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

E-mail：ntubebi@ntu.edu.tw
Website：http://www.bebi.ntu.edu.tw/
Address：10617台北市大安區羅斯福路4段1號　博理館410室
Room 410, Barry Lam Hall,No. 1, Sec. 4, Roosevelt Road,
Taipei, Taiwan (ROC) 10617
Phone：+886-3366-4961
Fax：+886-3366-3754

國立臺灣大學生醫電子與資訊學研究所

BEBI Annual Report, No. 8 / 2014

國立臺灣大學
生醫電子與資訊學研究所

Graduate Institute of
Biomedical Electronics and Bioinformatics,
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2014年第8期年報

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序言 Preface

過去一年以來，台大生醫電資所積極爭取教師員額，為所上增添更多不同領域的教學資源以及研究方向，並持續推動師生的跨領域學習研究及交流，擴展與國內外研究機構及企業的合作關係，協助學生接觸最新生醫工程及資訊技術，使之能與全球生醫科技接軌。

在培育跨領域人才方面，本所在去年一年中，透過電資學院與美國農業部國家農業圖書館（USDA National Agricultural Library, NAL）簽訂的實習計畫，推薦2名優異博班學生前往美國農業部國家農業圖書館進行研究實習。另從102學年度寒假開始，本所與台大醫院合作，薦送優秀研究生至台大醫院醫工部、資訊室、病歷資訊室實習；為獎勵表現優良之實習生，本所於實習結束後，選擇表現優良者頒予獎學金以茲獎勵。另外，本所也積極爭取企業前來徵才，目前已舉辦過美商貝克曼庫爾特有限公司台灣分公司、華聯生物科技股份有限公司及台達集團等徵才活動。我們也持續加強與相關產業的溝通，積極推動產學合作，我們定期安排師生進行企業參訪，去年一年來帶領所上學生前往國家同步輻射研究中心及大瓏企業股份有限公司實地參訪，讓學生實際體會研究機構及企業內部之運作、開發研究進程，以期能增加畢業生的就業機會、強化競爭力並落實密切的產學交流、人才流動機會，讓學生們學以致用。

此外，在所務及研究教學方面，我們致力於在既有的基礎上持續發展及改進。首先，為落實跨領域研究整合的目標，本所將成立生醫核心實驗室，開放本所師生共同使用，以進行前瞻性跨領域整合研究。在新一屆的生醫電資營活動中，今年首度與醫工所合作，安排二階段課程：生醫電資營營隊活動與學分挑戰課程，提供基礎理論外的進階課程，囊跨課程、臨床見習及專題討論等三方面，給予學員更全面的進修學習。

最後在課程方面，本所特於今年度起開設兩門實務課程，分別為「生醫電子技術與臨床見習」及「疾病實驗診斷與中醫辨證」，前者除由郭柏齡老師主授、院內多位教師合授外，更邀請醫學院多名醫師舉辦講座；後者由周迺寬老師與長庚醫院中醫部沈建忠主任合授，號召多名中醫師針對不同主題進行專題演講。理論與實務並進的學習趨勢促使我們在課程內容上積極整合，期望學生能在課堂上得到充分的實作經驗交流與互助，而得以事半功倍，將理論接軌於實務之中，並將活躍的創意發想逐步帶入研發實踐的階段，為生醫相關領域注入活水。

強調結合生醫、電機及資訊的跨領域研究整合，是本所最大特色，也是我們持續努力的目標。本所成立8年以來，上述豐碩的成果皆歸功於全體師生同仁的努力。面對新的年度，我們將配合國際潮流、政府經建所需來提升現有基礎與核心課程，此外也將增加跨領域產學研究計畫合作，爭取資源挹注來加強推動整合性研究。

最後，衷心期許台大生醫電資所在所內師生同仁的共同努力下，能持續邁步向前，本所能更加茁壯，成為整合生醫/工程/資訊跨領域研究的典範。

莊曜宇

2014年9月

Over the past year, the department of NTU Biomedical Electronics and Bioinformatics (NTUBEBI) actively recruited top professors from an array of research areas to continue promoting interdisciplinary research, expanding domestic and foreign research institutions coordination, and to assist in cooperating with enterprises in order to offer students access to the latest biomedical engineering and bioinformatics technology and to integrate with the global biomedical technology.

Regarding the fostering of interdisciplinary talents, the NTUBEBI and USDA National Agricultural Library (NAL) has contracted an internship program commencing last year and NTUBEBI has already recommended two excellent students for the NAL research internship. Since the spring semester of 2013, NTUBEBI additionally has collaborated with the National Taiwan University Hospital (NTUH) and has recommended and sent outstanding graduate students to the department of Biomedical Engineering, the Information Technology Office (IT Office) and the Medical Information Management Office (MIM Office) to the National Taiwan University Hospital Medical for internships. Upon completing these internship programs, interns with good performance were awarded with scholarships. In addition, NTUBEBI also held recruiting events for other enterprises such as American Beckman Coulter, Inc., Taiwan Branch, Phalanx Biotech Group Inc., and Delta Electronics Group Inc. to recruit within our institute. We also continue to strengthen our communication with related industries, aggressively promote industry-university collaboration, and regularly arrange visits to related enterprises for teachers and students. Last year, NTUBEBI led students to visit to the National Radiation Research Center and Deantronics Co., Ltd., giving students insight into the practical experience of working within research institutions, enterprise internal operations, and research & development process. We are aiming to increase the employment opportunities for graduates and strengthen the competitiveness by implementing industry to university exchanges and also give talent mobility opportunities for students to apply their knowledge.

Regarding institute teaching and research affairs, NTUBEBI is committed to develop andimprove on the existing basis. Firstly, for the implementation of integrated interdisciplinaryresearch, the Biomedical Core Laboratory will be established for providingteachers and students the ability to conduct their prospective interdisciplinaryintegration research. The previous BiomedicalElectronics and Bioinformatics camp was the first time NTUBEBI had collaboration with theInstitute of Biomedical Engineering. In our efforts towards improvement this year we arranged two stages of courses: BiomedicalElectronics and Bioinformatics camp activities and creditschallenge courses to provide advanced courses (including curriculum), and clinical training and seminars providing morecomprehensive learning for students.

In the aspect of curriculum, the institute recently gave two practical courses: "Biomedical Electronic Technology and Clinical Training" and "Laboratory Diagnosis of Disease and Tradition Chinese Medicine (TCM)". The former course is hosted by Po-Ling Kuo and co-taught by other teachers in the institute, and also invited medical school physicians to provide an up-to-date seminar. The latter course is hosted by Nai-Kuan Chou and co-taught by Jian Zhong Shen (the director for the department of Traditional Chinese Medicine of Chang Gung Memorial hospital), and this class also invited practitioners to give guest lectures on their practical topics of expertise. The trends of promoting both the theory and the practice of learning prompted us to actively integrate the content of our curriculum; students are expected to be able to fully implement the exchange of experience and mutual assistance in the classroom, to be effective in applying the theory into practice in the process, and to accelerate the procedure of putting the creative thinking into R&D practice. This will ideally stimulate the needed growth to lead research in Biomedical related areas.

NTUBEBI's most prominent feature is not only emphasizing the combination of biomedical, electrical, and information integration interdisciplinary research but also putting ongoing effort to reach this aforementioned goal. Ever since the establishment of our Institute eight years ago, the many great achievements are attributed to the efforts of all our colleagues and students. Facing the coming year, we will cooperate with the international trend and government funding policy to upgrade the existing foundation and core courses. In addition, NTUBEBI will also increase interdisciplinary studies and research cooperation programs, seeking for more resources to strengthen the promotion of integrated research.

Finally, thanks to the joint efforts of the NTUBEBI colleagues and students, we continue to move forward and are rapidly becoming a role model for the integrated Biomedical / Engineering / Information interdisciplinary research institute.

September, 2014

目錄 Contents

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、微陣列分析、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。

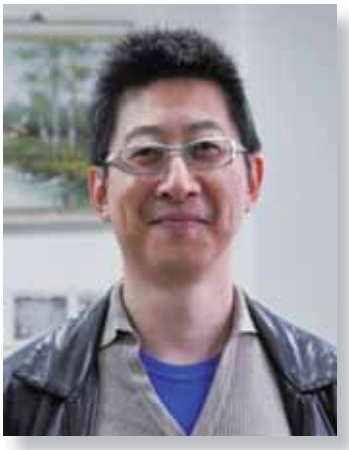
2006年8月，生醫電資所開始招收博士班，目前每年招收18名博士生加入生醫電資所的行列，碩士班也於2007年8月開始招生，每年有41名碩士新生加入。本所有39教師，來自不同領域的背景，包含了電機工程、資訊科學、生物、藥學、生醫工程、醫學以及生命科學。本所的課程設計也提供學生有足夠的跨領域訓練，以迎合生物醫學科技此一領域的挑戰。目前，我們針對重要的生醫問題進行整合性的研究，同時也和生醫電子及生物資訊相關產業合作，及進行跨領域的訓練和教育，我們期待本所持續的成長茁壯，並對生物科技與健康照護領域做出貢獻。

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 multi disciplinary 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, microarrays, 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 18 new Ph.D. students every year. Our master program started in August, 2007 with 41 new students entering the institute annually. There are 39 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 新進教師介紹
New Faculty

一、李心予教授 Hsinyu Lee, Professor



李心予教授於1987年取得台灣大學動物系學士學位，畢業後前往美國加州大學舊金山分校(University of California, San Francisco)取得生物醫學博士學位。李教授於2001年8月返台至今，目前擔任台大生科系電機系和生醫電資所合聘教師。李教授取得博士學位後，於加州大學擔任博士後研究員進行水解磷酸脂於細胞生理的研究，並獲得美國國衛院(National Institutes of Health)之研究計畫補助。回國後致力於細胞生物學以及跨領域之研究，發表論文超過八十篇。

李教授的主要研究方向可分為三個方向: (1)水解磷酸脂之生理功能探討 (2) 戴奧辛之生物檢測 (3) 個人化癌症醫療之可能模式。

Professor Hsinyu Lee received his B.S. in Zoology from National Taiwan University, Taipei, Taiwan, in 1987. He received his Ph. D. degree in Biomedical Science from the University of California, San Francisco, in 1998. He also had his postdoctoral training at UCSF, focused on the investigation of the physiological functions of lysophospholipids, and his research project was funded by NIH postdoctoral fellowship. He is currently jointly appointed by department of Life Science, Electrical Engineering and Institute of Biomedical Electronics and Bioinformatics of NTU. He continued his research on lysophospholipids and also initiated several cross-discipline research projects at NTU and published more than 80 papers.

