Expression Profiling Identifies a Novel Hyaluronan Synthases 2 Gene in the Pathogenesis of Lower Extremity Varicose Veins, J CLIN MED
9. P.H. Ko, Y.C. Shen, K. Murugan, C.W. Huang, G. Sivakumar, P. Pal, C.C. Liao, K.S. Luo, E.Y. Chuang, M.H. Tsai, L.C. Lai, Macrophage Migration Inhibitory Factor Acts as the Potential Target of a Newly Synthesized Compound, 1-(9'-methyl-3'-carbazole)-3, 4-dihydro-β-carboline, SCI REP-UK
10. T.T. Wang, C.Y. Lee, L.C. Lai, M.H. Tsai, T.P. Lu, E.Y. Chuang*, anamiR: integrated analysis of MicroRNA and gene expression profiling, BMC BIOINFORMATICS
11. C.S. Hsieh, P.S. Huang, S.N. Chang, C.K. Wu, J.J. Hwang, E.Y. Chuang*, C.T. Tsai, Genome-Wide Copy Number Variation Association Study of Atrial Fibrillation Related Thromboembolic Stroke, J CLIN MED



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12. P.H. Ko, C.W. Huang, H.H. Chang, Eric Y. Chuang, M.H. Tsai, L.C. Lai, Identifying the functions and biomarkers of Codonopsis pilosula and Astragalus membranaceus aqueous extracts in hepatic cells, CHIN MED-UK
13. C.H. Lin, C.C. Chen, H.L. Chiang, J.M. Liou, C.M. Chang, T.P. Lu, E.Y. Chuang, Y.C. Tai, C. Cheng, H.Y. Lin, M.S. Wu, Altered gut microbiota and inflammatory cytokine responses in patients with Parkinson's disease, J NEUROINFLAMM
14. C.Y. Lee, A. Chattopadhyay, L.M. Chiang, J.M. Jimmy Juang, L.C. Lai, M.H. Tsai, T.P. Lu, E.Y. Chuang*, VariED: the first integrated database of gene annotation and expression profiles for variants related to human diseases, DATABASE-OXFORD
15. L.C. Lai, Q.L. Sun, Y.A. Chen, Y.W. Hsiao, T.P. Lu, M.H. Tsai, L. Zhu, E.Y. Chuang*, W.T. Fang, Using proteomic profiling to characterize protein signatures of different thymoma subtypes, BMC Cancer
16. L.H. Chen, C.Y. Liao, L.C. Lai, M.H. Tsai, Eric Y. Chuang*, Semaphorin 6A Attenuates the Migration Capability of Lung Cancer Cells via the NRF2/HMOX1 Axis, SCI REP-UK
17. J.M. Liou, C.C. Chen, C.M. Chang, Y.J. Fang, M.J. Bair, P.Y. Chen, C.Y. Chang, Y.C. Hsu, M.J. Chen, C.C. Chen, J.Y. Lee, T.H. Yang, J.C. Luo, C.Y. Chen, W.F. Hsu, Y.N. Chen, J.Y. Wu, J.T. Lin, TP Lu, Eric Y Chuang, Emad M El-Omar, MS. Wu, Long-term changes of gut microbiota, antibiotic resistance, and metabolic parameters after Helicobacter pylori eradication: a multicentre, open-label, randomised trial, LANCET INFECT DIS

黃念祖副教授 Nien-Tsu Huang, Associate Professor

學術期刊論文 Journal articles

1. Yi-Ying Wang, Ho-Wen Cheng, Kai-Wei Chang, Jessie Shiue, Juen-Kai Wang, Yuh-Lin Wang, and Nien-Tsu Huang*, "A particle-based microfluidic molecular separation integrating surface-enhanced Raman scattering sensing for purine derivatives analysis", Microfluidics and Nanofluidics (2019) 23: 48. (Fields: Instruments & Instrumentation: 17/58, SCI, Impact Factor: 2.38)
2. Sheng-Han Chu, Li-Lun Lo, T. Tony Yang, Jung-Chi Liao, and Nien-Tsu Huang*, "A microfluidic device for in situ fixation and super-resolved mechanosensation studies of primary cilia", Biomicrofluidics 13, 014105, 2019. (Fields: Physics, Fluids & Plasmas: 10/31, SCI, Impact Factor: 2.57)
3. Da-Han Kuan, Chia-Chien Wu, Wei-Yu Su, and Nien-Tsu Huang*, "A Microfluidic Device for simultaneous Extraction of Plasma, Red Blood Cells and on-chip White Blood Cell Trapping" Scientific Reports, Volume 8, Issue 1, pp. 15345, 2018/10. (Fields: Multidisciplinary science: 12/64, SCI, Impact Factor: 4.12)
4. S.-H. Huang, Y.-S. Chang, J.-M. J. Juang, K.-W. Chang, M.-H. Tsai, T.-P. Lu, L.-C. Lai, E. Y. Chuang, and N.-T. Huang*, "An Automated Microfluidic DNA Microarray Platform for Genetic Variants Detection in Inherited Arrhythmic Diseases" Analyst, Volume 143, Issue 6, pp. 1367 - 1377, 2018/03. (Selected as the front cover image of Analyst) (Fields: Chemistry, analytical: 12/76, SCI, Impact Factor: 3.89)
5. N.-T. Huang*, Y. J. Hwang, R. L. Lai, "A microfluidic microwell device for immunomagnetic single-cell trapping" Microfluidics and Nanofluidics, 22:16, 2018. (Fields: Instruments & Instrumentation: 17/58, SCI, Impact Factor: 2.34)

研討會論文 Conference & proceeding papers

1. Hsiu-Kang Huang, Nien-Tsu Huang, "A Microfluidic Microwell Device Integrating Surface-enhanced Raman Scattering for Rapid Antibiotic Susceptibility Test of Blood-Borne Pathogen", IEEE NEMS 2019, Singapore, April 11 to 14, 2019.
2. Chi-Chen Lin, Jhih-Siang Chen, Chien-Lin Wu, Lon A. Wang, Nien-Tsu Huang, "A Nanodisk Array Based Localized Surface Plasmon Resonance (LSPR) Sensor Fabricated by Laser Interference Lithography", IEEE NEMS 2019, Singapore, April 11 to 14, 2019.
3. Da-Han Kuan, Chia-Chien Wu, Ting-Wei Lin, Chih-Ting Lin, and Nien-Tsu Huang, "A MICROFLUIDIC PLATFORM FOR WHOLE BLOOD COLLECTION AND ON-CHIP PLASMA EXTRACTION", μ TAS 2018, Kaohsiung, Taiwan, November 11 to 15, 2018.

4. Chia-Chien Wu, Da-Han Kuan, Wei-Yu Su, and Nien-Tsu Huang, "A Microfluidic Device for Simultaneous Extraction of Plasma, Red Blood Cells and On-Chip White Blood Cells Trapping", μ TAS 2018, Kaohsiung, Taiwan, November 11 to 15, 2018.
5. Yu-Hao Huang, Yu-Hao Chang, Da-Han Kuan, Jui-Cheng Huang, Yu-Jie Huang, Chih-Ting Lin and Nien-Tsu Huang, "A MICROFLUIDIC WHOLE BLOOD PROCESSING PLATFORM INTEGRATING ION-SENSITIVE FIELD-EFFECT TRANSISTOR SENSOR FOR GLYCATED HEMOGLOBIN DETECTION", μ TAS 2018, Kaohsiung, Taiwan, November 11 to 15, 2018.
6. Sheng-Han Chu, Li-Lun Lo, Richard Lee Lai, T. Tony Yang, Jung-Chi Liao and Nien-Tsu Huang, "DETERMINING MECHANICAL STIMULATION RESPONSES OF PRIMARY CILIA WITH AN INTEGRATED MICROFLUIDICS PLATFORM", μ TAS 2018, Kaohsiung, Taiwan, November 11 to 15, 2018.
7. Hana Tzu-Han Lin, Jhih-Siang Chen, and Nien-Tsu Huang, "An automated microfluidic platform integrating dual-mode microchannel and localized surface plasmon resonance sensing for multi-parallel biomolecule detection", μ TAS 2018, Kaohsiung, Taiwan, November 11 to 15, 2018.
8. Kai-Wei Chang, Ho-Wen Cheng, Jessie Shiue, Juen-Kai Wang, Yuh-Lin Wang, and Nien-Tsu Huang, "RAPID BACTERIAL DETECTION USING A MICROFLUIDIC SYSTEM INTEGRATING MEMBRANE FILTRATION AND SURFACE-ENHANCED RAMAN SCATTERING", μ TAS 2018, Kaohsiung, Taiwan, November 11 to 15, 2018.
9. C.-C. Lin, J.-F. Luo, L. A. Wang, and N.-T. Huang, "A Nanoplasmonic Sensor Fabricated by Laser Interference Lithography (LIL) for Immunoglobulin Detection" CLEO: Applications and Technology 2018, May 13 to 18, 2018.
10. Yi-Ying Wang, Ho-Wen Cheng, Kai-Wei Chang, Juen-Kai Wang, Yuh-Lin Wang, Nien-Tsu Huang, "A Microfluidic System Combining Liquid Chromatography and Surface-enhanced Raman Scattering for Molecular Detection", IEEE NEMS 2018, Singapore, April 22 to 26, 2018..

鍾孝文教授 Hsiao-Wen Chung, Professor

學術期刊論文 Journal articles

1. Lai PH, Chung HW, Chang HC, Fu JH, Wang PC, Hsu SH, Hsu SS, Lin HS, Chuang TC. Susceptibility-weighted imaging provides complementary value to diffusion-weighted imaging in the differentiation between pyogenic brain abscesses, necrotic glioblastomas, and necrotic metastatic brain tumors. European Journal of Radiology 2019;117:56-61.
2. Tsai PH, Chen YC, Chiang SW, Huang TY, Chou MC, Liu HS, Chung HW, Peng GS, Ma HI, Kao HW, Chen CY. Changes in sensorimotor-related thalamic diffusion properties and cerebrospinal fluid hydrodynamics predict gait responses to tap test in idiopathic normal-pressure hydrocephalus. European Radiology 2018;28:4504-4513.
3. Liu HS, Chiang SW, Chung HW, Tsai PH, Hsu FT, Cho NY, Wang CY, Chou MC, Chen CY. Histogram analysis of T2*-based pharmacokinetic imaging in cerebral glioma grading. Computer Methods and Programs in Biomedicine 2018;155:19-27.
4. Kuo YS, Yang SC, Chung HW, Wu WC. Toward quantitative fast diffusion kurtosis imaging with b-values chosen in consideration of signal-to-noise ratio and model fidelity. Medical Physics 2018;45:605-612.
5. Chu ML, Chang HC, Chung HW, Bashir MR, Cai J, Zhang L, Sun D, Chen NK. Free-breathing abdominal MRI improved by Repeated k-t-subsampling and artifact-minimization (ReKAM). Medical Physics 2018;45:178-190.

研討會論文 Conference & proceeding papers

1. Tsai PH, Su TJ, Liu HS, Hsu FT, Kao YC, Lu CF, Chung HW, Chen CY (2019) Quantitative R2 mapping reveals information of myelin content in rat brain at 7T, in International Society of Magnetic Resonance in Medicine, 27th Annual Meeting, #2621, Montreal, Canada.
2. Tsai PH, Liu HS, Hsu FT, Kao YC, Lu CF, Chung HW, Chen CY (2018) Sequential changes of diffusion anisotropy and mean kurtosis in cuprizone-induced demyelination: a rat model, in International Society of Magnetic Resonance in Medicine, 26th Annual Meeting, #1853, Paris, France.
3. Yu CY, Huang TY, Chung HW (2018) Single breath-hold MR T1-mapping in the heart: comparison of hybrid MOLLI and MOLLI53, in International Society of Magnetic Resonance in Medicine, 26th Annual Meeting, #2916, Paris, France.



4. Cheng CM, Yeh TC, Hsieh JC, Chung HW (2018) MR susceptometry based superior sagittal sinus venous oxygen saturation: effects of carbon dioxide based cerebral vascular reserve and anesthesia in Moyamoya patients, in International Society of Magnetic Resonance in Medicine, 26th Annual Meeting, #4934, Paris, France.