His current research focuses on the following subjects: Investigation of the physiological functions of lysophospholipids, establishment of bioassay systems for dioxin like compounds, and exploring the possibility of personalized medicine for cancer patients.

National Taiwan University

參 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。

Faculty members in this group have diverse research interests including "medical imaging", "medical instrumentation and biomedical signal processing", "biochips and biomedical sensors", and "biomedical optics". 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.

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」、「計算藥物學及計算化學」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)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，舉凡醫學資訊應用所涉及的網路系統、多媒體系統、資料庫系統以及平行計算、分散式計算、即時計算等均包含在內。

We dedicate our resources to cutting-edge topics such as "biomedical data analysis and mining", "computational system biology", "computational pharmacology and chemistry", and "medical information systems". Our major research interests in biomedical data analysis and mining include biochip (Micro-array) 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 system 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 computing, and real-time systems.

肆 學術活動
Academic Activities

一、第三屆獎勵研究創新獎
The 3rd Biomedical Electrical Engineering reward research and innovation

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」並施行之。102年度為第三次舉辦，於八月開放所上同學申請，在本所招生及學術委員會上審議通過得獎名單後，並於102年12月16日(一)舉行第三屆頒獎典禮。本獎項特別邀請本所傑出校友—泰博科技陳董事長朝旺先生擔任頒獎人，同時邀請院長、本所老師、校友、學生共襄盛舉，參與老師有王唯工、宋孔彬、陳中平、曾宇鳳、高成炎等諸位老師，及所上100多位同學熱烈參與。

在頒發獎項前，首先邀請泰博科技董事長—陳朝旺先生為所上師生進行個人在國際商業訴訟及專利訴訟的經驗，這樣的經驗分享著實讓所上師生獲益良多，並對未來在國際商業訴訟上可能遇到的問題有更進一步的了解。演講結束後，緊接著便開始進行頒獎典禮，本獎共分成兩大項，分別是學生傑出論文獎、年度最佳碩士、博士學位論文獎，此次特地邀請陳朝旺董事長及郭院長來頒發獎項。

本次學生傑出論文獎獲獎學生為：郭天爵同學、王國清同學及劉家宏同學，年度最佳碩士論文獎的獲獎學生為陳錫勳同學，年度最佳博士論文獎則由劉家宏同學獲得。此三個獎項除了鼓勵所上學生勇於在國際的舞台上創新研究外，也欲藉此肯定本所學生在研究上的成就。

The Graduate Institute of Biomedical Electronics and Bioinformatics (BEBI) at National Taiwan University encourage students in research and innovation study to promote our university international academic status. The Biomedical Electrical Engineering research and innovation award was established at 2011, The 3rd Biomedical Electrical Engineering research and innovation award in 2013 is open for submission in August for students to apply. The BEBI Admissions and Academic Committee will evaluate the final awarding list and the 2nd Biomedical Electrical Engineering research and innovation awarding ceremony will be held on December 16, 2013. This award specifically invited the distinguished alumni - TaiDoc Technology Chairman of the board Mr. Zhao Wang Chen to present this award. As well as invited the Dean of Electrical engineering and Computer Science, professors, alumni, and students from BEBI to participate in this honoring event. The participants professor are Wei-Kung Wang, Kung-Bin Sung, Chung-Ping Chen, Y. Jane Tseng, Cheng-Yan Kao and approximately 100 students have attended this event.

The open ceremony started by inviting speaker TaiDoc Technology Chairman of the board Mr. Zhao Wang Chen to give a talk about his experience of commercial litigation and Patent Litigation. Through this speech,students could gain a deeper understanding of international business litigation. The awarding ceremony starts after the inspiring speech. Two types of

awards were given: Graduate Student Outstanding Research Award and Best Master Thesis Award, Best Ph.D. Dissertation Award of the Year. The awards were hand out by Mr. Zhao Wang Chen and Dr. Kuo the dean of Electrical Engineering and Computer Science.

The students awarded for Graduate Student Outstanding Paper Award : Tien-Chueh Kuo Kuo-ching Wang Chia-Hung Liu.

The students awarded for Best Master Thesis Award: Hsi-Hsun Chen.

The student awarded for Best Ph.D. Dissertation Award: Chia-Hung Liu.

These three awards encourage students to stand international arena innovative research, and also reward the contribution of the student's achievement in the biomedical study.

肆 學術活動
Academic Activities

二、博士班招生說明會
BEBI Introduction to prospective students: PH.D Program (2014/03/28)

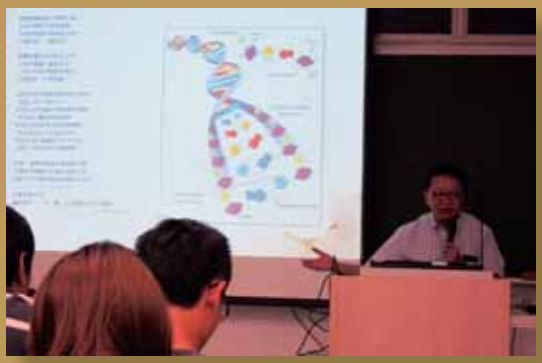
三、碩士班新生說明會 BEBI Introduction to new students (2014/3/31)

四、演講　Lectures

1. 102-9-16
明達館緊急應變演練

2. 102-9-23
Prof. Brian Chen, McGill University, Canada
Creating A User-Friendly Web Application for Accessing Genomic and Bioinformatics Data

3. 102-9-30
楊斯棓醫師
反核、擁核，公民如何思辨做抉擇？



4. 102-10-14
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5. 102-10-21
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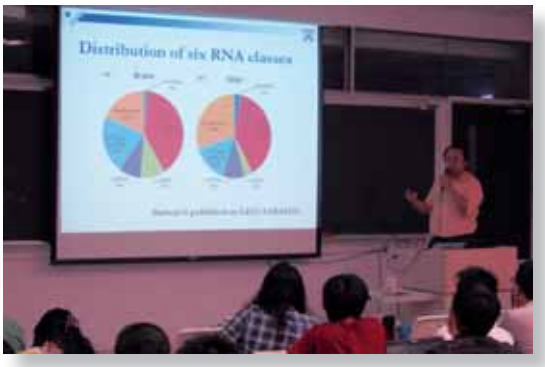

6. 102-10-28
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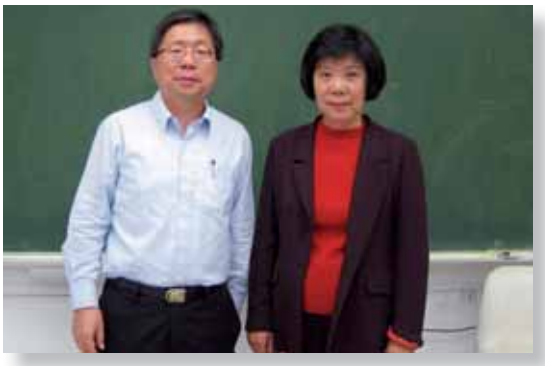

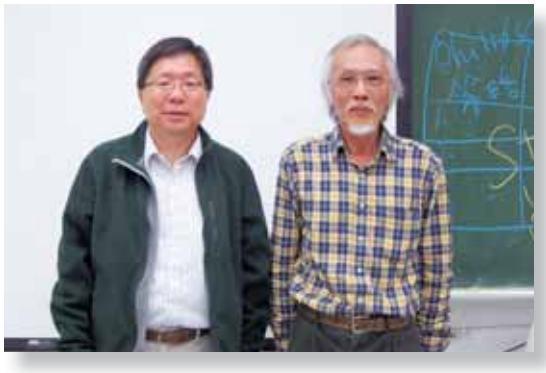

8. 102-11-18
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9. 102-11-25
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10. 102-12-2
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14. 102-12-30
財團法人小英教育基金會 蔡英文董事長
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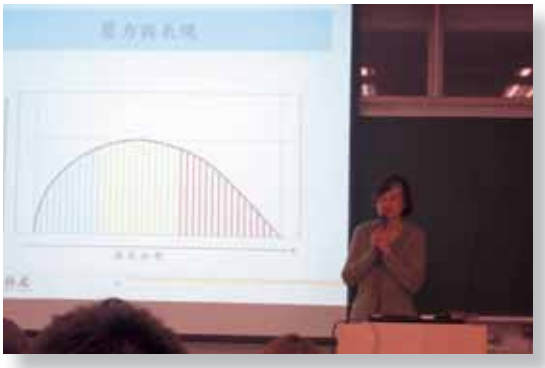

16. 103-3-3
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五、國立臺灣大學電機資訊學院102年度畢業典禮
2014 Commencement of College of Electrical Engineering and Computer Science, NTU







六、2014/07/08~07/10生醫電子資訊營
Biomedical Electronics and Bioinformatics Camp on July 8-10, 2014

2014臺大生醫電資營於7月8日至7月10日在臺大博理館舉辦，已是本所第八次舉行暑期營隊活動。今年活動主題為「腦科學技術與商業應用」，透過系列課程介紹引領學員認識此領域並培養其興趣，作為進入相關領域之準備，並為國家培養生物科技與醫療電子資訊的學術與產業人才。

自古以來，人類便渴望能揭開大腦的神秘面紗。「大腦研究」也一直都是國內外醫學、科學界熱門研究議題。本活動分為2階段，營隊系列演講將從多個面向透析大腦研究：科技面 - 各種造影技術的應用現況；臨床面 - 從神經內、外科醫師的觀點出發。學分挑戰課程進一步著眼於臨床需求探勘，將挑戰學員的創意與分析能力，從臨床技術見習到需求探勘再到商業化醫材構想。

本活動為第一階段營隊，透過多位學者與臨床醫師的講解，介紹大腦研究最新相關發現；並安排實驗室參觀活動，使學員了解生醫電資所教師的研究領域及背景，啟發學員對生醫電資領域的興趣。

另外在三天課程的尾聲舉辦了創意競賽，我們將不同背景的學員混合編組，學員們利用小組討論時間，將課堂上所學習到的知識充分應用到報告中，並透過組員間相互溝通交流，培養團隊合作的能力，將團隊成果呈現於評審面前。而後，評審委員透過創新度、可執行性、流程規劃完整性及貢獻價值評估等因素考量，選出本次競賽前三名之優勝隊伍頒發獎狀及獎金。

本次活動總共有90位學員報名參加，成員有大學生、研究生及社會人士，顯示生醫電資營課程安排豐富多元，吸引不同背景的學員報名參加。另外在學員問卷調查中，全體學員皆表示滿意這次的營隊規劃，同時有99%的學員表達願意再次參加的意願。明年亦將秉持培養生物科技與醫療電子資訊之學術與產業人才，繼續舉辦相關研習課程。