管傑雄教授Chieh-Hsiung Kuan, Professor

學術期刊論文 Journal articles

1. Chun Nien, Li-Cheng Chang, Jia-Hao Ye, Vin-Cent Su, Chao-Hsin Wu and Chieh-Hsiung Kuan (Aug, 2017). Proximity effect correction in electron-beam lithography based on computation of critical-development time with swarm intelligence. Journal of Vacuum Science & Technology B.
2. Li-Cheng Chang, Chun Nien, Jia-Hao Ye, Cheng-Huan Chung, Vin-Cent Su, Chao-Hsin Wu, and Chieh-Hsiung Kuan (Sept, 2017). A comprehensive model for sub-10nm electron-beam patterning through the shorttime and cold development. Nanotechnology.
3. Li-Cheng Chang, Chun Nien, Jia-Hao Ye, Cheng-Huan Chung, Vin-Cent Su, Chao-Hsin Wu, and Chieh-Hsiung Kuan (Sept, 2017). A comprehensive model for sub-10nm electron-beam patterning through the shorttime and cold development. Nanotechnology.
4. Kung-Chu Ho, Vin-Cent Su, Da-Yo Huang, Ming-Lun Lee, Nai-Kuan Chou, Chieh-Hsiung Kuan (Nov, 2017). Investigation of low frequency electrolytic solution behavior with an accurate electrical impedance method. Chemical Physics Letters.
5. Chen, P. H., Su, V. C., Wu, S. H., Lin, R. M., & Kuan, C. H (Jan, 2018). Defect reduction in GaN on dome-shaped patterned-sapphire substrates. Optical Materials.
6. Shuming Wang, Pin Chieh Wu, Vin-Cent Su, Yi-Chieh Lai, Mu-Ku Chen, Hsin Yu Kuo, Bo Han Chen, Yu Han Chen, Tzu-Ting Huang, Jung-Hsi Wang, Ray-Ming Lin, Chieh-Hsiung Kuan, Tao Li, Zhenlin Wang, Shining Zhu & Din Ping Tsai (Jan, 2018). A broadband achromatic metalens in the visible. Nature Nanotechnologyvolume.

研討會論文 Conference & proceeding papers

1. Chun Nien, Yi-Hsuan Li, Vin-Cent Su, Chieh-Hsiung Kuan (Mar, 2017). Ultra-sensitive molecular detection using surface-enhanced Raman scattering on periodic metal-dielectric nanostructures. SPIE Proceedings.
- Vin-Cent Su, Po-Hsun Chen, Ta-Cheng Hsu, Yu-Yao Lin, Chieh-Hsiung Kuan (May, 2017). Enhanced Internal-Quantum Efficiency of GaN-based Light-Emitting Diodes with a Larger Post-Duty Cycle of Patterned-Sapphire Substrates. 2017 The Conference on Lasers and Electro-Optics (CLEO 2017).

郭柏齡副教授 Po-Ling Kuo, Associate Professor

學術期刊論文 Journal articles

1. Yu-Chiu Kao, Jhu-Rong Jheng, Huei-Jyuan Pan, Wei-Yu Liao, Chau-Hwang Lee, Po-Ling Kuo," Elevated hydrostatic pressure enhances the motility and enlarges the size of the lung cancer cells through aquaporin upregulation mediated by caveolin-1 and ERK1/2 signaling", Oncogene, 2017, 36(6):863-874.
2. Po-Ling Kuo, Ching-Che Charng, Po-Chen Wu, Pai-Chi Li, "Shear-wave elasticity measurements of three-dimensional cell cultures for mechanobiology", Journal of Cell Science, 2017, 130(1):292-302.
3. Chia-Lun Yeh, Po-Ling Kuo, Jean-Luc Gennisson, Javier Brum, Mickaël Tanter, and Pai-Chi Li, "Shear wave measurements for evaluation of tendon diseases", IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 2016, 63(11), 1906.

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1. Yu-Chiu Kao, Huei-Jyuan Pan, Chau-Hwang Lee, Po-Ling Kuo, "Caveolin-1 phosphorylation drives elevated hydrostatic

pressure-induced invasion of lung cancer cells", The Biophysical Society thematic meeting on the Mechanobiology of Disease, 2016 Sep, Singapore.

李枝宏特聘教授Ju-Hong Lee, Distinguished Professor

學術期刊論文 Journal articles

1. Ju-Hong Lee, C.-J. Ciou, and Y.-H. Yang, "Two-dimensional symmetric half-plane recursive doubly complementary digital lattice filters," International Journal of Electrical, Computer, Energetic, Electronic and Communication Engineering, Vol. 10, No. 5, pp. 628-634, 2016.
2. Ju-Hong Lee and J.-S. Du, "Phase characteristics for the stability of 2-D quarter-plane recursive digital all-pass filters," IEEE Transactions on Circuits and Systems II, Vol. 63, No. 3, pp. 289-293, March 2016.
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6. T.-W. Chiang and Ju-Hong Lee, "Finite-SNR diversity-multiplexing tradeoff with accurate performance analysis for fully correlated Rayleigh MIMO channels," IEEE Trans. on Vehicular Technology, Vol. 65, No. 11, pp. 8910-8924, November 2016.
7. Ju-Hong Lee and J.-S. Du, "Lattice structure realization for the design of 2-D digital allpass filters with general causality," IEEE Trans. on Circuits and Systems I, Vol. 64, No. 2, pp. 419-431, February 2017.
8. Ju-Hong Lee and C.-J. Ciou "Design of two-channel quincunx quadrature mirror filter banks using digital all-pass lattice filters," International Journal of Computer, Electrical, Automation, Control and Information Engineering, Vol. 11, No. 5, pp. 446-452, 2017.
9. Y.-F. Wang and Ju-Hong Lee, "A simple phase noise suppression scheme for massive MIMO uplink systems" IEEE Trans. on Vehicular Technology, Vol. 66, No. 6, pp. 4769-4780, June 2017.
10. Ju-Hong Lee and J.-Y. Lee, "Optimal beamforming-selection spatial precoding using population-based stochastic optimization for massive wireless MIMO communication systems," Journal of the Franklin Institute, Vol. 354, No. 10, pp. 4247-4272, July, 2017.

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1. Y.-F. Wang and Ju-Hong Lee, "A novel symbol-based near ML detection scheme with unequal error protection for MIMO systems," IEEE Wireless Communications and Networking Conference (WCNC), San Francisco, CA, USA, March 19-22, 2017.

李嗣涇特聘教授 Si-Chen Lee, Distinguished Professor

學術期刊論文 Journal articles

1. Y. J. Huang and S. C. Lee, 2017, "Graphene/h-BN Heterostructures for Vertical Architecture of RRAM Design", Sci. Rep. 7, 9679, doi:10.1038/s41598-017-08939-2
2. W. L. Huang, H. H. Hsiao, C. Y. Lin, M. R. Tang, and S. C. Lee, 2017, "Waveguide resonances with selectable polarization in an infrared thermal emitter", AIP Advance, 7, 085112.
3. C. S. Chang Chien, H. M. Chang, W. T. Lee, M. R. Tang, C. H. Wu, and S. C. Lee, 2017, "High Performance MoS2 TFT using Graphene Contact First Process", AIP Advance, 8, 085018.
4. C. H. Hong, C. F. Hsieh, C. S. Tseng, W. C. Huang, C. Y. Guo, S. Lin, and S. C. Lee, 2017, "A nanobiosensing method based on force measurement of antibody-antigen interaction for direct detection of enterovirus 71 by the chemically modified atomic force



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5. M. R. Tang, H. H. Hsiao, C. H. Hong, W. L. Huang, and S. C. Lee, 2018, “An uncooled LWIR-detector with LSPR enhancement and selective narrow absorption”, IEEE Photon. Technol. Lett., accepted.

李百祺特聘教授 **Pai-Chi Li, Distinguished Professor**

學術期刊論文 **Journal articles**

1. C.-Y. Lee, T. L. Truong and P.-C. Li, “Automated Conformal Ultrasound Scanning for Breast Screening”, Journal of Medical and Biological Engineering, Vol.38, pp. 116-128, February 2018.
2. K.-W. Wu, Y.-A. Wang and P.-C. Li, “Laser Generated Leaky Acoustic Waves for Needle Visualization”, IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control, Vol. 65, Issue 4, pp. 546-556, April 2018.
3. L. T.-L. Tseng, C.-L. Lin, K.-H. Pan, K.-Y. Tzen, M.-J. Su, C.-T. Tsai, Y.-H. Li, P.-C. Li, F.-T. Chiang, S.-C. Chang and M.-F. Chang, “Single allele Lmbrd1 knockout results in cardiac hypertrophy”, Journal of the Formosan Medical Association, Vol. 117-6, pp. 471-479, June, 2018.
4. U-W Lok and P.-C. Li, “Micro-beamforming with Error Compensation”, IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control , Vol. 65, Issue 7, pp. 1153-1165, July 2018.
5. J. Gao, J. Chen, M. O’Dell, P.-C. Li, W. He, L.J. Du, J.M. Rubin, W. Weitzel, R. Min, “Ultrasound Strain Imaging to Assess the Biceps Brachii Muscle in Chronic Poststroke Spasticity”, Journal of Ultrasound in Medicine, Vol. 37, Issue 8, pp. 2043-2052, August, 2018.
6. P.-Y. Chao, W.-W. Liu, S.-F. You and P.-C. Li, “Shear Wave Elasticity Measurements of Three-Dimensional Cancer Cell Cultures Using Laser Speckle Contrast Imaging”, Scientific Reports 8, 14470, 2018.
7. Y.-H. Hsu, W.-W. Liu, T.-H. Wu, J.-T. Lee, Y.-H. Chena and P.-C. Li, “Study of Diffusive- and Convective-Transport Mediated Microtumor Growth in a Controlled Microchamber”, Biomedical Microdevices, Vol. 21-7, March, 2019.
8. W.-W. Liu, S.-H. Huang and P.-C. Li, “Synchronized optical and acoustic droplet vaporization for effective sonoporation”, Pharmaceutics, Vol. 11-6, June, 2019.
9. C.-Y. Lee and P.-C. Li, “Automatic Conformal Anti-Radial Ultrasound Scanning for Whole Breast Screening”, Journal of Medical and Biological Engineering, July, 2019.

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1. W.-W. Liu and P.-C. Li, “Ultrasound Modulates Piezo1-Mediated Mechanotransduction in Neuro2A Cells”, 62nd Annual Meeting of the Biophysical Society, San Francisco, California, February 17-21, 2018.
2. J. Gao, J. Chen, M. O’Dell, P.-C. Li, J. Rubin, and R. Min, “Ultrasound Strain Imaging to Assess the Biceps Brachii Muscle in Chronic Post-Stroke Spasticity”, The American Institute of Ultrasound in Medicine(AIUM2018) Convention, New York, USA, March 24-28, 2018.
3. P.-C. Li, “Adaptive Beamforming and Motion Estimation in Ultrafast Ultrasound Imaging”, invited talk, the 13th Congress of the Asian Federation of Societies for Ultrasound in Medicine and Biology in conjunction with ACUCI 2018, Seoul, Korea, May 23-26, 2018.
4. P.-C. Li, “Shear Wave Imaging for Preclinical Research”, invited talk, the 13th Congress of the Asian Federation of Societies for Ultrasound in Medicine and Biology in conjunction with ACUCI 2018, Seoul, Korea, May 23-26, 2018.
5. P.-C. Li, “Future Prospects of Basic Ultrasound Research”, invited talk, the 13th Congress of the Asian Federation of Societies for Ultrasound in Medicine and Biology in conjunction with ACUCI 2018, Seoul, Korea, May 23-26, 2018.

6. P.-C. Li, “Ultrasound technologies for preclinical and clinical research”, IFMBE Awardees Keynote Lectures, World Congress on Medical Physics and Biomedical Engineering, Prague, Czech Republic, June 3-8, 2018.
7. P.-C. Li and P.-Y. Chao, “3D Shear Wave Elasticity Tomography based on Laser Speckle Contrast Imaging”, IEEE International Ultrasonics Symposium (IUS), Kobe, Japan, October 22-25, 2018.
8. P.-C. Li, W.-W. Liu and S.-H. Huang, “Synchronized ADV and ODV for enhanced cavitation”, IEEE International Ultrasonics Symposium (IUS), Kobe, Japan, October 22-25, 2018.
9. P.-C. Li , C.-L. Lee and Y.-S. Yang, “Shear Wave Computed Tomography with Directional Filtering”, IEEE International Ultrasonics Symposium (IUS), Kobe, Japan, October 22-25, 2018.
10. P.-C. Li, and C.-Y. Lee, “Improved Decorrelation Based Elevational Motion Estimation with Singular Value Decomposition and Machine Learning”, IEEE International Ultrasonics Symposium (IUS), Kobe, Japan, October 22-25, 2018.
11. W.-W. Liu, S.-H. Chen and P.-C. Li, “Functional calcium imaging using opticalresolution photoacoustic microscopy in a 3D tumor cell culture”, SPIE BiOS, San Francisco, California, United States, February 2-7, 2019.

李心予教授 **Hsinyu Lee, Professor**

學術期刊論文 **Journal articles**

1. Chang HH, Liu YL, Lu MY, Jou ST, Yang YL, Lin DT, Lin KH, Tzen KY, Yen RF, Lu CC, Liu CJ, Peng SS, Jeng YM, Huang SF, Lee H, Juan HF, Huang MC, Liao YF, Lee YL, Hsu WM. A multidisciplinary team care approach improves outcomes in high-risk pediatric neuroblastoma patients. Oncotarget. 8(3): 4360-4372. doi: 10.18632/oncotarget.13874. Dec 10, 2017. (5.168, 44/217, 2016)
2. Hsia K, Yang MJ, Chen WM, Yao CL, Lin CH, Loong CC, Huang YL, Lin YT, Lander AD, H Lee* and J Lu*. S1P improves endothelialization with reduction of thrombosis in re-cellularized human umbilical vein graft by inhibiting syndecan-1 shedding in vitro. Acta Biomaterialia. 51:341-350. 2017. (6.319, 3/77, 2016)
3. Wang BJ, Her GM, Hu MK, Chen YW, Tung YT, Wu PY, Lee H, Jin LW, Huang, SL, Chen RP, Huang CJ and Liao YF. ErbB2 regulates autophagic flux to modulate the proteostasis of APP-CTFs in Alzheimer's disease. Proceedings of the National Academy of Sciences of the United States of America, 114(15): E3219-E3138. [Epub ahead of print, Mar 28, 2017], 2017. (9.661, 4/64, 2016)
4. Kuo CT, Wang JY, Wo AM, Chen BP* and H Lee*. ParaStamp and its application to cell patterning, drug synergy screening, and rewritable devices for droplet storage. Advanced Biosystems. DOI: 10. 1002/abdi.201770024. [Epub ahead of print, Apr. 25, 17], 2017. (Selected as cover image)
5. Kuo CT, Wang JY, Lin YF, Wo AW, Chen BP* and H Lee*. Three-dimensional spheroid culture targeting versatile tissue bioassays using a PDMS-based hanging drop array. Scientific Reports. 7(1): 4363. Jun 29, 2017. (4.259, 10/64, 2016)
6. Weng WC, Lin KH, Wu PY, Ho YS, Liu YL, Wang BJ, Chen CC, Liao YF, Lee WT, Hsu WM* and H Lee*. VEGF expression correlates with neuronal differentiation and predicts a favorable prognosis in patients with neuroblastoma. Scientific Reports. 7(1): 11212. Sep 11, 2017. (4.259, 10/64, 2016)
7. Lin YC, Ohbayashi N, Hongu T, Katagiri N, Funakoshi Y, Lee H and Kanaho Y. Arf6 in lymphatic endothelial cells regulates lymphangiogenesis by controlling directional cell migration. Scientific Reports. 7(1): 11240. Sep 12, 2017. (4.259, 10/64, 2016)
8. Lin KH, Li MW, Chang YC, Lin YN, Chang BE, Huang CJ, Yao CL* and Lee H*. Activation of lysophosphatidic acid receptor 3 inhibits megakaryopoiesis in human hematopoietic stem cells and zebrafish. Stem Cells and Development. 27 (3): 216-224. doi: 10.1089/scd.2017.0190. [Epub ahead of print Dec 14, 2017], 2018. (3.562, 34/128, 2016)
9. Lin YF, Shih HY, Shang ZF, Guo J, Du C, Lee H and BPC Chen. PIDD mediates the association of DNA-PKcs and ATR at stalled replication forks to facilitate the ATR signaling pathway. Nucleic Acid Research. 46(4): 1847-1859. doi: 10.1093/nar/gkx1298. [Epub ahead of print Jan 4, 2018], 2018 (10.162, 14/290, 2016)
10. Lee CY, Hsieh PH, Chiang LM, Chattopadhyay A, Li KY, Lee YF, Lu TP, Lai LC, Lin EC, Lee H, Ding ST, Tsai MH, Chen CY and Chuang EY. Whole-genome de novo sequencing reveals unique genes that contributed to the adaptive evolution of the Mikado pheasant.



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1. CT Kuo, JY Wang, AM. Wo, BPC Chen, and H Lee, "A novel round bottom μ -well array chip with biomimetic nano-cilia promotes 3D tumor cultures and metastatic bioassays," Proceedings of 19th International Conference on Solid-State Sensors, Actuators and Microsystems, Kaohsiung, Taiwan, June 18-22, 2017. (Transducers 2017) (Oral Presentation)
2. JC Chiang, WM Chen, KH Lin, and H Lee. Pharmacological activation of LPA receptors regulates murine erythro-megakaryocytic differentiation in myeloid lineage. ASCB 2017: B860, P2703, Philadelphia, USA.
3. WM Chen and H Lee. To investigate the roles of lysophosphatidic acid type 2 receptor in cell senescence. ASCB 2017: B596, P2446, Philadelphia, USA.
4. PY Chuang, YY Chan, PY Wu, PJ Chen and H Lee. Investigation of the roles of novel endogenous ligand of aryl hydrocarbon receptor in neural development. ASCB 2017: B527, P3240, Philadelphia, USA.
5. PY Chuang, YY Chan, PY Wu, PJ Chen and H Lee. Investigation of the roles of novel endogenous ligand of aryl hydrocarbon receptor in neural development. EB 2018: 864.19, San Diego, USA, 2018.
6. CY Chen, YC Chien and H Lee. Calreticulin stabilizes vascular endothelial growth factor-A mRNA via interaction with AU-rich element at 3'-UTR. EB 2018: 614.2, San Diego, USA, 2018.

林致廷教授 Chih-Ting Lin, Professor

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1. Y.-C. Syu, W.-E. Hsu, C.-T. Lin, "Field-Effect Transistor Biosensing: Devices and Clinical Applications," ECS Journal of Solid State Science and Technology, 2018, 7, Q3196-Q3207, doi: 10.1149/2.0291807jss.
2. Y.-C. Kuo, C.-K. Lee, C.-T. Lin, "Improving sensitivity of a miniaturized label-free electrochemical biosensor using zigzag electrodes," Biosensors and Bioelectronics, 2018, 103, 130-137, doi:10.1016/j.bios.2017.11.065.
3. J.-K. Lee, I.-S. Wang, C.-H. Huang, Y.-F. Chen, N.-T. Huang, C.-T. Lin*, "Pre-clinical tests of an integrated CMOS biomolecular sensor for cardiac diseases diagnosis," Sensors, 2017, 17, 2733, doi:10.3390/s17122733.
4. C.-C. Wu, W.-Y. Chuang, C.-D. Wu, Y.-C. Su, Y.-Y. Huang, Y.-J. Huang, S.-Y. Peng, S.-A. Yu, C.-T. Lin*, and S.-S. Lu, "A Self-Sustained Wireless Multi-Sensor Platform Integrated with Printable Organic Sensors for Indoor Environmental Monitoring," Sensors, 2017, 17, 715, doi:10.3390/s17040715.
5. P.-H. Lin and C.-T. Lin*, "Effects of Silicon Interface and Frequency Dependence in Solution-Processed High-K Poly(Vinylidene Fluoride-Trifluoroethylene-Chlorotrifluoroethylene) Dielectric Characteristics," Thin Solid Films, 2017, 628, 75-80.

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1. T.-W. Wu, Y.-J. Huang, C.-H. Gao and C.-T. Lin, "Microelectrode Design for Electro-Impedance Cell Counting Technology," 11th IEEE International Conference on Nano/Molecular Medicine and Engineering, Shenzhen, China, Dec. 2017.
2. C.-T. Lin, "CMOS-Based Biomolecular Diagnosis Technologies," 12th Asian Conference on Chemical Sensors (ACCS 2017), Hanoi, Vietnam, Nov. 2017.
3. W.-Y. Chuang, H.-H. Chen, Y.-C. Su, and C.-T. Lin, "Printable sensing materials for low-power consumption applications," 18th International Union of Materials Research Societies International Conference in Asia, Taipei, Taiwan, Nov. 2017.
4. T.-W. Wu, C.-H. Gao, and C.-T. Lin, "Electrode spatial design for a new microfluidics impedance flow cytometer," The 21st International Conference on Miniaturized System for Chemistry and Life Science (μ TAS 2017), Savannah, Georgia, U.S.A., Oct. 2017.

5. C.-T. Lin, "CMOS technologies for analytical bio-diagnosis," 5th Photonics Global Conference 2017, Singapore, Singapore, Jul. 2017.
6. C.-H. Gao, T.-W. Wu, and C.-T. Lin, "A Microfluidic Particle-analyzing Device with Novel Coplanar Electrode Design Based on Impedance Sensing," 17th IEEE International Conference on Nanotechnology, Pittsburgh, PA, U.S.A., Jul. 2017.
7. W.-Y. Chuang, C.-C. Wu, S.-S. Lu, and C.-T. Lin, "A printable conductive polymer CO₂ sensor with high selectivity to humidity," 19th International Conference on Solid-State Sensors, Actuators, and Microsystem (Transducer 2017), Kaohsiung, Taiwan, Jun 2017.
8. H.-T. Hsueh, P.-H. Chen, F.-E. Chen, M.S. Tsai, T.-W. Wu, and C.-T. Lin, "Incremental Interface Surface Potential Measured with a Nano-Gap Coplanar Device Structure and Its Applications," 231st Electrochemical Society Meeting, New Orleans, LA, U.S.A., May 2017.
9. F.-E. Chen, T.-W. Wu, H.-T. Hsiao, P.-H. Chen, M.-S. Tsai, C.-T. Lin, "A Nano-Gap Field-Effect Biosensor Based on Solid-Liquid Interfacial Potential," 12th IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE-NEMS 2017), Los Angeles, CA, U.S.A., Apr. 2017
10. T.-W. Wu, C.-H. Gao, F.-E. Chen, and C.-T. Lin, "Impedance Spectroscopy for Microfluidic Particle-analyzing Device with Spatial-Coplanar Electrode Design," 12th IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE-NEMS 2017), Los Angeles, CA, U.S.A., Apr. 2017
11. T.-Y. Liu, P.-W. Yen, D.-Y. Chang, and C.-T. Lin, "CMOS-based Biomolecular Diagnosis Platform," 12th IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE-NEMS 2017), Los Angeles, CA, U.S.A., Apr. 2017

林啟萬教授 Chii-Wann Lin, Professor

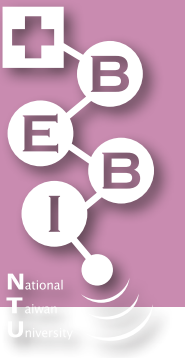
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1. A.-B Wang, P.-H. Fang, Y. Chu-Su, Y.-W. Hsieh, C.-W. Lin, Y.-T. Chen, Y.-C. Hsu, "A novel lab-on-a-chip design by sequential capillary-gravitational valves for urinary creatinine detection", Sensors and Actuators B 222: 721–727 (2016)
2. Y.-T. Lin, T.-H. Hsieh, S.-C. Chen, C.-H. Lai, T.-S. Kuo, C.-P. Chen, C.-W. Lin, S.-T. Young, C.-W. Peng, "Effects of pudendal neuromodulation on bladder function in chronic spinal cord-injured rats", Journal of the Formosan Medical Association (2016)
3. M. C. Lipford, K. Ramar, Y.-J. Liang, C.-W. Lin, Y.-T. Chao, J. An, C.-H. Chiu, Y.-J. Tsai, C.-H. Shu, F.-P. Lee, R. P.-Y. Chiang, "Biomarkers in Obstructive Sleep Apnea", Sleep Medicine Reviews, 28: 121-128 (2016)
4. C.-C. Chang, C.-P. Chen, C.-Y. Chen, C.-W. Lin*, "DNA base-stacking assay utilizing catalytic hairpin assembly induced gold nanoparticle aggregation for colorimetric protein sensing", Chem. Commun., 2016, DOI: 10.1039/C6CC01238H
5. X. Zhao, Y.-C. Tsao, F.-J. Lee, W.-H. Tsai, C.-H. Wang, T.-L. Chuang, M.-S. Wu, C.-W. Lin* "Optical Fiber Sensor Based on Surface Plasmon Resonance for Rapid Detection of Avian Influenza Virus Subtype H6: Initial Studies" Journal of Virological Methods, 233 (2016) 15–22
6. Mohit S. Verma, Shih-Chung Weix, Jacob L. Rogowski, Jackson M. Tsuji, Paul Z. Chen, Chii-Wann Lin, Lyndon Jones and Frank X. Gu, "Interactions between bacterial surface and nanoparticles govern the performance of "chemical nose" biosensors, Biosensors and Bioelectronic, <http://dx.doi.org/10.1016/j.bios.2016.04.024>
7. Zhao, Xihong; Chang, Chia-Chen; Chuang, tsung-liang; Lin, Chii-Wann*, "Detection of KRAS mutations of colorectal cancer with peptide nucleic acid mediated real-time PCR clamping", Biotechnology & Biotechnological Equipment, Accepted

孫啟光特聘教授 Chi-Kuang Sun , Distinguished Professor

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1. L. Cahill, M. Giacomelli, T. Yoshitake, H. Vardeh, B. Faulkner-Jones, J. Connolly, C.-K. Sun, and J. G. Fujimoto, "Rapid virtual H&E histology of breast tissue specimens using a compact fluorescence nonlinear microscope," Laboratory Investigation 98 (1), pp. 150-160 (2018).
2. A. A. Maznev, T.-C. Hung, Y.-T. Yao, T.-H. Chou, J. S. Gandhi, L. Lindsay, H. D. Shin, D. W. Stokes, R. L. Forrest, A. Bensaoula, C.-K. Sun, and K. A. Nelson, "Propagation of THz acoustic wave packets in GaN at room temperature," Applied Physics Letters 112 (6), 061903 (2018).