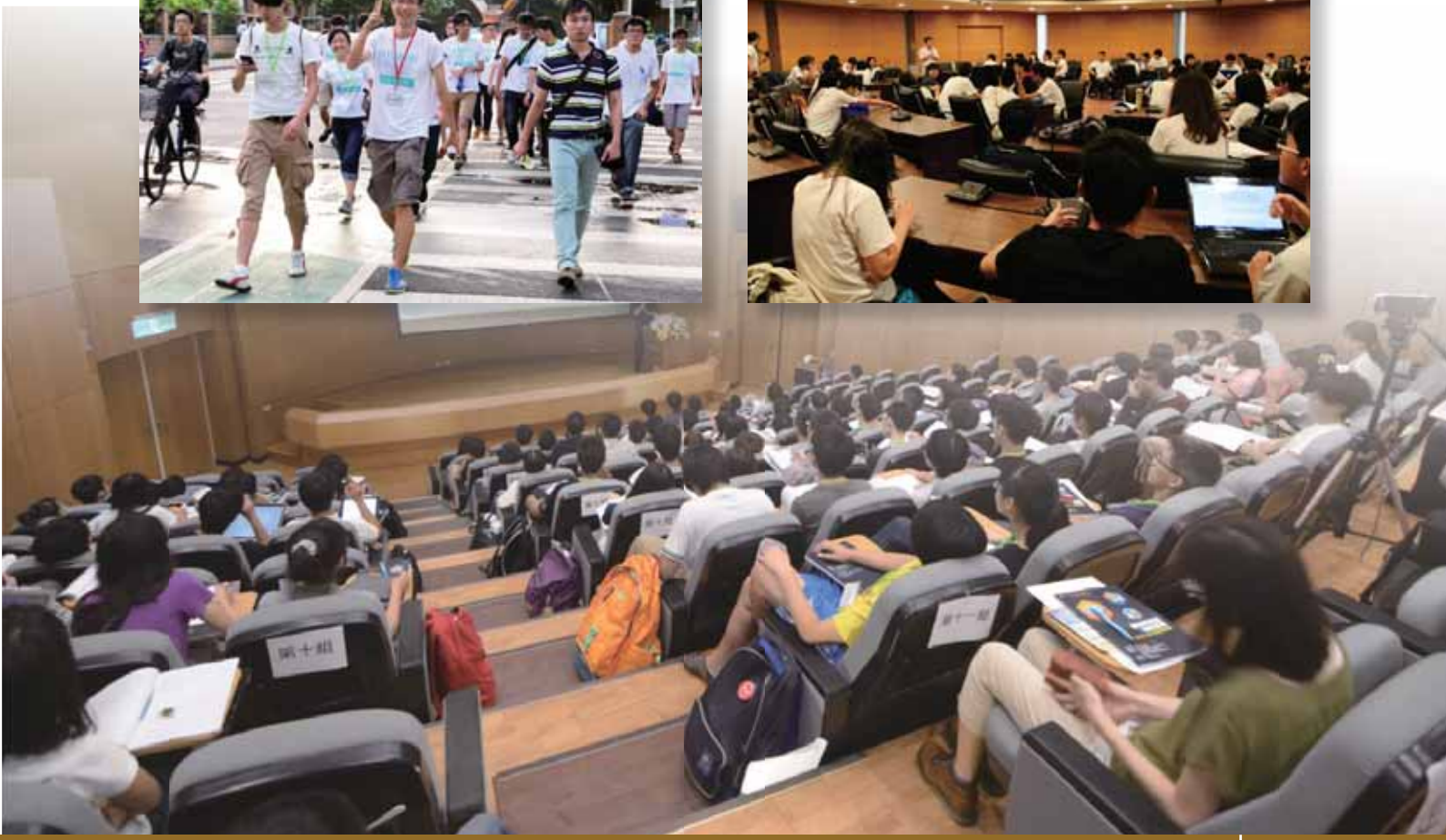
The 2014 Biomedical Electronics and Bioinformatics Summer Camp is held on 8 Jul 2014 to 10 Jul 2014 at National Taiwan University Barry Lam Hall. The theme for this year is "Brain science and business commercialization" introduced through a series of courses in which we aims to develop students' understanding and interests in biomedical informatics. This summer camp provides them with a platform to enter related fields and to develop personal profession in biotechnology and medical electronics information for both industry and academic categories.

Brain study is one of the most popular subjects among medicine and science research. This year's summer camp program is conducted in 2 sessions. The first session is on a series of lectures which features both scientific application and clinical development from medical doctor's point of view. The second session focus more on discovering potential needs and business commercialization ideas in clinical application by leveraging participated students creativity and

analytical capabilities. The introduction of the latest development in brain study and laboratories visiting is arranged during the camp as well to help students' understanding and further arouse their interests in biomedical informatics.

The three-day course is ended by a creative competition, students from different backgrounds mixed into groups, students use group discussion time to understand what they learned from the lectures and make full use of the knowledge to their final report. Communicate with each other through team cooperation, and in the end their final results will be presented to the jury. Then, the jury judge through the reports innovation, enforceability, process planning, integrity and contribution valuation considerations and other factors to elect the top three winning teams contest awarded with a certificate and prize.

There are 90 student′ s participants in this camp, composed of undergraduates, graduates, and community members; this shows that Biomedical Electronics and Bioinformatics summer camp contains rich and diverse curriculum to attract students of different backgrounds. The student survey shows that all the students are satisfied with this camp, and 99% of participants expressed willingness to participate again. Next year the Biomedical Electronics and Bioinformatics summer Camp will keep the good tradition of opening biotechnology and medical electronic information programs train more academic and industry professionals.



伍 國際交流 International Exchanges

一、2013國際生醫超音波研討會 2013 International Conference on Biomedical Ultrasound

生醫超音波領域的研究在近年來有許多突破性的發展，國際間的學術交流亦日趨密切。本領域全世界最重要的指標性會議之一IEEE International Ultrasonics Symposium（IUS），將在2015年首次在台灣舉辦，並由本所李百祺教授擔任大會主席。由於這是IUS大會首度在台舉辦，故藉此機會先行於2013年10月22日至23日舉辦前期會議（International Conference on Biomedical Ultrasound，簡稱ICBMU），以藉由本前期會議來聚焦生醫超音波相關之重點研究領域，並促成區域間主要研究團體之交流與整合，以及提升國際之能見度。同時，藉由本會議開啟一系列於生醫超音波領域之年會，讓本系列會議成為全世界頂尖研究團體固定之學術交流平台。

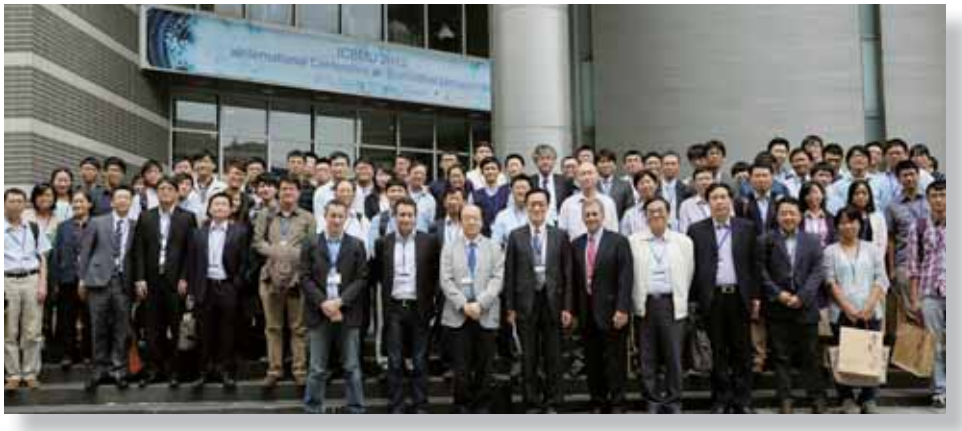
本研討會（ICBMU）之主要目的有三：

一、促進生醫超音波領域之國際交流：在邀請演講部份，將邀請美國、日本、新加坡與中國之相關學者，在一般論文部分，則以亞太地區學者為主要邀請對象。本會議以聚焦為主要規劃方式，因此在人數上控制在 100 人與會，會議亦採單一議程（single session），期能透過密切之互動促成更密切之交流。

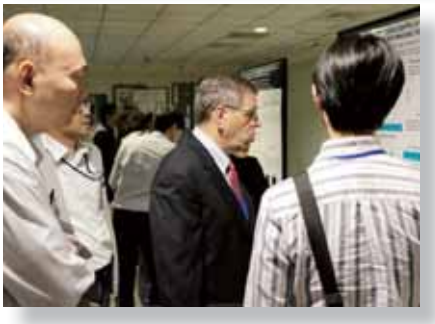
二、加強相關國際學術組織之橫向聯結：預期與會成員將涵蓋多個國際學會組織，包括 IEEE、AIUM、WMIC 等。藉由此研討會作為一橫向聯結之平台，可使本會議之主題更加聚焦，定位亦將更為明確。

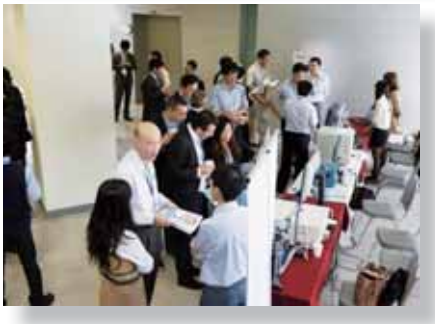
三、提升台灣相關領域之學術國際能見度：在台灣舉辦國際研討會，可順道安排交流與參訪之活動。學術報告亦將促進各與會團體之瞭解，對於未來媒合國際學術合作都將有直接的幫助。

此次研討會發表文章議題豐富，內容充實，且與會者均為生醫超音波相關研究領域成就卓越之學者專家，在會期中互動討論熱絡，對國內學者助益甚多，而會議圓滿落幕，亦有助於推動後續之國際合作。



In recent years, many significant and ground-breaking ultrasound researches have been presented, and frequent collaboration between international academic organizations are noted. IEEE International Ultrasonics Symposium (IUS), one of the most prestigious and influential international conference in ultrasound, will be held in Taiwan in 2015, organized by Professor Pai-Chi Li (the General Chair) from National Taiwan University. This will be the first time that IUS is held in Taiwan. Taking this opportunity, we have hosted a pre-conference – International Conference on Biomedical Ultrasound (ICBMU) – in 22-23 October 2013. This conference focused on the study of biomedical ultrasound, which aimed to integrate and promote collaboration between regional leading ultrasound researchers, and thus, increase the visibility and influential status of the researches achieved in Asia. ICBMU is intended to become an annual conference and a regular platform where world' s leading academic research group can gathered and corporate.





The main purposes of this conference (ICBMU) are

1. Promote international ultrasound research collaborations.
   ICBMU will invite speakers from Unite States, Japan, Singapore and China. Scholars from Asia-Pacific region will be invited to present their works in the conference. The number of attendees will be limited to approximately 100 people, as only specific topics on biomedical ultrasound will be focused in the conference. The conference has adopted a single-session format, which we hope will result in closer interaction between attendees
2. Strengthened the connections with other international academic organization. We expected several members from other international ultrasound-related academic organizations, such as IEEE, AIUM and WMIC, will be attending this conference. This conference can served as a platform for networking with other organization, which may help to define and clarify the theme of this conference.
3. Promote the academic researches achieved in Taiwan internationally By organizing international conference in Taiwan, events such as lab tours and cross-institute collaborations can be arranged. The works achieved by other participating organizations can be better understood through the conference paper received, which may directly benefit future international academic collaborations.

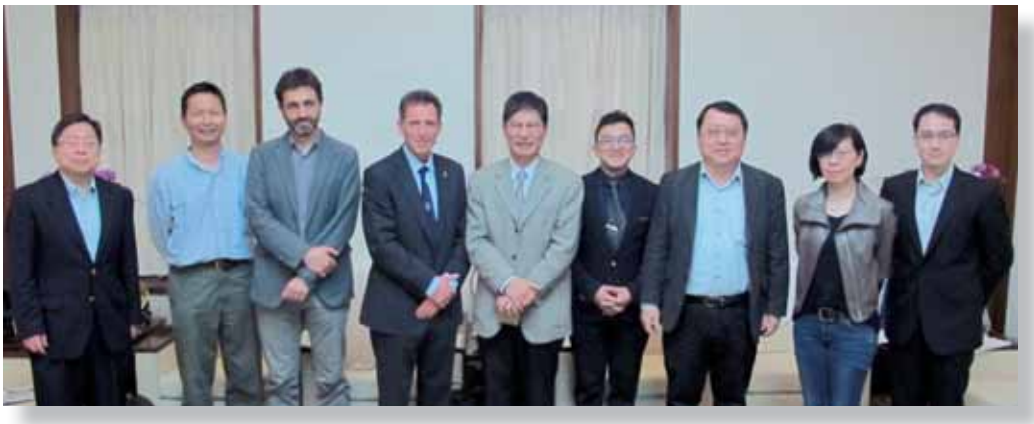
二、外賓參訪 International Visits

本年度國際化活動頻繁，前後共有多位學者蒞臨本所進行參訪、演講等活動。鑑於本所結合電子、資訊及醫學等領域之特色，並致力於跨領域整合的國際化學術趨勢，深受以醫學、理工領域聞名國際的英國格拉斯哥大學肯定，自100年起即多次與本所接觸，洽談學術、學位合作等事宜。

Dr. Jonathan Cooper為該校新任副校長，在此之前已曾多次來台與本所接觸，本年度於5月6日來訪，除了延續往年討論的學術項目之外，更希望透過本所牽線，與校內各系所進行學術互動，尋求領域多樣化的合作契機，因此安排於本校行政大樓會議室由本所莊曜宇所長、電資學院郭斯彥院長、國際事務處傅友祥副國際長及陳良基學術副校長一同接待，相信良好的互動會是未來無限可能的開端。

The international activities are frequent this year. There are a number of scholars to come to visit, lectures and other activities. According to the characteristics of combining the field of electronics, information &medicine and the results of the interdisciplinary works, we are able to attract foreign scholars from the University of Glasgow, England, is well known on the field of medicine, science and engineering, to come visit us and discuss a series of academic cooperation and exchange program.

On May 6th, 2014, Dr. Jonathan Cooper, the new vice principle at the University of Glasgow,came visit and continued discussing the previous academic issuses, and expressed an interest in cooperation with not just BEBI but the other academic research institutes all around NTU. Hence, Prof. Chuang, Eric Y., the director of BEBI made arrangements with the dean of college of electrical engineering and computer science (EECS), Prof. Sy-Yen Kuo, the associate dean of the office of international affairs (OIA) in NTU, Prof. Bennett Fu and the vice president for academic affairs of NTU, Prof. Liang-Gee Chen to have the meeting with Dr. Cooper . Keeping the good interaction with the University of Glasgow will bring more academic cooperative opportunities in the future.



上圖左一本所莊曜宇所長、左三 Prof. Manuel Salmeron Sanchez、左四英國格拉斯哥大學 Dr. Jonathan Cooper、左五本校陳良基學術副校長、右四國際事務處傅友祥副國際長、右三電資學院郭斯彥院長、電資學院國際事務辦公室楊佳玲主任

三、學術互動 Academic Interaction

由本所莊曜宇所長居中協調的美國農業部國家圖書館(NAL)與電資學院學生實習案自簽訂合作備忘錄以來於本年度首次舉辦，實習條件相當優渥，本所學生申請踴躍。經雙方甄選後，全院共薦舉三名博士生赴美實習，其中兩名學生林翰、李建樂為本所博士班三年級學生。此案往後將常態性舉辦，相信會是本所學子不可多得的學習經驗。

甄選結束後，美國農業部國家圖書館館長Dr. Simon Liu更為此實習計畫案於返台期間特地抽空造訪本校，並應邀為本所學子提供精彩演講，其重視程度可見一斑。

This is the first time that the signing of academic interaction agreement between the USDA National Agricultural Library (NAL) and College of Electrical Engineering and Computer Science (EECS) coordinated by the director of BEBI, Prof. Chuang, Eric Y.. After a cautious evaluation by NAL and EECS in numerous applications from our students due to the generoustreatment of the intern, we recommended three doctoral degree students which two of them,Han Lin andChien-Yueh Lee are the third year doctoral degree students of BEBI to the NAL intern progam.We believe that as this program continues in the future, it will become one of the most valuable learning opportunities to our students.

After the evaluation, the president from NAL, Dr. Simon Liu, paid a visit to EECS and gave our students a speech on the program; denoting the importance of this program to both NAL and EECS.

上圖講者為美國農業部國家圖書館館長 Dr. Simon Liu

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 Room 405, Barry Lam Hall
醫學影像實驗室/磁共振影像頻譜實驗室 Medical Imaging Lab./Magnetic Resonance Imaging Lab.	陳志宏 Jyh-Horng Chen	明達館706 Room 706, MingDa Building
智慧型與精密運動控制實驗室 IPMC Lab.	陳永耀 Yung-Yaw Chen	明達館604 Room 604, 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 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 Room 702, MingDa Building
醫用磁振造影研究室 Magnetic Resonance in Medicine Lab.	鍾孝文 Hsiao-Wen Chung	明達館704 Room 704, MingDa Building
紅外線暨生醫奈米元件實驗室 Infrared and Bio-Chemical Nano-Device Lab.	管傑雄 Chieh-Hsiung Kuan	電機二館426 Room 426, EE 2
細胞行為實驗室 Cell Behavior Lab.	郭柏齡 Po-Ling Kuo	明達館707 Room 707, MingDa Building
生物醫學信號實驗室 Biomedical Signal Lab.	郭德盛 Te-Son Kuo	明達館705 Room 705, 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 Room 553, EE 2
紅外線元件實驗室 IR Device Lab.	李嗣涔 Si-Chen Lee	電機二館451 Room 451, EE 2
超音波影像實驗室 Ultrasonic Imaging Lab.	李百祺 Pai-Chi Li	明達館731 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 Hsinyu 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 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	展書樓605/608 Room 605/608, Jan Su Hall
人腦實驗室 Brain Imaging and Modeling Lab.	林發暄 Fa-Hsuan Lin	展書樓703 Room 703, Jan Su Hall
奈米生醫光電實驗室 Nano-Biophotonics Lab.	孫啟光 Chi-Kuang Sun	電機二館R406A 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 Room 703, MingDa Building
微奈米分析技術及系統實驗室 Micro/Nano Analytical Technologies & Systems Lab.	田維誠 Wei-Cheng Tian	明達館509 Room 509, MingDa Building
數位信號處理實驗室 Digital Signal Processing Lab.	曹建和 Jen-Ho Tsao	電機二館552 Room 552, EE 2
心臟輔助器實驗室 Ventricular Assist Device Lab.	王水深 Shoei-Shen Wang	臺大醫院 NTUH
臨床磁振影像實驗室 Clinical Magnetic Resonance Imaging Lab.	吳文超 Wen-Chau Wu	明達館704 Room 704, 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

陸 實驗室及教師
Laboratories and Faculty

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	資訊館402 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	資訊館432 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	資訊館328 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 Room 1105, Life Science Building
生物資訊實驗室 Bioinformatics Lab.	高成炎 Cheng-Yan Kao	資訊館401 Room 401, CSIE Building
醫學資訊實驗室 Medical Informatics Lab.	賴飛羆 Fei-Pei Lai	資訊館346 Room 346, CSIE Building
演算法實驗室 Algorithmic Research Lab.	呂學一 Hsueh-I Lu	資訊館406 Room 406, CSIE Building
分子生醫資訊實驗室 Molecular Biomedical Informatics Lab.	歐陽彥正 Yen-Jen Oyang	資訊館410 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
生物資訊與化學資訊實驗室 Bioinformatics and Cheminformatics Lab.	曾宇鳳 Y. Jane Tseng	資訊館403 Room 403, CSIE Building

趙坤茂 教授

Kun-Mao Chao, Professor

國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學資訊工程學系暨研究所教授兼主任
國立臺灣大學資訊網路與多媒體研究所合聘教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Chairman and Professor , Department of Computer Science and Information Engineering
Adjunct Professor, Graduate Institute of Networking and Multimedia, National Taiwan University

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.

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. 單一核苷酸多型性資訊運用的演算法設計
   Efficient Algorithms for Utilizing SNP information
2. 線上拓撲排序問題之快速演算法
   Fast Algorithms for Online Topological Ordering
3. 多重基因複製問題的快速演算法
   Faster Algorithms for the Multiple Gene Duplication Problems

E-mail: kmchao@csie.ntu.edu.tw
Phone: +886-2-23625336*423
Office: 德田館423 (CSIE-423)
Website: http://www.csie.ntu.edu.tw/~kmchao
Lab. Phone: +886-2-33664888*432
Fax: +886-2-23628167
Lab.: 德田館432 (CSIE-432)

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兼所長
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與預防醫學所教授
國立臺灣大學動物研究所教授
國立臺灣大學生命科學院與中央研究院合辦-系統生物學學位學程教授
國立臺灣大學腫瘤醫學研究所教授
國立臺灣大學永齡生醫工程中心主任
國立臺灣大學基因體醫學研究中心生物統計暨生物資訊核心實驗室主持人

Director and Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, Department of Electrical Engineering/ Department of Life Science/ Graduate Institute of Epidemiology and Preventive Medicine/ Institute of Zoology/ Genome and Systems Biology Degree Program, College of Life Science, Graduate Institute of Oncology
Director, Yong Lin Biomedical Engineering Center, National Taiwan University
Principal Investigator, Bioinformatics and Biostatistics Core, NTU Center of Genomic Medicine

生物晶片研究室
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研究，研究範疇涵蓋晶片製備技術、影像擷取與分析、基因序列資料分析、生物資訊學、資料管理，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 has 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 technology in the biomedical field. Interests in our laboratory include microarray fabrication, image capture and analysis, bioinformatics, database management, and analytic technique to understand 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.