3. C.-K. Sun, H.-Y. Chen, T.-F. Tseng, B. You, M.-L. Wei, J.-Y. Lu, Y.-L. Chang, W.-L. Tseng, T.-D. Wang, "High Sensitivity of T-Ray for Thrombus Sensing," Scientific Reports 8, 3948 (2018).
4. P.-C. Wu, Y.-F. Shen, C.-K. Sun, C. P. Lin, and T.-M. Liu, "Harmonic generation microscopy of bone microenvironment in vivo," Optics Communications 422, pp. 52-55 (2018). Invited Article
5. S. Chakraborty, S.-Y. Lee, J.-C. Lee, C.-T. Yen, and C.-K. Sun, "Saturated two-photon excitation fluorescence microscopy for the visualization of cerebral neural networks at millimeters deep depth," Journal of Biophotonics 12 (1), e201800136 (2019). Issue Back Cover
6. J.-H. Lee, Y.-T. Shih, M.-L. Wei, C.-K. Sun, and B.-L. Chiang "Classification of Established Atopic Dermatitis in Children with the In Vivo Imaging Methods," Journal of Biophotonics 12 (5), e201800148 (2019).
7. C.-K. Sun, C.-T. Kao, M.-L. Wei, S.-H. Chia, F. X. Kärtner, A. Ivanov, and Y.-H. Liao, "Slide-free imaging of hematoxylin-eosin stained whole-mount tissues using combined third-harmonic generation and three-photon fluorescence microscopy," Journal of Biophotonics 12 (5), e201800341 (2019). Inside Front Cover

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1. C.-K. Sun, "Probing interfaces using femtosecond acoustics," in Proceeding of the 10th Asian Conference on Ultrafast Phenomena, paper IT-21, pp. 31, Hong Kong, China (2018). Invited Speaker
2. C.-K. Sun, "Noninvasive histopathological imaging by using harmonic generation microscopy for onsite differential diagnosis and treatment assessment," OSA Biophotonics Congress: Biomedical Optics, Hollywood, Florida, USA (2018). Invited Speaker
3. S. Chakraborty, H.-C. Gao, C.-T. Yen, H.-Y. Huang, and C.-K. Sun, "Third Harmonic Generation Microscopy for Label-free Human Brain Imaging," in OSA Technical Digest of Conference on Lasers and Electro-Optics (CLEO), paper ATH3Q.4, San Jose, California, USA (2018).
4. C.-K. Sun, "Sub-atomic resolution imaging using femtosecond acoustics," in Program Book and Abstracts of The 16th International Conference on Phonon Scattering in Condensed Matter and The 4th International Conference on Phononics and Thermal Energy Science (Phonons 2018 & PTES 2018 Joint Conference), pp. 59-60, Nanjing, China (2018). Invited Speaker
5. C.-K. Sun, "Femtosecond Acoustics and Terahertz Ultrasonics," in Program Book of The 6th Advanced Electromagnetics Symposium, pp. 22, Marseille, France (2018). Invited Talk
6. C.-K. Sun, C.-C. Shen, M.-Y. Weng, H.-Y. Chen, and J.-K. Sheu, "Femtosecond acoustics for sub-atomic-resolution imaging of interface," in Conference Digest of XXI International Conference on Ultrafast Phenomena, paper THU. PO.36, Hamburg, Germany (2018); Europhysics Conference Abstracts 42B, THU.PO.36 (2018).
7. C.-K. Sun, "Femtosecond Acoustics and Terahertz Ultrasonics," in Proceedings of the 3rd International Conference of Terahertz and Microwave Radiation: Generation, Detection and Applications (TERA-2018), Nizhny Novgorod, Russia (2018). Plenary Speaker
8. C.-K. Sun, "Noninvasive histopathological imaging by using label-free harmonic generation microscopy," International Workshop on Biolmaging (IWBI2019), paper 18-10, Utsunomiya, Japan (2019). Invited Speaker
9. M. Foret; A. Huynh; E. Peronne; J. Sheu; T. Hung; B. Perrin; B. Ruffle; R. Vacher; C.-K. Sun, "High-frequency acoustic modes in vitreous silica via ultrafast optical techniques," The 25th International Congress on Glass (ICG 2019), paper ICG-SII-220-2019, Boston MA (2019). Invited Talk.
10. C.-K. Sun, C.-T. Kao, Y.-H. Liao, and M.-L. Wei, "Rapid intraoperative margin assessment by using multi-modal third-harmonic generation and three-photon fluorescence microscopy," in Preclinical and Clinical Optical Diagnosis, European Conferences on Biomedical Optics, paper 11073-32, Munich, Germany (2019); SPIE Proceedings 11073, Clinical and Preclinical Optical Diagnostics II, 110730X (2019); <http://dx.doi.org/10.1117/12.2525658>

宋孔彬副教授 Kung-Bin Sung, Associate Professor

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1. P. H. Wang, V. R. Singh, J. M. Wong, K. B. Sung, and Y. Luo, "Non-axial-scanning multifocal confocal microscopy with multiplexed volume holographic gratings," Optics letters, 42(2), 346-349, 2017.
2. P. Y. Liu, L. K. Chin, W. Ser, H. F. Chen, C.-M. Hsieh, C.-H. Lee, K.-B. Sung, T. C. Ayi, P. H. Yap, B. Liedberg, K. Wang, T. Bourouinaj and Y. Leprince-Wang, "Cell refractive index for cell biology and disease diagnosis: past, present and future," Lab on a Chip, 16(4), 634-644, Feb. 2016.

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1. Kung-Bin Sung, Yang-Hsien Lin, Fong-Jheng Lin, Chao-Mao Hsieh, Shang-Ju Wu, "Investigation of light scattering characteristics of individual leukocytes using three-dimensional refractive index maps," Proc. SPIE 10251, Biomedical Imaging and Sensing Conference, Yokohama, Japan (April 2017)
2. Fan-Hua Ko, Gen-Hao Tien, Min-Jie Chuang, Tsan-Hsueh Huang, Ming-Hua Hung, and Kung-Bin Sung, "In-vivo diffuse reflectance spectroscopy (DRS) of oral mucosa of normal volunteers," Biomedical Optics 2016: Optical Tomography and Spectroscopy, paper JTu3A.45, Fort Lauderdale, FL United States (April 2016).
3. Ting-Wen Yu, Gen-Hao Tien, Fang-Wei Hsu, and Kung-Bin Sung, "Extracting Fluorescence Efficiency with a GPU-Based Monte Carlo Model for Two-Layer Mucosal Tissue," Biomedical Optics 2016: Optical Tomography and Spectroscopy, paper JTu3A.10, Fort Lauderdale, FL United States (April 2016), – received OSA student travelling grant.
4. Andy Liao and Kung-Bin Sung, "Simulation Study on Optimal Probe Numerical Aperture for Diffuse Reflectance Spectroscopy," Biomedical Optics 2016: Optical Tomography and Spectroscopy, paper JM3A.17, Fort Lauderdale, FL United States (April 2016).

楊泮池特聘教授 Pan-Chyr Yang, Distinguished Professor

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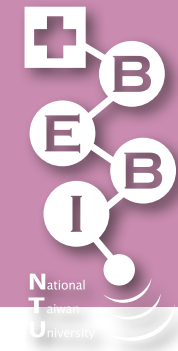
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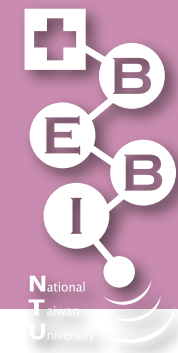
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張瑞峰教授 Ruey-Feng Chang , Professor

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傅楸善教授 Chiou-Shann Fuh, Professor

學術期刊論文 Journal articles

1. T. Y. Lin and C. S. Fuh, “Zero-Knowledge Realization of Software-Defined Gateway in Fog Computing,” accepted by KSII Transactions on Internet and Information Systems, 2018. SCI 0.611 (Computer Science, Information Systems, SCIE, 137/148), EI
2. H. P. Liu, Y. Tsao, and C. S. Fuh, “Bone Conducted Speech Enhancement by Deep Denoising Autoencoder,” accepted by Speech Communication, 2018. SCI 1.768 (Acoustics, 12/31), EI

研討會論文 Conference & proceeding papers

1. B.J. Lin, T. C. Tsan, Y. H. Lee, T. C. Tung, and C.S. Fuh, “Use 3D Convolutional Neural Network to Inspect Solder Ball Defects,” Proceedings of International Conference on Neural Information Processing, Siem Reap, Cambodia, Paper# 50, pp. 1-12, 2018.
2. T. C. Tsan, Y. H. Lee, T. C. Tung, B. J. Lin, and C.S. Fuh, “Solder Ball 3D Reconstruction with X-Ray Images Using Filtered Back Projection,” Proceedings of TenCon, Jeju, Korea, Paper# 1570461557, pp. 1-6, 2018.
3. T. C. Tung and C.S. Fuh, “Image Watercolorization Based on Color Intensity Alteration,” Proceedings of International Workshop on Advanced Image Technology, Chiang Mai, Thailand, Paper# 202, pp. 1-4, 2018.
4. H. P. Kao, T. C. Tung, H. Y. Chen, C. S. Wong, and C.S. Fuh, “Pin Defect Inspection with X-Ray Images,” Proceedings of International Symposium on Neural Networks, Sapporo, Japan, Lecture Notes in Computer Science, Vol. 10262, Part II, pp. 465-473, 2017.

黃俊升教授 Chiun-Sheng Huang, Professor

學術期刊論文 Journal articles

1. Dubsy, P., Curigliano, G., Burstein, H.J., Winer, E.P., Gnant, M., Loibl, S., Colleoni, M., Regan, M.M., Piccart-Gebhart, M., Senn, H.J., Thurlimann, B., Andre, F., Baselga, J., Bergh, J., Bonnefoi, H., Brucker, S.Y., Cardoso, F., Carey, L., Ciruelos, E., Cuzick, J., Denkert, C., Di Leo, A., Ejlersen, B., Francis, P., Galimberti, V., Garber, J., Gulluoglu, B., Goodwin, P., Harbeck, N., Hayes, D.F., Huang, C.S., Huober, J., Khaled, H., Jassem, J., Jiang, Z., Karlsson, P., Morrow, M., Orecchia, R., Osborne, K.C., Pagni, O., Partridge, A.H., Pritchard, K., Ro, J., Rutgers, E.J.T., Sedlmayr, F., Semiglazov, V., Shao, Z., Smith, I., Toi, M., Tutt, A., Viale, G., Watanabe, T., Whelan, T.J., Xu, B. & St Gallen Int Expert, C. Reply to 'The St Gallen International Expert Consensus on the Primary Therapy of Early Breast Cancer 2017: the point of view of an International Panel of Experts in Radiation Oncology' by Kirova et al. Annals of Oncology 29, 281-282 (2018).



2. Martin, M., Hurvitz, S.A., Chan, D., Fernandez-Abad, M., Petru, E., Rostorfer, R., Guarneri, V., Huang, C.S., Press, M.F., Costigan, T.M., Caldwell, C.W., Wijayawardana, S., Turner, P.K., Barriga, S. & Slamon, D.J. Final results of NeoMONARCH: A phase 2 neoadjuvant study of abemaciclib in postmenopausal women with hormone receptor positive (HR+), HER2 negative breast cancer (BC). *Cancer Research* 78, 1 (2018).

3. Huang, Y.S., Takada, E., Konno, S., Huang, C.S., Kuo, M.H. & Chang, R.F. Computer-Aided tumor diagnosis in 3-D breast elastography. *Computer Methods and Programs in Biomedicine* 153, 201-209 (2018).

4. Hurvitz, S.A., Martin, M., Symmans, W.F., Jung, K.H., Huang, C.S., Thompson, A.M., Harbeck, N., Valero, V., Stroyakovskiy, D., Wildiers, H., Campone, M., Boileau, J.F., Beckmann, M.W., Afenjar, K., Fresco, R., Helms, H.J., Xu, J., Lin, Y.G., Sparano, J. & Slamon, D. Neoadjuvant trastuzumab, pertuzumab, and chemotherapy versus trastuzumab emtansine plus pertuzumab in patients with HER2-positive breast cancer (KRISTINE): a randomised, open-label, multicentre, phase 3 trial. *Lancet Oncology* 19, 115-126 (2018).

5. Moon, W.K., Chang, J.F., Lo, C.M., Chang, J.M., Lee, S.H., Shin, S.U., Huang, C.S. & Chang, R.F. Quantitative breast density analysis using tomosynthesis and comparison with MRI and digital mammography. *Computer Methods and Programs in Biomedicine* 154, 99-107 (2018).

6. Lin, C.H., Chuang, P.Y., You, S.L., Chiang, C.J., Huang, C.S., Wang, M.Y., Chao, M., Lu, Y.S., Cheng, A.L. & Tang, C.H. Effect of glucocorticoid use on survival in patients with stage I-III breast cancer. *Breast Cancer Research and Treatment* 171, 225-234 (2018).

7. Petrossian, K., Nguyen, D., Lo, C., Kanaya, N., Somlo, G., Cui, Y.X., Huang, C.S. & Chen, S.A. Use of dual mTOR inhibitor MLN0128 against everolimus-resistant breast cancer. *Breast Cancer Research and Treatment* 170, 499-506 (2018).

8. Petrossian, K., Kanaya, N., Lo, C., Hsu, P.Y., Nguyen, D., Yang, L., Yang, L., Warden, C., Wu, X., Pillai, R., Bernal, L., Huang, C.S., Kruper, L., Yuan, Y., Somlo, G., Mortimer, J. & Chen, S. ERalpha-mediated cell cycle progression is an important requisite for CDK4/6 inhibitor response in HR+ breast cancer. *Oncotarget* 9, 27736-27751 (2018).

9. Lai, S.F., Chen, Y.H., Liang, T.H., Hsu, C.Y., Lien, H.C., Lu, Y.S., Huang, C.S. & Kuo, S.H. The breast graded prognostic assessment is associated with the survival outcomes in breast cancer patients receiving whole brain re-irradiation. *Journal of Neuro-Oncology* 138, 637-647 (2018).

10. Lee, C.Y., Chen, C.M., Wang, H.J., Lai, J.H., Lee, C.E., Lin, F.Y., Chung, M.J., Chang, Y.C. & Huang, C.S. Longitudinal Infrared Image Registration Without Adhesive Markers for Breast Cancer Chemotherapy Patients. *Journal of Medical Imaging and Health Informatics* 8, 516-525 (2018).

11. Kuo, S.H., Lo, C., Chen, Y.H., Lien, H.C., Kuo, W.H., Wang, M.Y., Lee, Y.H. & Huang, C.S. * Prognostic Significance of Clinicopathologic Features in Patients With Breast Ductal Carcinoma-in-Situ Who Received Breast-Conserving Surgery. *Clinical Breast Cancer* 18, 441-450 e442 (2018)

12. Bardia, A., Parton, M., Kummel, S., Estevez, L.G., Huang, C.S., Cortes, J., Ruiz-Borrego, M., Telli, M.L., Martin-Martorell, P., Lopez, R., Beck, J.T., Ismail-Khan, R., Chen, S.C., Hurvitz, S.A., Mayer, I.A., Carreon, D., Cameron, S., Liao, S., Baselga, J. & Kim, S.B. Paclitaxel With Inhibitor of Apoptosis Antagonist, LCL161, for Localized Triple-Negative Breast Cancer, Prospectively Stratified by Gene Signature in a Biomarker-Driven Neoadjuvant Trial. *Journal of Clinical Oncology*, JCO2017748392 (2018).

13. von Minckwitz, G., Huang, C.S., Mano, M.S., Loibl, S., Mamounas, E.P., Untch, M., Wolmark, N., Rastogi, P., Schneeweiss, A., Redondo, A., Fischer, H.H., Jacot, W., Conlin, A.K., Arce-Salinas, C., Wapnir, I.L., Jackisch, C., DiGiovanna, M.P., Fasching, P.A., Crown, J.P., Wulfing, P., Shao, Z., Rota Caramoli, E., Wu, H., Lam, L.H., Tesarowski, D., Smitt, M., Douthwaite, H., Singel, S.M., Geyer, C.E., Jr. & Investigators, K. Trastuzumab Emtansine for Residual Invasive HER2-Positive Breast Cancer. *New England Journal of Medicine* (2019).

14. Chiang, T.C., Huang, Y.S., Chen, R.T., Huang, C.S.* & Chang, R.F.* Tumor Detection in Automated Breast Ultrasound Using 3-D CNN and Prioritized Candidate Aggregation. *IEEE Transactions on Medical Imaging* 38, 240-249 (2019).

15. Chen, P.D., Hu, R.H., Liang, J.T., Huang, C.S. & Wu, Y.M. Toward a fully robotic surgery: Performing robotic major liver resection with no table-side surgeon. *Int J Med Robot* 15, e1985 (2019).

16. Hsiao, F.H., Kuo, W.H., Jow, G.M., Wang, M.Y., Chang, K.J., Lai, Y.M., Chen, Y.T. & Huang, C.S. The changes of quality of life and their correlations with psychosocial factors following surgery among women with breast cancer from the post-surgery to post-treatment survivorship. *Breast* 44, 59-65 (2019).

17. Wu, C.Y., Chen, P.D., Chou, W.H., Liang, J.T., Huang, C.S. & Wu, Y.M. Is robotic hepatectomy cost-effective? In view of patient-reported outcomes. *Asian J Surg* (2019)

18. Lin CH, Yap YS, Lee KH, Im SA, Naito Y, Yeo W, Ueno T, Kwong A, Li H, Huang SM, Leung R, Han W, Tan B, Hu FC, Huang CS, Cheng AL, Lu YS. Contrasting Epidemiology and Clinicopathology of Female Breast Cancer in Asians versus the US Population. *Journal of the National Cancer Institute*, 19 May 2019 pii: djz090. doi: 10.1093/jnci/djz090. [Epub ahead of print]

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阮雪芬教授 Hsueh-Fen Juan, Professor

1. Wu, P.-Y., Yu, I.-S., Lin, Y.-C., Chang, Y.-T., Chen, C.-C., Lin, K.-H., Tseng, T.-H., Kargren, M., Tai, Y.-L., Shen, T.-L., Liu, Y.-L., Wang, B.-J., Chang, C.-H., Chen, W.-M., Juan, H.-F., Huang, S.-F., Chan, Y.-Y., Liao, Y.-F., Hsu, W.-M., Lee, H. "Activation of aryl hydrocarbon receptor by kynurenine impairs progression and metastasis of neuroblastoma" *Cancer Research* (Accepted).

2. Huang, C.-T., Hsieh, C.-H., Chung, Y.-H., Oyang, Y.-J., Huang, H.-C.*, Juan, H.-F.* (2019) "Perturbational gene-expression signatures for combinatorial drug discovery" *iScience* 15:291-306 (Cell Press).

3. Huang, C.-T., Hsieh, C.-H., Lee, W.-C., Liu, Y.-L., Yang, T.-S., Hsu, W.-M., Oyang, Y.-J., Huang, H.-C.*, Juan, H.-F.* (2019) "Therapeutic targeting of non-oncogene dependencies in high-risk neuroblastoma" *Clinical Cancer Research* 25(13):4063-4078.

4. Yang, T.-W., Sahu, D., Chang, Y.-W., Hsu, C.-L., Hsieh, C.-H., Huang, H.-C.*, Juan, H.-F.* (2019) "RNA-binding proteomics reveals MATR3 interacting with lncRNA SNHG1 to enhance neuroblastoma progression" *Journal of Proteome Research* 18: 406-416.

5. Chang, J.-Y., Yu, W.-H., Juan, H.-F.*, Huang, H.-C.* (2018) "Dynamics of alternative polyadenylation in human preimplantation embryos" *Biochemical and Biophysical Research Communications* 504(4):727-733.

6. Huang, C.-T., Hsieh, C.-H., Oyang, Y.-J., Huang, H.-C.*, Juan, H.-F.* (2018) "A large-scale gene expression intensity-based similarity metric for drug repositioning" *iScience* 7: 40-52. (Cell Press)

7. Lin, M.-C., Chien, P.-H., Wu, H.-Y., Chen, S.-T., Juan, H.-F., Lou, P.-J.*, Huang, M.-C.* (2018) "C1GALT1 predicts poor prognosis and is a potential therapeutic target in head and neck cancer" *Oncogene* 37:5780-5793.

8. Sahu, D., Ho, S.-Y., Juan, H.-F.*, Huang, H.-C.* (2018) "High-risk, expression-based prognostic long noncoding RNA signature in neuroblastoma" *JNCI Cancer Spectrum* 2(2): pky015.

研討會論文 Conference & proceeding papers

1. Huang, C.-T., Hsieh, C.-H., Lee, W.-C., Liu, Y.-L., Yang, T.-S., Hsu, W.-M., Oyang, Y.-J., Huang, H.-C.* and Juan, H.-F.* "Therapeutic targeting of non-oncogene dependencies in high-risk neuroblastoma" The 78th Annual Meeting of the Japanese Cancer Association, Kyoto, Japan, Sep. 26-28, 2019. (Travel Grant Award)

2. Hsieh, C.-H., Cheung, C. H. Y., Liu, Y.-L., Hou, C.-L., Hsu, C.-L., Huang, C.-T., Yang, T.-S., Chen, S.-F., Chen, C.-N., Hsu, W.-M.*, Huang, H.-C.* and Juan, H.-F.* "Targeting aurora kinases reduces neuroblastoma progression by altering the metabolic pathways via enhancing ACADM" The 78th Annual Meeting of the Japanese Cancer Association, Kyoto, Japan, Sep. 26-28, 2019. (Travel Grant Award)



3. Kao, Y.-C., Chang, N.-W., Chang, Y.-W., Lai, C. P., Huang, H.-C. and Juan, H.-F.* "Ectopic ATP synthase induces extracellular vesicle release for cell-to-cell communications" The 8th Congress of the International Society for Extracellular Vesicles (ISEV2019), Kyoto, Japan, April 24-28, 2019.
4. Wang, C.-C., Chang, Y.-W., Wu, C.-H., Cheung, C. H. Y., Lee, J.-L., Huang, H.-C.* and Juan, H.-F.* "Mesenchymal stem cells-derived microenvironment promote lung cancer cell progression via c-Fos S374 phosphorylation in MAPK signaling pathway" 34th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 23-24, 2019. (Best Poster Award)
5. Tsai, H.-H., Wang, W.-H., Hou, J.-T., Hsieh, C.-H., Chang, Y.-W., Huang, H.-C.* and Juan, H.-F.* "Investigation of molecular mechanism in mitochondria fission leading ATP synthase toward cell surface" 34th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 23-24, 2019. (Best Poster Award)
6. Yang, F.-M., Kuo, I.-Y., Juan, H.-F., Wang, Y.-C.* "Rab37-mediated IL-6 secretion in the polarization of macrophages" 34th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 23-24, 2019. (Best Poster Award).
7. Lee, W.-H., Chen, K.-P., Huang, H.-C.* and Juan, H.-F.* "Exploring cancer-associated microbiome characteristics using large-scale patient small RNA sequencing data" 34th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 23-24, 2019.
8. Chang, N.-W., Kao, Y.-C., Chang, Y.-W., Lai, C. P., Huang, H.-C.* and Juan, H.-F.* "The function of ectopic ATP synthase in extracellular vesicles under serum deprivation" 34th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 23-24, 2019.
9. Liaw, Y.-g., Chang, Y.-W., Hung, Y.-H., Huang, H.-C.* and Juan, H.-F.* "Live-cell imaging of ectopic ATP synthase trafficking" 34th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 23-24, 2019.
10. Cheung, C. H. Y., Hsu, C.-L., Tsuei, C.-Y., Kuo, T.-T., Huang, C.-T., Wu, H.-Y., Hsu, C.-C. Chung, Y.-H., Huang, H.-C.* and Juan, H.-F.* "MYCN-mediated purine biosynthesis enhances cancer metabolism via MTHFD2 and PAICS in neuroblastoma" 2018 Taiwan Proteomics Society (TPS) Annual Meeting, Taichung, Taiwan, Nov. 17, 2018. (1st Prize Poster Award)
11. Wang, W.-H., Hsu, C.-L., Huang, H.-C.* and Juan, H.-F.* "Phosphoproteomics reveals cyclic stretch induces microtubule rearrangement, changes cell alignment and disrupts mitochondrial dynamics in lung cells" 2018 The Taiwan Society for Biochemistry and Molecular Autumn Camp, Chitou, Taiwan, Nov. 9-11, 2018.
12. Hsieh, C.-H., Huang, C.-T., Chung, Y.-H., Liu, Y.-L., Yang, T.-S., Chien, C. Y., Cho, C.-C., Hsu, C.-H., Hsu, W.-M., Huang, H.-C.* and Juan, H.-F.* "Targeting a key enzyme in serine/glycine metabolism for neuroblastoma therapy" 2018 The Taiwan Society for Biochemistry and Molecular Autumn Camp, Chitou, Taiwan, Nov. 9-11, 2018. (Poster Award)
13. Cheung, C. H. Y., Hsu, C.-L., Tsuei, C.-Y., Kuo, T.-T., Huang, C.-T., Wu, H.-Y., Hsu, C.-C., Chung, Y.-H., Huang, H.-C.* and Juan, H.-F.* "MYCN-mediated purine biosynthesis enhances cancer metabolism via MTHFD2 and PAICS in neuroblastoma" The 77th Annual Meeting of the Japanese Cancer Association, Osaka, Japan, Sep. 27-29, 2018. (Travel Grant Award)
14. Chang, Y.-W., Hsu, C.-L., Chen, X.-J., Huang, H.-C.* and Juan, H.-F.* "Ectopic ATP synthase blockade overcomes gefitinib-resistance via CK2 /TOP2A/GASS axis" The 77th Annual Meeting of the Japanese Cancer Association, Osaka, Japan, Sep. 27-29, 2018. (Travel Grant Award)
15. Chang, Y.-W., Hou, J.-T., Chen, M.-C., Huang, T.-Y., Tsai, H.-H., Hsu, C.-L., Huang, H.-C.* and Juan, H.-F.* "Proteomics reveals the trafficking pathway of mitochondrial ATP synthase to cancer cell surface" Cascadia Proteomics Symposium, Seattle, USA, July 23-24, 2018.
16. Hsieh, C.-H., Huang, C.-T., Chung, Y.-H., Liu, Y.-L., Yang, T.-S., Chien, C. Y., Cho, C.-C., Hsu, C.-H., Hsu, W.-M., Huang, H.-C.* and Juan, H.-F.* "Targeting a key enzyme in serine/glycine metabolism for neuroblastoma therapy" Advances in Neuroblastoma Research 2018 (ANR2018), San Francisco, USA, May 9-12, 2018. (Travel Award)
17. Tang, C.-W., Chang, Y.-W., Hsu, C.-L., Ye, S.-P., Huang, H.-C.* and Juan, H.-F.* "Targeting the E2F1/GASS/p53 axis as a

potential therapeutic strategy for drug-resistant lung cancer" 33th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 24-25, 2018. (Best Poster Award)