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

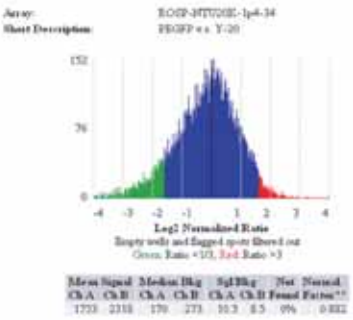
Biochip, Next-Generation Sequencing, Bioinformatics, Cancer Biology, Radiation Biology

研究計畫 Research Projects

1. 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
   To investigate the roles of SEMA6A in lung tumorigenesis and susceptibility-associated SNPs of SEMA6A in non-smoking female lung cancer

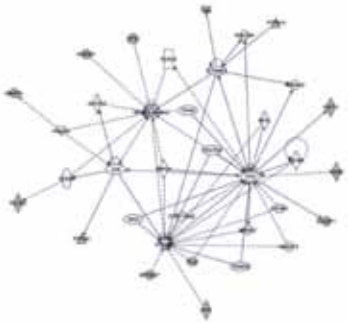
2. 以尖端系統生物科技探索Brugada 症候群及開發嶄新臨床基因檢測技術
   Use systems biology approach to explore Brugada Syndrome and develop an innovative genetic screening technology for clinical applications

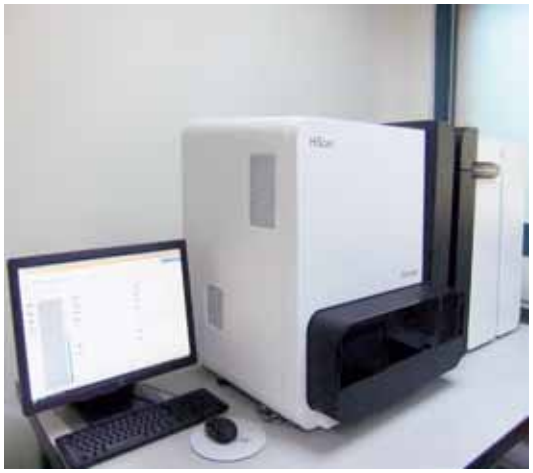
3. 應用次代定序探查有與無抽煙喝酒嚼檳榔習慣之食道癌病患基因特徵
   To explore the genetic signature of esophageal cancer patients with and without the histories of smoking, drinking and betel chewing habits using next generation sequencing



4. 黃花蜜菜作為藥草之代謝體與轉錄體學研究
   Metabolomic and transcriptomic studies for use of Wedelia chinensis as medicinal herb

5. 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
   Bioinformatics and Biostatistics Core Facility





E-mail: chuangey@ntu.edu.tw
Phone: +886-2-33663660
Office: 明達館622 (MD-622)
Website: http://www.ee.ntu.edu.tw/profile?id=99
Lab. Phone: +886-2-33669601
Lab.: 明達館701 (MD-701)

鍾孝文 教授

Hsiao-Wen Chung, 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

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

醫用磁振造影研究室

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9名，碩士班研究生4名。博士班畢業生25名，碩士班畢業生14名。

Founded in July 2000. Supervisor: Prof. Hsiao-Wen Chung. This lab currentlyhas 9 Ph.D. students and 4 M.S. student, plus 25 Ph.D. graduates and 14 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

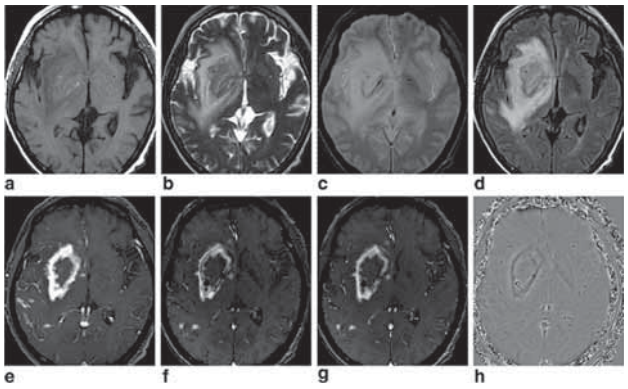
1. 螺旋槳式面迴訊磁振造影進階技術發展

   Advanced technical developments for Propeller echo-planar MR imaging

2. 磁化率加權磁振造影之進階研發與臨床應用

   Technical advancements and clinical applications of susceptibility-weighted MR imaging

■ 代表圖及中英文說明：



54歲女性右側基底核腦膿瘍病患。a：T1權重影像。b：T2權重影像。c：梯度迴訊T2*權重影像。d：FLAIR影像。e：顯影劑T1權重影像。f：顯影劑磁化率權重影像。g與h：原始絕對值與相位影像，用以產生f中之磁化率權重影像。腦膿瘍莢膜在顯影劑磁化率權重影像中顯現出亮暗相間之多層結構。

A 54-year-old female patient with pyogenic abscess in the right basal ganglion. a: T1-weighted image. b: T2-weighted image. c: Gradient-echo T2*-weighted image. d: T2-weighted fluid-attenuated inversion recovery image. e: Contrast-enhancedT1-weighted image. f: Contrast-enhanced susceptibility-weighted image. g,h: The original magnitude and correctedphase images used to generate the susceptibility-weighted image shown in f. The abscess capsule exhibiting hyperintensityon contrast-enhanced T1-weighted image shows a darkened ring within the central layer on contrast-enhanced susceptibility-weighted image.

E-mail: chunghw@ntu.edu.tw
Phone: +886-2-33663628
Office: 明達館624 (MD-624)
Website: http://www.mrilab.org/
Lab. Phone: +886-2-33663675
Lab.: 明達館704 (MD-704)

賴飛羆 教授

Fei-Pei Lai, Professor

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

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

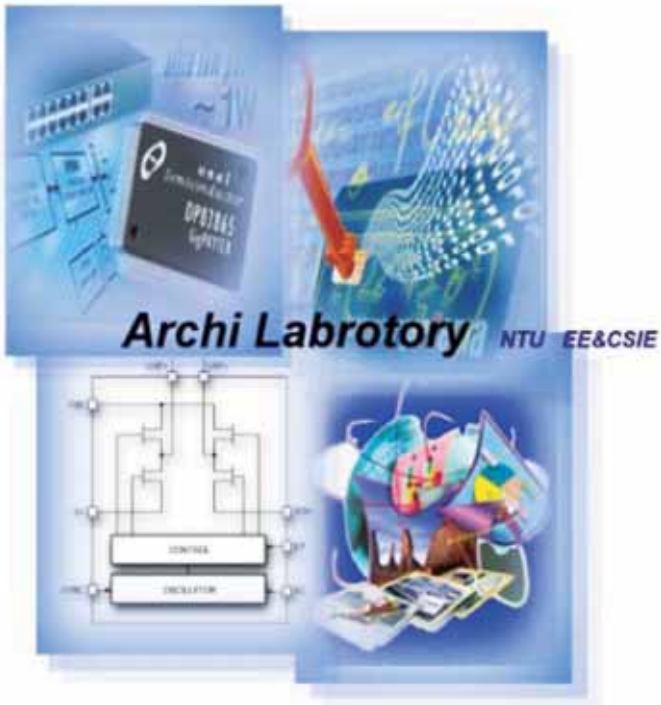
醫學資訊實驗室

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組成。實驗室成員包括博士班10人，碩士班10人。實驗室創立初期以研究「計算機結構」，「低功率系統晶片設計」為主，近年來改以醫學資訊為主要目標，本實驗室的研究方向包含：

1. 電腦與通訊網路資訊安全機制研究
2. 醫學資訊

This Lab. was established in 1987 and Professor Feipei Lai works together with 10 Ph.D. students and 10 master students. The major research areas include Information Security, and Medical Informatics. Our Lab. has cooperated with numerous IT companies and other overseas universities including Dortmund University in Germany, Calgary University in Canada and Mongolian University of Science and Technology in Mongolia as well as Tallinn University of Technology in Estonia.



主要研究領域 Major Research Areas

資訊安全、醫學資訊

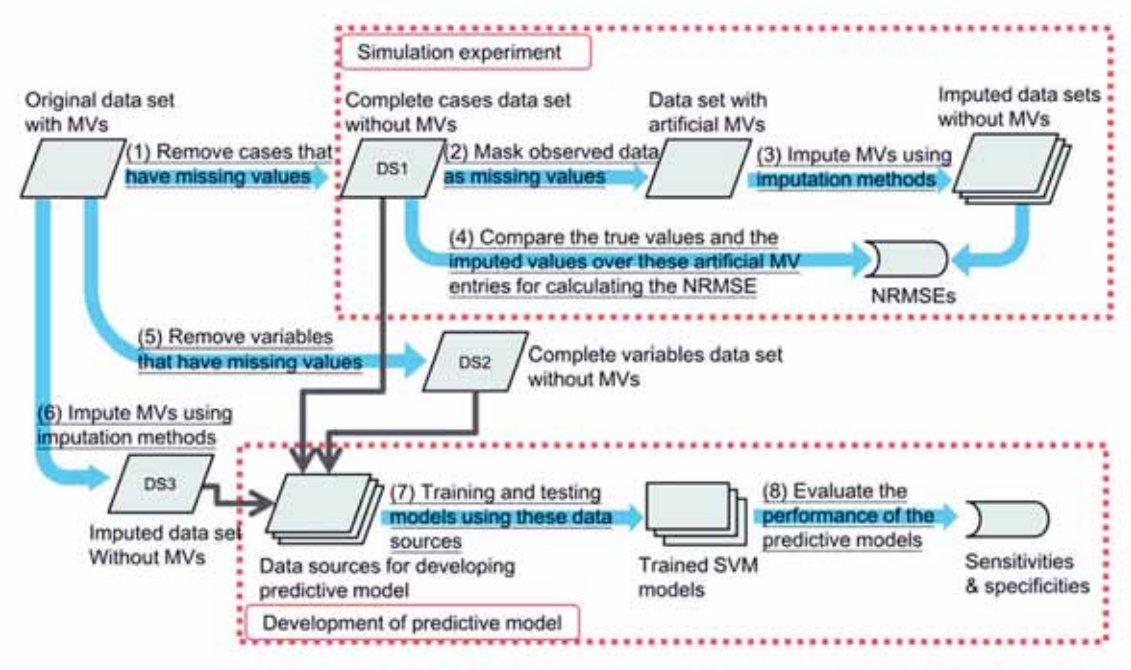
Information Security, Medical Informatics

研究計畫 Research Projects

1. 醫療資訊抽取與不完整醫療資料處理之平臺(2012/08/01-2015/07/31)

   Platform for medical information extraction from incomplete data

■ **研究計畫** - 醫療資訊抽取與不完整醫療資料處理之平臺Platform for medical information extraction from incomplete data之代表圖及說明：



缺值模擬實驗與缺值處理方式實驗流程圖

E-mail: flai@ntu.edu.tw
Phone: +886-2-33664924
Office: 德田館419 (CSIE-419)
Website: http://archi.csie.ntu.edu.tw/
Lab. Phone: +886-2-33664888*346
Lab.: 德田館346 (CSIE-346)

李百祺 特聘教授

Pai-Chi Li, 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特聘教授
國家衛生研究院醫工組兼任研究員

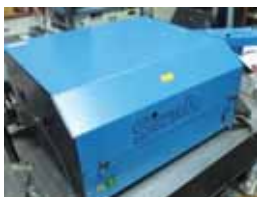
Distinguished Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Distinguished Professor, Department of Electrical Engineering, National Taiwan Universit
Adjunct PI, National Health Research Institutes

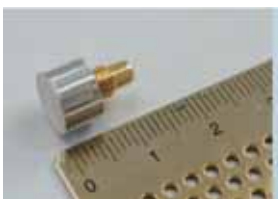
超音波影像實驗室

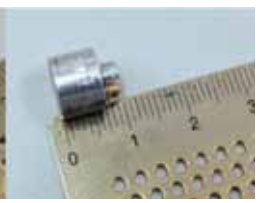
Ultrasonic Imaging Lab.

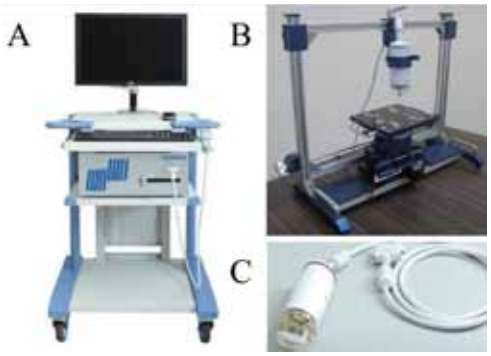
本實驗室由李百祺教授成立於1997年，主要從事醫學電子與影像物理相關研究，目前以生醫超音波技術與光聲影像等領域為研究重點。本實驗室在上述領域已產出許多具體貢獻並在全世界有很高之能見度。此外，本實驗室之成員來自電子、資訊、工程、生命科學及醫學等各領域，多年來亦積極與國內外單位進行合作，合作夥伴包括產、研、學各界，領域更涵蓋基礎科學、工程技術與臨床研究。跨界整合研究資源，致力前瞻生醫科技研究，提升健康與醫療品質，是本實驗室之成立宗旨與具體目標。

Ultrasonic Imaging Laboratory was founded by Professor Pai-Chi Li in 1997, with the main research focus in biomedicalelectronics 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. 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
   Three-Year Plan for Developing Key Technologies of Diagnostic Ultrasound
2. 明基友達集團臺大產學合作研究中心基金 - 超音波先進影像技術
3. 全光學式血管內超音波及光聲影像探頭與系統研究與開發
   All optical based intravascular ultrasound/photoacoustic imaging: scanhead and system design and Development
4. 用於三維細胞培養系統之多波影像技術
   Multiwave imaging technologies for 3D cell culture systems
5. 超音波/光聲多模式分子探針之影像與治療應用
   Applications of multi-modality US/PA molecular probes in imaging and therapy

■ **研究計畫** - 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Three-Year Plan for Developing Key Technologies of Diagnostic之代表圖及說明：

E-mail: paichi@ ntu.edu.tw
Phone: +886-2-33663551
Office: 博理館425 (BL-425)
Website: http://ultrasound.ee.ntu.edu.tw
Lab Phone: +886-2-33669752
Lab.: 明達館731 (MD-731)

歐陽彥正 教授

Yen-Jen Oyang, Professor

國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學資訊工程學系教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, Department of Computer Science and Information Engineering, National Taiwan University

分子生醫資訊實驗室

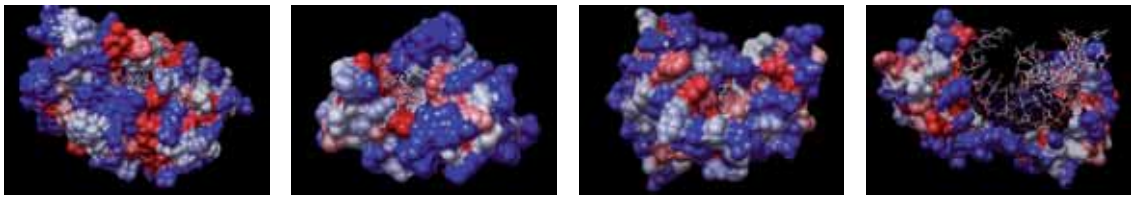
Molecular Biomedical Informatics Lab.

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

生物資訊學、機器學習

Bioinformatics, Machine Learning

研究計畫 Research Projects

1. 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.

E-mail: yioyang@csie.ntu.edu.tw
Phone: +886-2-33664888-431
Office: 德田館431 (CSIE-431)
Website: http://mbi.csie.ntu.edu.tw/member/yjoyang.html
Lab. Phone: +886-2-33664888*410
Lab.: 德田館410 (CSIE-410)

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

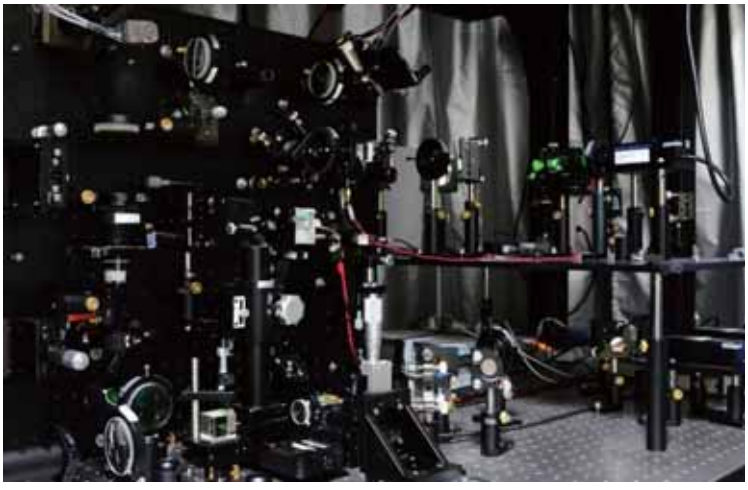
Associate Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Associate Professor, Department of Electrical Engineering, National Taiwan University

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。長期的目標是發展低侵入性的儀器系統，協助癌症早期徵兆與癌前病變之活體診斷。

Current research in our laboratory is focused on pushing forward technologies of optical spectroscopy and optical microscopy and utilizing these methods to aidbiomedical research and develop new diagnostic tools.The long-term objective is to develop minimally invasive diagnostic tools for the early detection of cancer and precancerous lesions in vivo.



主要研究領域 Major Research Areas

生醫光電、生醫工程

Biomedical Optics, Biomedical engineering

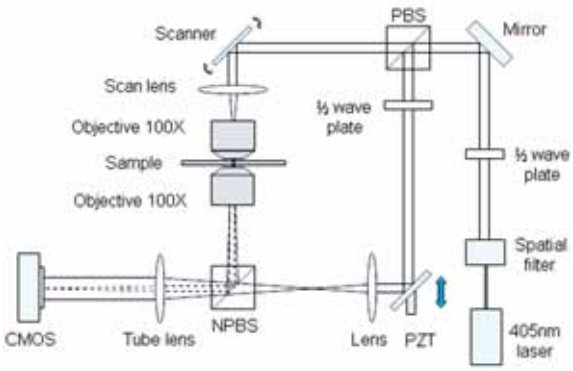
研究計畫 Research Projects

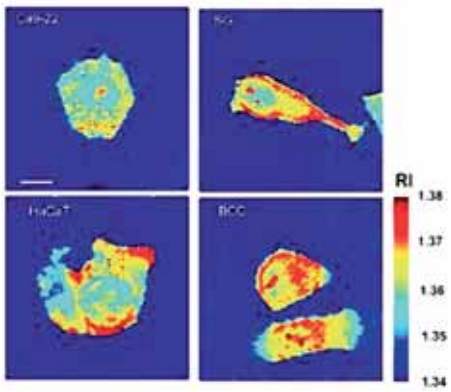
1. 以結合光纖之高光譜影像術進行非侵入性癌前病變與癌症早期診斷
   Noninvasive early diagnosis of precancer and cancer using fiber-optic-based hyperspectral imaging
2. 癌症與癌前病變細胞之結構與其散射光特性之關連性研究
   Studying the relation between structure and light scattering properties of cancer/precancerous cells
3. 三維折射率活細胞顯微術
   Three-dimensional refractive-index microscopy for live cell imaging

■ **研究計畫** - 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：

右圖為本計劃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10μm。

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.





E-mail: kbsung@ntu.edu.tw
Phone: +886-2-33669675
Office: 明達館715 (MD-715)
Website: http://www.ee.ntu.edu.tw/profile?id=739
Lab. Phone:+886-2-33669600
Lab.: 明達館703 (MD-703)

曾宇鳳 教授

Y. Jane Tseng, Professor

國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學資訊科學與工程學系教授
國立臺灣大學藥學系教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, Department of Computer Science and Information Engineering / Department of pharmacy, National Taiwan University

生物資訊與化學資訊實驗室

Bioinformatics and Cheminformatics 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臨床前藥物吸收、分佈、代謝及毒性之分析及新藥設計。2.以化合物三維結構分析用在化學資料庫做虛擬藥物篩選與化學結構資訊比對。3.應用代謝體之化學結構光譜找尋臨床上用來做為診斷、病程及預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.