18. Cheung, H. Y. C., Hsu, C.-L., Tsuei, C.-Y., Kuo, T.-T., Huang, C.-T., Huang, H.-C.* and Juan, H.-F.* "MYCN mediates metabolic enzymes MTHFD2 and PAICS during neuroblastoma cell progression" 33th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 24-25, 2018. (Poster Award)
19. Lee, W.-C., Hsieh, C.-H., Huang, C.-T., Liu, Y.-L., Yang, T.-S., Hsu, W.-M., Huang, H.-C.* and Juan, H.-F.* "A gene expression-based strategy identifies the anthelmintic drug niclosamide for high-risk neuroblastoma therapy" 33th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 24-25, 2018. (Poster Award)
20. Kao, Y.-C., Chang, Y.-W., Lai, C. P., Huang, H.-C.* and Juan, H.-F.* "Ectopic ATP synthase on extracellular vesicles" 33th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 24-25, 2018. (Poster Award)
21. Hou, J.-T., Huang, T.-Y., Chen, M.-C., Chang, Y.-W., H.-H., Tsai, Huang, H.-C.* and Juan, H.-F.* "Trafficking of ectopic ATP synthase" 33th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 24-25, 2018.
22. Lin, S.-H., Yang, T.-W., Sahu, D., Huang, H.-C.* and Juan, H.-F.* "Long Non-coding RNA SNHG1 in the regulation of neuroblastoma tumorigenesis" 33th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 24-25, 2018.
23. Cheng, P.-Y., Hsu, C.-L., Chen, K.-P., Juan, H.-F.* and Huang, H.-C.* "Web-based visualization system for individual gene variants and their associated diseases" 33th Joint Annual Conference of Biomedical Sciences, Taipei, Taiwan, March 24-25, 2018.

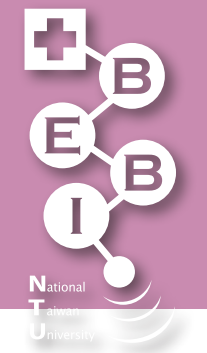
專書 Book Chapters

1. Juan, H.-F. (2019) "Proteomic techniques and their applications" in Biomolecular and Bioanalytical Techniques: Theory, Methodology and Applications, Edited by Vasudevan Ramesh (John Wiley & Sons, Inc., UK), pp.81-99.
2. Siddiqui, H., Sami, F., Juan, H.-F.* and Hayat, S.* (2019) "Brassinosteroid Regulated Physiological Process: An Omics Perspective" Brassinosteroids: Plant Growth and Development, ed. By Shamsul Hayat, Dr. Mohammad Yusuf, Dr. Renu Bhardwaj & Dr. Andrzej Bajguz (Springer Nature, Singapore), pp. 297-322.
3. Juan, H.-F. and Huang, H.-C. (2018) A Practical Guide to Cancer Systems Biology (World Scientific Publishing, Singapore)

賴飛羆教授 Fei-Pei Lai, Professor

學術期刊論文 Journal articles

1. eng-Wei Lin, Wei Chen, Chia-Ping Shen, Ming-Jang Chiu, Yi-Huei Kao, Feipei Lai, Qibin Zhao, Andrzej Cichocki, "Visualization and Sonification of Long-Term EpilepsyElectroencephalogram Monitoring," Journal of Medical and Biological Engineering, 2018 January 23, pp: 1–10
2. Fong Ci Lin, Chen-Yu Wang, Rung-Ji Shang, Fei-Yuan Hsiao, Mei-Shu Lin, Kuan-Yu Hung, Jui Wang, Zhen-Fang Lin, Feipei Lai, Li-Jiuan Shen, Chih-Fen Huang, "Electronic clinical surveillancesystem to identify unmet treatment needs for patients encountering osteoporoticfracture," Journal of Medical Internet Research, 2018 Apr 24;20(4):e142.
3. Chien-Hui Wu, Te-Wei Ho, Jin-Ming Wu, Ting-Chun Kuo, Ching-Yao Yang, Feipei Lai, Yu-Wen Tien, "Preoperative biliary drainage associated with biliary stricture afterpancreaticoduodenectomy: a population-based study," Journal of Hepato-Biliary-Pancreatic Sciences, 2018 Jun; 25(6): 308-318.
4. Dai-Lun Chiang, Yin-Tzu Huang, Tzer-Shyong Chen and Feipei Lai, "Applying time-constraint access control of personal health record in cloud computing," Journal of Enterprise Information Systems, Published online: 16 Sep 2018.
5. Yung-Wei Chen, Jui-Tse Hsu, Chih-Chieh Hung, Jin-Ming Wu, Feipei Lai, Sy-Yen Kuo, "Surgical Wounds Assessment System for Self-Care," IEEE Transactions on Systems, Man and Cybernetics: Systems.



柒 | 發表論文 Publications

6. Jui-Tse Hsu, Yung-Wei Chen, Te-Wei Ho, Hao-Chih Tai, Jin-Ming Wu, Hsin-Yun Sun, Chi-Sheng Hung, Yi-Chong Zeng, Sy-Yen Kuo, Feipei Lai, "Chronic Wound Assessment and Infection Detection Method," BMC Medical Informatics and Decision Making.
7. Te-Wei Ho, Sheng-Yuan Ruan, Chun-Ta Huang, Yi-Ju Tsai, Feipei Lai, and Chong-Jen Yu, "Validity of ICD9-CM codes to diagnose chronic obstructive pulmonary disease from National Health Insurance claim data in Taiwan," International Journal of Chronic Obstructive Pulmonary Disease, 2 October 2018 Volume 2018:13 Pages 3055—3063.
8. Tsung-Chien Lu, Yi Chen, Te-Wei Ho, Yao-Ting Chang, Yi-Ting Lee, Yu-Siang Wang, Yen-Pin Chen, Chia-Ming Fu, Wen-Chu Chiang, Matthew Huei-Ming Ma, Cheng-Chung Fang, Feipei Lai, Anne M. Turner, "A novel depth estimation algorithm of chest compression for feedback of high-quality cardiopulmonary resuscitation based on a smartwatch," Journal of Biomedical Informatics 87 (2018) 60–65.
9. Chen-Yu Li, Chien-Cheng Huang, Feipei Lai, San-Liang Lee, and Jingshown Wu, "A Comprehensive Overview of Government Hacking Worldwide," IEEE Access, vol. , pp. , 2018.
10. Shyh-Wei Chen, Dai-Lun Chiang, Tzer-Shyong Chen, Han-Yu Lin, Yu-Fang Chung, and Feipei Lai, "An Implementation of Interactive Healthy Eating Index and Healthcare System on Mobile Platform in College Student Samples," IEEE Access, Vol. 6, Issue 1, pp. 71651-71661, December 2018.
11. Yuan-Chia Chu, Yen-Fu Cheng, Ying-Hui Lai, Yu Tsao, Tzong-Yang Tu, Shuenn Tsong Young, Tzer-Shyong Chen, Yu-Fang Chung, Feipei Lai, Wen-Huei Liao, "A Smartphone-Based Approach for Hearing Screening of School-age Children: A Prospective Study," JMIR mHealth and uHealth, 2018.
12. D. L. Chiang, Y. T. Huang, T. S. Chen and Feipei Lai, "Applying Time-constraint Access Control of Personal Health Record in Cloud Computing," Enterprise Information Systems, 2019.
13. Tsung-Chien Lu, Yao-Ting Chang, Te-Wei Ho, Yi Chen, Yi-Ting Lee, Yu-Siang Wang, Yen-Pin Chen, Chu-Lin Tsai, Matthew Huei-Ming Ma, Cheng-Chung Fang, Feipei Lai, and Hendrika W Meischke, "Using a Smartwatch with Real-Time Feedback Improves the Delivery of High-Quality Cardiopulmonary Resuscitation by Healthcare Professionals," Resuscitation, 2019 May; 140: 16-22. PMID: 31078650.
14. Jin-Ming Wu, Te-Wei Ho, Yao-Ting Chang, Chung-Chieh Hsu, Chia-Jui Tsai, Feipei Lai, Ming-Tsan Lin, "Wearable-Based Mobile Health App in Gastric Cancer Patients for Postoperative Physical Activity Monitoring: Focus Group Study," JMIR mHealth and uHealth, 2019 April; 7(4): e11989. PMID: 31012858.
15. Te-Wei Ho, Chun-Ta Huang, Yi-Ju Tsai, Angela Shin-Yu Lien, Feipei Lai, and Chong-Jen Yu, "Metformin use mitigates the adverse prognostic effect of diabetes mellitus in chronic obstructive pulmonary disease," Respiratory Research, 2019 Mar; 20: 69. PMID: 30953517.
16. Lin FC, Huang ST, Shang RJ, Wang CC, Hsiao FY, Lin FJ, Lin MS, Hung KY, Wang J, Shen LJ, Lai F, Huang CF, "A Web-Based Clinical System for Cohort Surveillance of Specific Clinical Effectiveness and Safety Outcomes: A Cohort Study of Non-Vitamin K Antagonist Oral Anticoagulants and Warfarin," JMIR Med Inform. 2019 Jul 3;7(3):e13329.
17. Wu ET, Hwu WL, Chien YH, Hsu C, Chen TF, Chen NQ, Chou HC, Tsao PN, Fan PC, Tsai IJ, Lin SP, Hsieh WS, Chang TM, Chen CN, Lee CH, Chou YY, Chiu PC, Tsai WH, Hsiung HC, Lai F, Lee NC, "Critical Trio Exome Benefits In-Time Decision-Making for Pediatric Patients With Severe Illnesses," Pediatr Crit Care Med. 2019 Jul 1
18. Chu YC, Kuo WT, Cheng YR, Lee CY, Shiao CY, Tarng DC, Lai F, "Author Correction: A Survival Metadata Analysis Responsive Tool (SMART) for web-based analysis of patient survival and risk," Sci Rep. 2019 Jun 4;9(1):8356.

研討會論文 Conference & proceeding papers

1. Te-Wei Ho, Jin-Ming Wu, Hao-Chih Tai, Chun-Che Chang, Chien Hsu Chen and Feipei Lai, "Automated Scale Calibration and Color Normalization for Recognition of Time Series Wound Images," ADVANCE 2018: 6th International Workshop on ADVANCEs in ICT INfrastructures and Services, 11-12 January 2018, Santiago De Chile, CHILE.