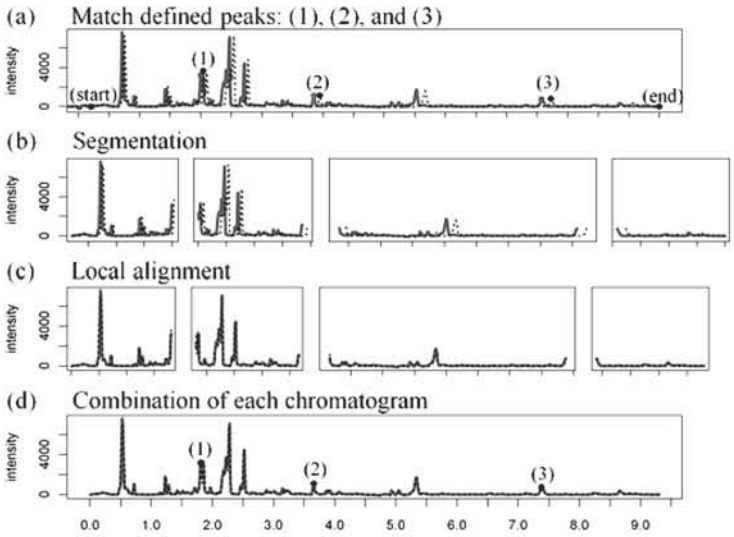
主要研究領域 Major Research Areas

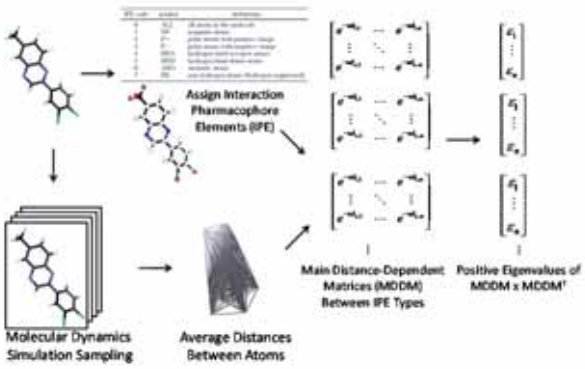
計算化學及計算毒理學、生物資訊學、化學資訊學、代謝體學

Computational Chemistry and Computational Toxicology, Cheminformatics, Bioinformatics, and Metabolomics

研究計畫 Research Projects

1. 電腦輔助設計組蛋白甲基轉移酶G9a之抑制劑暨臨床前結構安全性篩選
   Computer-aided Drug Design and in silico Pre-Clinical PK/SafetyScreening of Histone Methyltransferase G9a Inhibitors as the Target Cancer Therapies
2. 運動處方對國人重大疾病的健康效益 - 臨床與代謝體指標的探討
   Exercise prescription for current major diseases recovery with special emphasis on clinicalindices and metabolomics biomarkers





E-mail: yjtseng@csie.ntu.edu.tw
Phone: +886-2-33664888 *529
Office: 德田館529(CSIE-529R)
Webpage: http://www.csie.ntu.edu.tw/~yjtseng/
Lab. Phone:+886-2-33664888*404
Lab.: 德田館404 (CSIE-404)

張瑞峰 教授

Ruey-Feng Chang, Professor

國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學資訊工程學系教授
國立臺灣大學資訊網路與多媒體研究所教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor,Department of Computer Science and Information Engineering, National Taiwan University / 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

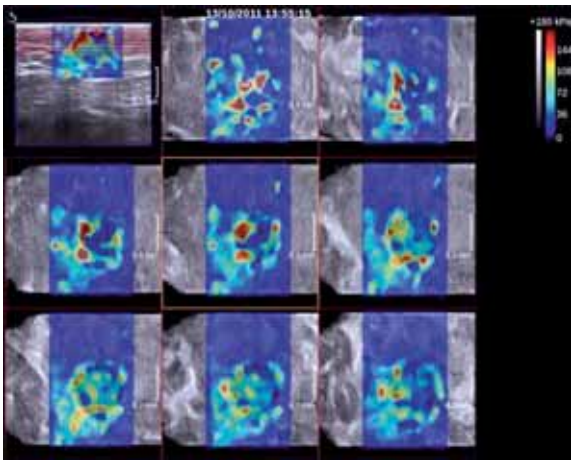
醫學影像電腦輔助診斷、影像視訊處理、多媒體系統及通訊

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

研究計畫 Research Projects

1. 多功能乳房超音波電腦輔助診斷系統3年計畫(學界科專)
   Multifunctional Breast Ultrasound Computer-aided Diagnosis
2. 新式乳房彈性超音波之電腦輔助診斷
   Computer-aided Diagnosis System for Advanced Breast Elastography
3. 乳房磁振造影之電腦輔助偵測與診斷
   Computer-aided Detection and Diagnosis System for Breast MRI

■ **研究計畫** - 新式乳房彈性超音波之電腦輔助診斷Computer-aided Diagnosis System for Advanced Breast Elastography之代表圖及中英文說明：



3-D剪力彈性超音波

3-D Shearwave elastography

E-mail: rfchang@csie.ntu.edu.tw
Phone: +886-2-33664888 *331
Office: 德田館331 (CSIE-331)
Website: http://www.csie.ntu.edu.tw/~rfchang/
Lab. Phone:+886-2-33664888*402
Lab.: 德田館402 (CSIE-402)

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
國立臺灣大學電子工程學研究所教授

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

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轉之影響及解決方案。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

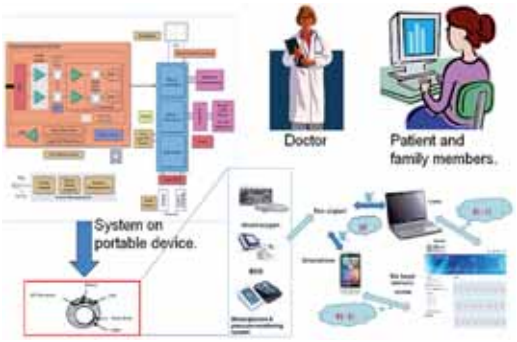
主要研究領域 Major Research Areas

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** - 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。

E-mail: cpchen@ntu.edu.tw
Phone: +886-2-33663611
Office: 博理館625 (BL-625)
Website: http://vlsi.ece.wisc.edu/
Lab. Phone:+886-2-33663700*6405
Lab.: 博理館405 (BL-405)

陳志宏 教授

Jyh-Horng 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

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, 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(Room706, MingDa Building)。負責人為陳志宏(Jyh-Horng Chen)教授，助理1人，研究生6人，博士班學生1人。主要研究方向為核磁共振造影(MRI)、殘障者人機介面與噪音抑制(Noise cancelation)等研究主題。在電機一館一樓設有MRI/MRS實驗室，設有一台Bruker 3.0 Tesla MR，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。

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 interdisplinary research, including school of humanity, psychology, medicine, engineering, agriculture and food science. Its object is to combine experts in different 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.

生醫分子影像核心實驗室

Biomedical Molecular Imaging Core Lab.

此核心實驗室結合磁共振(MR)分子影像、光學分子影像(Optical molecular imaging)及超音波分子影像(Ultarsonic 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.

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. 新世代磁振造影之研發: 以多截面激發接收為基礎之多通道高溫超導收發陣列線圈
   Next Generation MRI: MRI with Multi-slice Acquisition and High Temperature Superconducting Multi-channel Transceiver Array.
2. 高溫超導陣列線圈於動物磁振造影之生醫應用
   Novel Applications of High Temperature Superconducting Phased Array Coils for MR Animal Imaging
3. 心智科學大型研究設備建置及共同使用服務計畫—大腦與心智文化整合性研究
   Installation and Operation of Core Facility in Mind Science: An Initiative for Integrated Research on Brain, Mind and Culture

E-mail: jhchen@ntu.edu.tw
Phone: +886-2-33663610
Office: 博理館619 (BL-619)
Website: http://fmri1.ee.ntu.edu.tw/wiki/doku.php
Lab. Phone: +886-2-33663517
Lab.: 明達館706 (MD-706)

陳永耀 教授

Yung-Yaw Chen, Professor

國立台灣大學生醫電子與資訊學研究所教授
國立台灣大學電機工程學系教授

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

智慧型及精密運動控制實驗室

IPMC Lab.

本實驗室「智慧型精密運動控制實驗室」由陳永耀教授領導，位於明達館604室，其研究的主要方向為智慧型控制與超音波熱療。實驗室的近期研究領域分成反向光學微影技術、電子束微影系統、姿態辨識聲音的分析與處理、仿生機械人、及超音波熱療等五大主題。

反向光學微影技術的研究是針對在IC製程上小尺度的光罩所產生的繞射現象，在光罩設計時將繞射現象考慮進去，設計出最佳的光罩形狀。電子束微影系統的研究是在IC製程中的電子束蝕刻時，對電子束做位置的訊號回授控制以修正電子移動時所產生的漂移現象。姿態辨識的研究是利用人工智慧的方式來處理影像中的資訊，本實驗室建立影像的監視系統應用在老人看護上。另外在聲音處理的方面是利用訊號處理的方式將聲音中的雜訊濾除，進而研究聲音本質與語者分析。仿生機械人的研究是模仿生物的運動模式，將生物的優點轉換成電機領域的應用，近期的研究是將蛇的運動設計成新型的載具。超音波熱療的研究是發展新的預測方式，來追蹤人體中因呼吸而上下運動的腫瘤細胞，使得聚焦的超音波能夠正確的加熱在腫瘤細胞上，殺死腫瘤細胞。

本實驗室致力於將智慧型控制嘗試應用在各方領域，將機械自動化，改良儀器控制法，改善人類生活。

Intelligent Precision Motion Control Laboratory isled by Prof. Yung-Yaw Chan and located in room 604, Minda building. Researches included inverse optical micro-lithography, electron beam lithography, motion identification, sound Analysis, biomimetics, and high intensity focus ultrasound.

Inverse optical micro-lithography is to design the optimal from of the mask, due to the diffraction of light changes. Electron Beam Lithography is to write on wafers by electron beam directly. We use sensors to feedback control the system to reduce beam broadening and proximity effect. In motion identify, we analyze the human activities for the home care systems. Biomimetics is to study the biological structure and the locomotion of real snakes,and to develop and design advanced platform actuation systems.Our laboratory applies Intelligent Control to automate machine and to improve the system performance.