2. Fong-Ci Lin, Meng-Tse Lee, Feipei Lai, and Chien-Chang Lee, "Web-based Dashboard for the Interactive Visualization and Analysis of National Risk Standardized Mortality Rates of Sepsis in the US," AMIA 2018 Informatics Summit, March 12-15, 2018, San Francisco, CA, USA.
3. Chia-Tung Wu, Yu-Han Hung, Chien-Hsu Chen, Te-Wei Ho, Feipei Lai, "A Zenbo Robot Application for Improving Life Quality and Social Contact for the Elderly," e-CASE & e-Tech 2018, Osaka, Japan, April 1~3, 2018.
4. Chang, Yu-Hsuan, Hung, Yu-Han and Feipei Lai, "Automatic ICD-10 classification system from free-text data," e-CASE & e-Tech 2018, Osaka, Japan, April 1~3, 2018.
5. Yu-Chien Chang, Ting-Fu Chen, Yu-Hsuan Chang, Shu-Tzu Huang, Chia-Chi Ying and Feipei Lai, "Web Service of relevance comparison of Chinese Medical Regulations based on Natural Language Processing," e-CASE & e-Tech 2018, Osaka, Japan, April 1~3, 2018.
6. Ting-Fu Chen, Ching Hsu, Hann-Chang Hsiung, Kan-Yu Tai, Ni-Chung Lee, Yin-Hsiu Chien, Wuh-Liang Hwu, and Feipei Lai, "Using MViewer and text mining to facilitate variant interpretation in exome data," 2018 ACMG Clinical Genetics Meeting, Charlotte, North Carolina, April 10-14, 2018.
7. Ying Lin, Hsin-Yun Chou, Kun-Yih Huang, Chen Lin, and Feipei Lai, "Increased vagal tone in Therapists when interacting with complex, suicidal patients: a pilot study," 2018 IASP Asia Pacific Conference, Waitangi, New Zealand, May 2-5.
8. Yuan-Chia Chu, Yen-Fu Cheng, Shang-Liang Wu, Feipei Lai, Wen-Huei Liao, "A Smartphone-based Hearing Screening in the School-aged Children," 6th East Asian Symposium on Otology (EASO 2018), Seoul, South Korea, May 24-26, 2018.
9. Wen-Chi Huang, Pei-Lin Lee, Yu-Ting Liu, and Feipei Lai, "Prediction of Obstructive Sleep Apnea using Machine Learning Technique," SLEEP 2018 - the 32nd Annual Meeting of the APSS, Baltimore, Maryland, US, June 2-6, 2018.
10. Te-Wei Ho, Jin-Ming Wu, Ching-Yao Yang, Yu-Wen Tien, and Feipei Lai, "Mortality, Malignancy, and Comorbidities Associated with Chronic Pancreatitis: A Nationwide Database Study in Taiwan," International Meeting on Emerging Diseases and Surveillance (IMED 2018), November 9-12, 2018, Vienna, Austria.
11. Te-Wei Ho, Jia-Sheng Yao, Yao-Ting Chang, Feipei Lai, Jui-Fen Lai, Sue-Min Chu, and Han-Mo Chiu, "A Platform for Dynamic Optimal Nurse Scheduling Based on Integer Linear Programming along with Multiple Criteria Constraints," Artificial Intelligence and Cloud Computing Conference (AICCC 2018), December 21-23, 2018, Tokyo, Japan.
12. Te-Wei Ho, Huan Qi, Feipei Lai and Fu-Ren Xiao, "Brain Tumor Segmentation Using U-Net and Edge Contour Enhancement," The 3rd International Conference on Digital Signal Processing (ICDSP 2019), Jeju Island, Korea, February 23-26, 2019.
13. Te-Wei Ho, Timothy Wei, Jing-Ming Wu, and Feipei Lai, "Dynamic Human-Centered Design: Reinventing Design Philosophies for Advanced Technologies," 6th International Conference On Computer Networks & Communications (CCNET 2019), April 27-28, 2019, Copenhagen, Denmark.

孫維仁教授 Wei-Zen Sun, Professor

學術期刊論文 Journal articles

1. Yu-Chang Yeh, Linda Chia-Hui Yu, Chun-Yu Wu, Ya-Jung Cheng, Chen-Tse Lee, Wei-Zen Sun, Jui-Chang Tsai, Tzu-Yu Lin: Effects of Endotoxin Absorber Hemoperfusion on Microcirculation in Septic Pigs. J Surg Res, May 1, 2017;211:242-250. doi: 10.1016/j.jss.2016.12.026.
2. Hsin-Chia Lin, Hao-Pai Lin, Hsin-Hui Yu, Li-Chieh Wang, Jyh-Hong Lee, Yu-Tsan Lin, Yao-Hsu Yang, Wei-Zen Sun*, Bor-Luen Chiang*: Tai-Chi-Chuan Exercise Improves Pulmonary Function and Decreases exhaled nitric oxide level in both Asthmatic and Non-Asthmatic Children and Improves Quality of Life Children with Asthma, Evid Based Complement Alternat Med, 2017;2017:6287642. doi: 10.1155/2017/6287642. Epub 2017 Apr 13.
3. Chih-Peng Lin, Kai-Hsiang Kang, Huang-Ju Tu, Ming-Yueh Wu, Tzu-Hung Lin, Houngh-Chi Liou, Wei-Zen Sun*, Wen-Mei Fu*: CXCL12/CXCR4 Signaling Contributes to the Pathogenesis of Opioid Tolerance: A Translational Study. Anesth Analg, 124(3):972-9, 2017.



4. Yow-Shan Lee, Wei-Zen Sun*: Epidemiology of anaphylaxis: A retrospective cohort study in Taiwan. Asian J Anesth, Jan 20, 2017.

5. Kuang-Cheng Chan, Jia-Rong Yeh, Wei-Zen Sun*: The role of autonomic dysfunction in Predicting One-Year Mortality after Liver Transplantation. Liver International, Jan 20, 2017.

6. Jim Reynold, Wei-Zen Sun*: Journeys and Journals East and West, Acta Anaesthesiol Taiwan, 54(4):103-105, 2016.

7. I-Wen Su, Fang-Wei Wu, Keng-Chen Liang, Kai-Yuan Cheng, Sung-Tsang Hsieh, Wei-Zen Sun, Tai-Li Chou*: Pain Perception Can Be Modulated: A Resting-state fMRI Study. Frontiers in Human Neuroscience, Nov 10, 10;10:570, 2016.

8. Muammar Sadrawi, Wei-Zen Sun, Mathew M Ma, Chun-Yi Dai, Maysam F Abbod, Jiann-Shing Shieh: Cardiopulmonary Resuscitation Pattern Evaluation Based on Ensemble Empirical Mode Decomposition Filter via Nonlinear Approaches. BioMed Res Inter, 2016;2016:4750643, 2016.

9. Jui-Hung Kao, Fei-pei Lai, Bo-Cheng Lin, Wei-Zen Sun, Kuan-Wu Chang, Ta-Chien Chan: Spatial analysis and data mining techniques for identifying risk factors of Out-of-Hospital Cardiac Arrest. Inter J Inform Manage, May 24, 2016.

10. Jim Reynold, Chen-Hsing Yang, Wei-Zen Sun*: Measuring and Reducing Perioperative Anesthetic-Related Mortality: View from East Asia, Acta Anaesthesiol Taiwan, 54(2)41-3, 2016.

11. Albert Y. Chen, Tsung-Yu Lu, H. M. Mathew Ma, Wei-Zen Sun*: Demand forecast using machine learning for the pre-allocation of ambulances, IEEE J Biomed Health Informatics, 20(4):1178-87, 2016.

12. Yu-Chang Yeh, Chun-Yu Wu, Ya-Jung Cheng, Chih-Min Liu, Jong-Kai Hsiao, Wing-Sum Chan, Zong-Gin Wu, Linda Chia-Hui Yu, Wei-Zen Sun*, NCMMR: Effect of Dexmedetomidine on Intestinal Microcirculation and Intestinal Epithelial Barrier in Endotoxemic Rats. Anesthesiology, 125(2):355-67, 2016.

13. Ming-Cheng Chang, Chen YL, Chiang YC, Chen TC, Tang YC, Chi-An Chen, Wei-Zen Sun*, Wen-Fang Cheng*: Anti-CD40 Antibody and Toll-like Receptor 3 Ligand Restore Dendritic Cell-mediated Anti-tumor Immunity Suppressed by Morphine. Am J Cancer Res, 6(2):157-72, 2016.

14. Wei-Han Chou, Feng-Sheng Lin, Chih-Peng Lin, Wen-Ying Lin, Jr-Chi Yie, Wei-Zen Sun*: Mirtazapine, in orodispersible form, for pre-operative psychologically distressed patients: a pilot study. Acta Anaesthesiol Taiwan, 54(1)16-23, 2016.

15. Ming-Cheng Chang, Chen YL, Chiang YC, Chen TC, Tang YC, Chi-An Chen, Wei-Zen Sun, Wen-Fang Cheng*: Mesothelin-specific cell-based vaccine generates antigen-specific immunity and potent anti-tumor effects by combining with IL-12 immunomodulator. Gene Ther, 23(1):38-49, 2016.

研討會論文 Conference & proceeding papers

1. 孫維仁：應用巨量資料探勘與地理空間資訊分析技術針對緊急救護服務之醫療資源管理、配置與未來規劃進行整體研究計畫。台灣地理資訊學會年會暨學術討論會, July 4, 2017

2. Jiann-Shing Shieh, Muammar Sadrawi, Wei-Zen Sun, Matthew Huei-Ming Ma, Maysam F. Abbod: The Evaluation of the Fuzzy C-Mean and Random Classifications for the Unbalanced Data in the Emergency Medical System via Artificial Neural Networks. 2017 World Conference on Innovation, Engineering, and Technology (IET 2017), Kyoto, Japan, June 27-9, 2017.

3. Wei-Zen Sun: Soreness across east and west medicine (plenary lecture). 2017 Congress of Chinese Society of Integrative Anesthesiology (ICMLC), Xiaan, Jun 22-5, 2017.

4. Wei-Zen Sun, Ming-Yu Lo: Assessing acupuncture effect on migraine: the role of dynamic biomarker for cerebral and muscular microcirculation (Plenary Lecture). The Second International Taiwanese Congress of Neurology (2nd ITCN), 2017 Annual Meeting of Taiwan Neurological Society (2017 AMTNS), May 19, 2017.

5. Wei-Zen Sun: Treatment of diabetic peripheral neuropathic pain in Taiwan (plenary lecture). 38th Annual Meeting of the Endocrine Society and the Diabetes Association of ROC (Taiwan), April 8-9, 2017.

6. 孫維仁：跨越中西藩籬的痠痛感--從纖維肌痛症、針刺得氣、到控酸離子通道的分子遺傳機制研究(大會演講)。台北國際中醫藥學數論壇, 2017 Taipei Traditional Chinese Medicine International Forum, Taiwan, s73, March 12, 2017.

7. 孫維仁：結合醫學、運動、政府、產業的人力培訓藍圖(大會演講), 2017 OlympiCare Forum, Taipei, Taiwan, March 11, 2017.

8. 孫維仁：臺灣疼痛專科醫師在健保制度下的角色(大會演講), 2017 Annual Congress of Taiwan Pain Society, Taipei, Taiwan, March 4, 2017.

9. Jr-Chi Ye, Chih-Peng Lin, Wei-Han Chou, Wen-Ying Lin, Feng-Sheng Lin, Wei-Zen Sun: An anesthesiologist in the community medicine: share of our experience in NTUH Jin-Shan branch. 2017 Annual Congress of Taiwan Pain Society, Taipei, Taiwan, March 4, C19, 2017.

10. Chih-Fan Chen, Yi-Shiuan Lin, Wei-Han Chou, Cheng-Yuan Hsieh, Jr-Chi Ye, Chih-Peng Lin, Wen-Ying Lin, Feng-Sheng Lin, Wei-Zen Sun: Satisfaction of patient controlled epidural analgesia after cesarean section. 2017 Annual Congress of Taiwan Pain Society, Taipei, Taiwan, March 4, B06, 2017.

11. 孫維仁：超聲如何推動台灣麻醉的典範轉移(大會演講)。2016超聲技術在麻醉科的應用, 福州, 中國·Dec 30, 2016.

12. 孫維仁：圍術期鎮痛治療的衛生經濟學(大會演講)。2016第一屆圍術期多學科疼痛管理高峰論壇, Beijing, China, Nov 27, 2016.

13. Wei-Zen Sun: 麻醉醫師職業生涯規劃(大會演講)。2016 Annual Congress of Taiwan Society of Anesthesiologists, Taipei, Taiwan.

14. 孫維仁：新世代自控式止痛裝置-- 我們的研發理念和創新(大會演講)。2016 Annual Congress of Taiwan Society of Anesthesiologists, Taipei, Taiwan.

15. Chih-Fan Chen, Jr-Chi Yeh, Wei-Han Chou, Chih-Peng Lin, Wen-Ying Lin, Feng-Sheng Lin, Wei-Zen Sun: PainDETECT questionnaire for neuropathic pain after burn injury (one-year follow-up). 2016 Annual Congress of Taiwan Society of Anesthesiologists, Taipei, Taiwan.

16. Yi-Chun Chen, Tzu-Su Wang, Wei-Zen Sun: Effect of menopause on post-operative cognitive dysfunction in midlife women. 2016 Annual Congress of Taiwan Society of Anesthesiologists, Taipei, Taiwan.

17. Wei-Zen Sun: A novel role of ketorolac in multimodal analgesia. (Plenary Lecture) 兩岸重症麻醉新進展學習班 南京, July 2, 2016.

18. Wei-Zen Sun: Cerebral hemodynamic measurement as a powerful dynamic biomarker for acupuncture research in migraine headache. 2016 Congress of Chinese Society of Integrative Anesthesiology (ICMLC), Chengchou, Jun 24, 2016.

19. 孫維仁：重大公共安全緊急救護系統。台灣安全研究與教育學會·Jun 22, 2016

20. Wen-Ying Lin, Yu-Hsin Huang, Wen-Hua Chu, Chen-Tung Yen, Wei-Zen Sun: Positron emission tomography of supraspinal antinociceptive modulation in rat neuropathic and cancer-induced bone pain models. 2016 Annual Congress of Taiwan Pain Society, Taipei, Taiwan.

21. Wei-Zen Sun: Next-generation PCA pump: Our innovation and design (Plenary Lecture), 2016 Annual Congress of Taiwan Pain Society, Taipei, Taiwan.

22. Jhe-Nan Lin, Wei-Zen Sun, Meng-Han Yang: Analyzing Seasonal Incidence Patterns of Epileptic Seizure Using Various Statistical Methods. International Conference of Machine Learning and Cybernetics (ICMLC), Hong Kong, 2016.

23. 孫維仁：從傳統武術到健康促進-太極拳的應用。Active approach to musculoskeletal pain. 台灣脊骨矯治醫學會·May-01-2016

專書 Book Chapters

1. 許惠恒、王署君、王治元醫師、朱志勳、李奕德、杜思德、孫維仁、張鳴宏、郭清輝、陳榮福、黃禹堯 (台灣糖尿病周邊神經病變工作小組Taiwan Diabetic Peripheral Neuopathic Pain Advisory Board)合著: Taiwan Clinical Guideline for Diabetic Peripheral Neuropathy 台灣糖尿病周邊神經病變臨床指引。台灣糖尿病醫學會出版·1st ed, pp1-97, 2017.

2. 黃安年、孫維仁、余廣亮:末期疾病疼痛治療之新觀念及進展。IN: 黃安年:末期疾病疼痛治療學(Pain Management for Terminal Diseases, ISBN 978-986-126-924-5)·台灣安寧緩和醫學學會, 3rd ed, pp1-42, 2016.

3. Jui-Hung Kao, Feipei Lai, Bo-Cheng Lin, Wei-Zen Sun, Kuan-Wu Chang, Ta-Chien Chan: Application of Cloud Computing for Emergency Medical Services: A Study of Spatial Analysis and Data Mining Technology. IN: Frontier Computing, Chapter 88, 2016.



柒 | 發表論文 Publications

曾宇鳳教授 Y. JaneTseng,Professor

學術期刊論文 Journal articles

1. Chen, C. H., Kuo, T. C., Kuo, H. C., Tseng,Y. J., Kuo, C. H., Yuan, T. H., Chan, C. C.*(2019) Metabolomics of Children and Adolescents Exposed to Industrial Carcinogenic Pollutants. Environmental Science & Technology, 53(9), 5454-65. (IF=7.250, Ranking=11/231, 5%, Category: Environmental Sciences)

2. Wang, P.H., Tu, Y. S., Tseng, Y. J.*(2019) PgpRules: a Decision Tree Based Prediction Server for P-glycoprotein Substrates and Inhibitors. Bioinformatics, <https://doi.org/10.1093/bioinformatics/btz213>. (IF=5.481, Ranking=2/59, 3%, Category: Mathematical & Computational Biology)

3. Tu, Y. S., Tseng, Y. J., Appell, M.* (2019) Quantum Chemical Investigation of The Detection Properties of Alternariol And Alternariol Monomethyl Ether. Structural Chemistry, <https://doi.org/10.1007/s11224-019-01302-3>, 1-11.(IF=1.526, Ranking=99/170, 58%, Category: Chemistry, Multidisciplinary)

4. Tu, Y. S., Tseng, Y. J., Appell, M. * (2018) Theoretical investigation of cyromazine tautomerism using density functional theory and Møller–Plesset perturbation theory methods. Molecular Simulation, 44(16), 1344-1352. (IF=1.396, Ranking=26/36, 72%, Category: Physics, Atomic, Molecular & Chemical)

5. Kuo, T. C., Tseng, Y. J.* (2018) Lipidpedia: a comprehensive lipid knowledgebase. Bioinformatics, 34(17), 2982–2987. (IF=7.307, Ranking=2/57, 4%, Category: Mathematical & Computational Biology)

6. Lin, F. Y., Esposito, E. X., Tseng, Y. J.* (2018) LeadOp+R: Structure-Based Lead Optimization With Synthetic Accessibility. Frontiers in Pharmacology, 9, 96. (IF=4.400, Ranking=40/251, 16%, Category: Pharmacology & Pharmacy)

研討會論文 Conference & proceeding papers

1. Renn, A., Su, B. H., Liu, H., Tseng, Y. J.*, Mouse-Liver Microsomal Stability Prediction using Graph Convolutional Neural Networks. Spring 2019 ACS National Meeting, Orlando, FL, March 31-April 4, 2019

2. Liu, H., Su, B. H., Cho, T.S., Tien, Y.C., Tseng, Y. J.*, Graph based neural network model for predicting aqueous solubility. Spring 2019 ACS National Meeting, Orlando, FL, March 31-April 4, 2019

3. Wang, P. H., Tu, Y. S., Tseng, Y. J.*, PgpRules: a Decision Tree Based Prediction Server for P-glycoprotein Substrates and Inhibitors. Spring 2019 ACS National Meeting, Orlando, FL, March 31-April 4, 2019

4. Shieh, T. W., Su, B. H., Tseng , Y. J.*, Predicting human liver microsomal stability. Spring 2019 ACS National Meeting, Orlando, FL, March 31-April 4, 2019

5. Tu, Y. S., Tseng, Y. J., Appell, M., Quantum molecular dynamics and cheminformatics study of mycotoxin toxicity and detection to improve food safety. 256th American Chemical Society National Meeting and Exposition, Boston, Massachusetts, August 19-23, 2018

6. Tu, Y. S., Tseng, Y. J., Appell, M., Density functional theory and ab initio investigation of the detection properties of cyromazine. 255th American Chemical Society National Meeting and Exposition, New Orleans, Louisiana, March 18-22, 2018

楊東霖助理教授 T. Tony Yang, Assistant Professor

學術期刊論文Journal articles

1. Lo, C.-H., Lin, I.-H., Yang, T.T., Huang, Y.-C., Tanos, B.E., Chou, P.-C., Chang, C.-W., Tsay, Y.-G., Liao, J.-C., Wang, W.-J. (2019) Phosphorylation of CEP83 by TTBK2 is necessary for cilia initiation, Journal of Cell Biology, 218(10), 3489. (Fields: Cell biology: 23/193, SCI, Impact Factor: 8.891)

2. Yang, T.T., Tran T.M.N., Chong, W.M., Liao, J.-C. (2019) Single-particle tracking localization microscopy reveals nonaxonemal dynamics of intraflagellar transport proteins at the base of mammalian primary cilia, Molecular Biology of the Cell, 30, 828-837. (Fields: Cell biology: 82/193, SCI, Impact Factor: 3.905)

3. Chu, S.-H., Lo, L.-L., Lai, R.L., Yang, T.T., Liao, J.-C., Huang, N.-T. (2019) A microfluidic device for in situ fixation and super-resolved mechanosensation studies of primary cilia, Biomicrofluidics, 13, 014105. (Fields: Biomedical research methods: 36/79, SCI, Impact Factor: 2.531)

研討會論文 Conference & proceeding papers

1. Chong, W. M., Yang, T. T., & Liao, J. C. (2019). Super-Resolution Microscopy Reveals the Molecular Architecture of Centriole Subdistal Appendages and Its Role in Microtubule/Golgi Anchoring. Biophysical Journal, 116(3), 133a.



捌 教師得獎、專利及技術轉移

Award、patents and Technology Transfer

一、教師得獎

Award

※ 2019

1. 李百祺，IEEE UFFC DISTINGUISHED LECTURER (2019/1-2020/6)
2. 孫啟光，國立臺灣大學學術研究成果傑出獎，2019
3. 孫啟光，國立臺灣大學107學年度全校全英語授課專任教師教學優良獎，2019
4. 林致廷，第15屆國家新創獎 臨床新創獎，2019
5. 李心予，美國生理學會會士，2019
6. 成佳憲，American Society for Radiation Oncology –FASTRO–Fellow

※ 2018

1. 李百祺，107年度中國工程師學會傑出工程教授獎，2018
2. 李百祺，IFMBE Vladimir K. Zworykin Award，2018
3. 鍾孝文，台大教學傑出獎，2018
4. 黃俊升，2018 Outstanding Teaching Award，2018
5. 魏安祺，MOST Young Scholar Fellowship，2018

※ 2017

1. 莊曜宇，國立臺灣大學電資學院106年學術貢獻獎，2017。
2. 曾宇鳳，國立臺灣大學電資學院106年學術貢獻獎，2017。
3. 曾宇鳳教授團隊，2017未來科技展未來科技突破獎，2017
4. 李百祺，第15屆有庠科技講座 (Y. Z. HSU SCIENCE AWARD) ，2017。
5. 李百祺，神基講座教授 (Getac Chair) ，2017。
6. 孫啟光，106年度瑞軒科技講座主持人，2017。
7. 孫啟光，教育部第61屆學術獎，2017。
8. 成佳憲，行政院科技部傑出研究獎，2017

※ 2016

1. 莊曜宇，國立臺灣大學105年校內服務優良獎，2016。
2. 李百祺，神基講座教授(Getac Chair) ，2016。
3. 黃念祖，第十六屆旺宏金矽獎優勝獎，2016。
4. 呂學一，臺大教學傑出獎，2016。
5. 鍾孝文，臺大教學優良獎，2016。
6. 張家禎、陳震宇、莊琮亮、吳子珩、魏淑鈺、廖洪恩、林啟萬，臺灣化學感測器科技協會105年度傑出論文獎，2016。

7. 林致廷，臺灣化學感測器科技協會年度最佳論文獎，2016。
3. 林致廷，旺宏金矽獎優勝，2016。
4. 周迺寬，教育部與所屬機關 (構) 學校105年模範公務人員，2016。
5. 曾宇鳳，諾華創投導師計畫，2016。
6. 曾宇鳳，第13屆國家新創獎，2016。
7. 曾宇鳳，景康青年教師獎，2016。
8. 陳志宏，傑出技術移轉貢獻獎，2016。
9. 林發暄，臺大教學優良獎，2016。

※ 2015

1. 楊泮池，美國國家發明家學會 (NAI) 院士，2015。
2. 林啟萬，科技部103年度傑出特約研究員獎，2015。
3. 陳志宏，103年度國家發明創作獎~發明獎銀牌，2015。
4. 李百祺，SPIE Fellow, 2015.
5. 林致廷，科技部吳大猷先生紀念獎。
6. 林致廷，臺灣化學感測器科技協會年度最佳論文獎，2015。
7. 林致廷，國家晶片系統設計中心優良晶片特別設計獎，2015。
8. 林致廷，國家晶片系統設計中心優良晶片特優設計獎，2015。
9. 林致廷，國家晶片系統設計中心優良晶片優等設計獎，2015。
10. 林致廷，旺宏金矽獎優勝，2015。
11. 曾宇鳳，2015 IBM Faculty Award，2015。
12. 曾宇鳳教授、田維誠教授、李嗣涔教授與呂學士教授實驗室，2015優良晶片特別設計獎，2015。
13. 曾宇鳳，2015老藥新用獎，2015。
14. 呂學一，灣大學教學優良獎，2015。
15. 莊曜宇，The 5th Excellent Research Award on Breast Cancer, Taiwan Breast Cancer Foundation。
16. 田維誠，旺宏金矽獎 應用組 最佳指導教授獎，2015。
17. 田維誠，青年論文獎，2015。
18. 阮雪芬，2015 Emerging Information and Technology Association (EITA) Service Award，2015。

二、專利

Patents

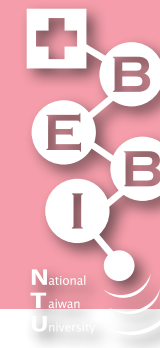
※ 2019

1. J.-T. Yang, L.-C. Lin, I-N. Lee, J.-W. Huang, J.-L. Yeh, M.-Y. Lin, Y.-P. Lu, C.-T. Lin, C.-H. Gao, "Method for detecting dehydration," EP 3,229,021, 2019.



捌 | 教師得獎、專利及技術轉移

Award、Patents and Technology Transfer



- J.-T. Yang, L.-C. Lin, I.-N. Lee, J.-W. Huang, J.-L. Yeh, M.-Y. Lin, Y.-P. Lu, C.-T. Lin, C.-H. Gao, “Method and apparatus for detecting dehydration,” US 10,299,677, 2019
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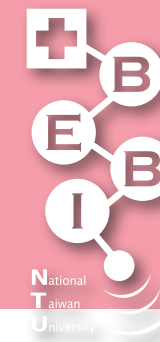
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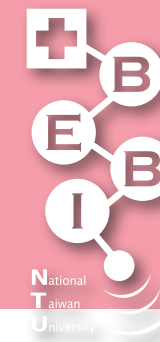
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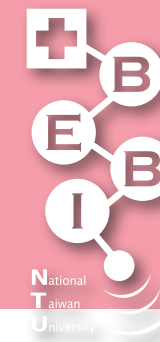
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