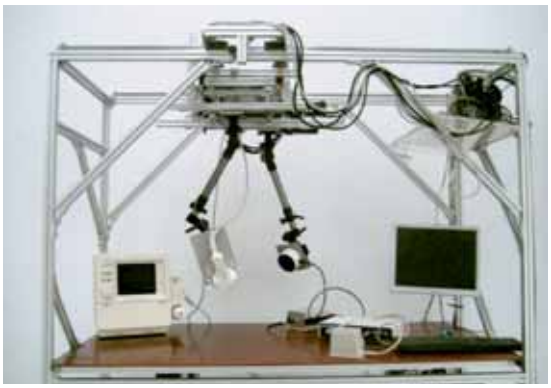
主要研究領域 Major Research Areas

智慧型控制、居家看護、精密伺服控制、超音波加熱治療

Intelligent control, Home care, Precision servo control, Hyperthermia treatment planning

研究計畫 Research Projects

1. 智慧型微創手術擴增實境系統研發(總計劃)
   Development on Intelligent Augmented Reality Mini-invasive Surgical System
2. 結合影像深度資訊之智慧型人體動作辨識與多目標追蹤
   Application of Image Depth Information on Intelligent Human Action Recognition and Multi-targets Tracking



E-mail: yychen@ ntu.edu.tw
Phone: +886-2-33663573
Office: 明達館719 (MD-719)
Website: http://usl.ee.ntu.edu.tw/drupal/
Lab. Phone: +886-2-33669724
Lab.: 明達館604 (MD-604)

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

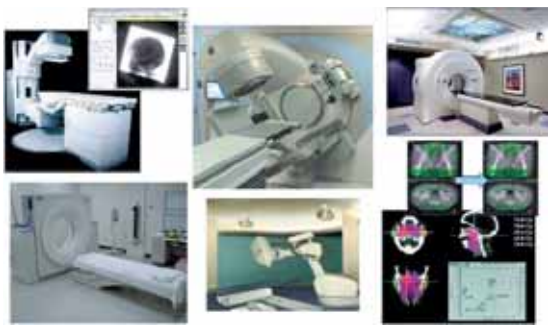
Adjunct Professor, Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University
Professor , Graduate Institute of Oncology, National Taiwan University College of Medicine / Graduate Institute of Clinical Medicine, National Taiwan University College of Medicine
Attending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

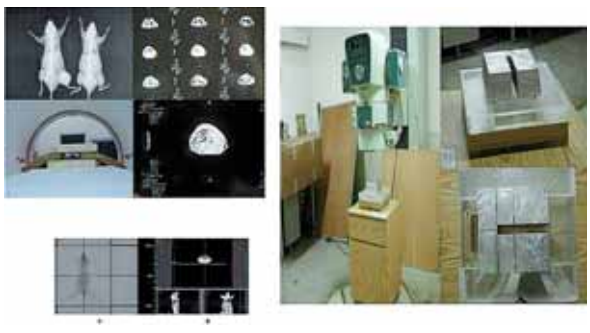
放射物理生物實驗室

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.





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

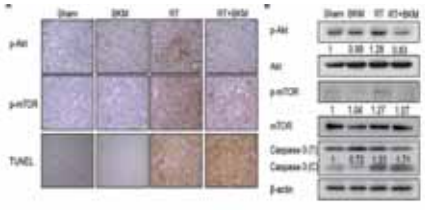
Radiation Oncology, Radiation Physics, Radiation Biology, Cancer Translational Medicine

研究計畫 Research Projects

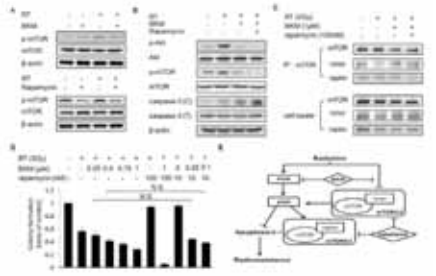
1. 探討組織蛋白去乙醯基酵素在肝癌放射治療的角色
   Investigation on Therapeutic Role of Histone Deacetylase in Radiotherapy to Hepatocellular Carcinoma
2. 探討磷脂醯肌醇3 - 激酶酶/蛋白質激酶酶B/哺乳動物雷帕黴素靶蛋白傳遞路徑及相關拮抗劑對於肝癌細胞放射抵抗性之作用機轉
   Investigation on the mechanisms of PI-3K/Akt/mTOR dependent radioresistance of epatocellular carcinoma and the related inhibitors

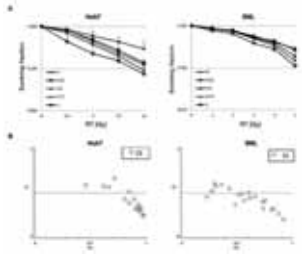
■ **研究計畫** - 探討磷脂醯肌醇3-激酶/蛋白質激酶B/哺乳動物雷帕黴素靶蛋白傳遞路徑及相關拮抗劑對於肝癌細胞放射抵抗性之作用機轉 Investigation on the mechanisms of PI-3K/Akt/mTOR dependent radioresistance of hepatocellular carcinoma and the related inhibitors之代表圖及中英文說明

Combined radiotherapy (RT) and BKM120 inhibits RT-activated PI3K/Akt signaling and enhances BNL cell apoptosis in vivo.

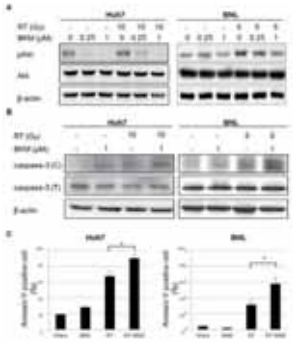


The addition of rapamycin to BKM120 enhances the inhibition of mTOR and Akt phosphorylation and increases caspase-3 activation in irradiated BNL cells.

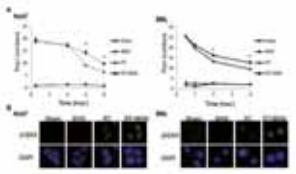




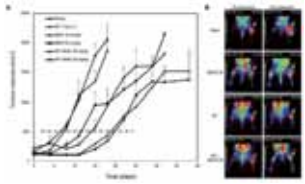
A PI3K inhibitor, BKM120, enhances the radiosensitization of hepatocellular carcinoma cell lines (Huh7 and BNL).



BKM120 inhibits radiation-activated PI3K/Akt signaling and enhances radiation-induced apoptosis in Huh7 and BNL cells.



Inhibition of PI3K signaling by BKM120 leads to the persistence of DNA damage.



Combined BKM120 and radiotherapy (RT) enhances tumor suppressive activity in two BNL xenograft models.

E-mail: jasoncheng@ntu.edu.tw
Phone: +886-2-2356-2842
Website: http://www.ntuh.gov.tw/onc/
Lab Phone: +886-2-2312-3456*67141
Office: 臺大醫院西址 檢驗大樓地下1樓 放射腫瘤科
NTUH (West site) Laboratory Building B1/ Department of Radiation Oncology

周迺寬 臨床副教授

Nai-Kuan Chou, Clinical Associate Professor

國立臺灣大學生醫電子與資訊學研究所合聘臨床副教授
國立臺灣大學醫學系外科臨床副教授
國立臺灣大學醫院附設醫院外科加護病房主任
國立臺灣大學醫院附設醫院器官勸募小組召集人

Clinical Associate professor, 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 of Organ Procurement Organization, National Taiwan University Hospital

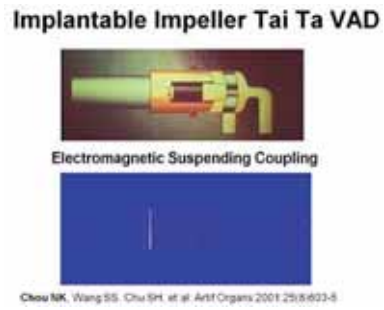
臺大醫院第七共同研究室

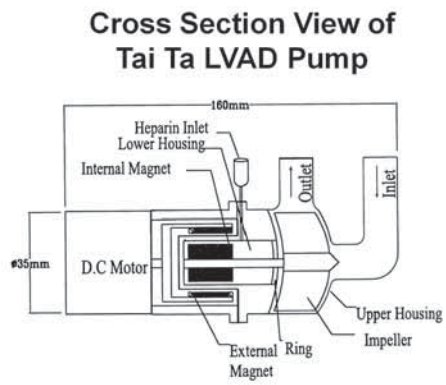
Laboratory.

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。

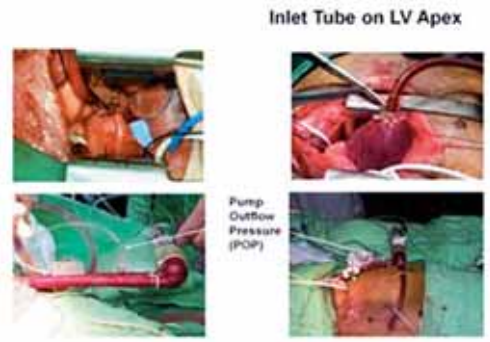
1. 小動物實驗模型
2. 醫療儀器、訊號分析處理
3. 超音波影像處理
4. 實驗室儀器：雙向心臟血管用X光射影系統、多頻道生理記錄分析系統(Polygraphy)、Injector、Autoinjector、多頻道心理生理電腦化記錄分析儀(EP recording)、CARTO、電氣生理刺激器、血管內導線壓力儀器(PressureWire)、OCT、電燒機、血管內超音波(i-LAB)、血液凝固測試儀(ACT)、波士頓科技羅塔培特控制台系統、IABP、電擊器、血中含氧測定儀、非侵入式自動血壓計、微量點滴控制器(Syringe pump)、人工心律調整器、血氧飽合濃度監視器、血壓血氧ECG監視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

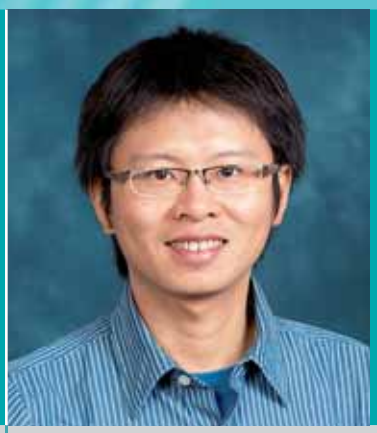




Chou NK, Wang SS, Chu SH, et al: Artif Organs 2001;25(8)603-5



E-mail: nickchou@ntu.edu.tw
Phone: +886-2-23123456*65066
Fax: +886-2-23956934
Office: 臺大醫院新大樓臨床研究大樓8樓
外科研究室08-11室



黃念祖 助理教授

Nien-Tsu Huang, Assistant Professor

國立臺灣大學生醫電子與資訊學研究所助理教授
國立臺灣大學電機工程學系助理教授

Assistant Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Assistant 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

光微流道系統, 微系統細胞操控, 集中型表面電漿共振, 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. 細胞表型分析之整合式光流體平台研發
   Developing integrated optofluidic platform for cellular phenotyping
2. 免標定侷限表面電漿共振感測系統應用於肺結核病患免疫系統檢測
   A Microfluidic Platform Integrating Localized Surface Plasma Resonance (LSPR) Sensing for Immunodiagnostics of Patients with Tuberculosis

■ **研究計畫** - 細胞表型分析之整合式光流體平台研發 Developing integrated optofluidic platform for cellular phenotyping之代表圖說明：

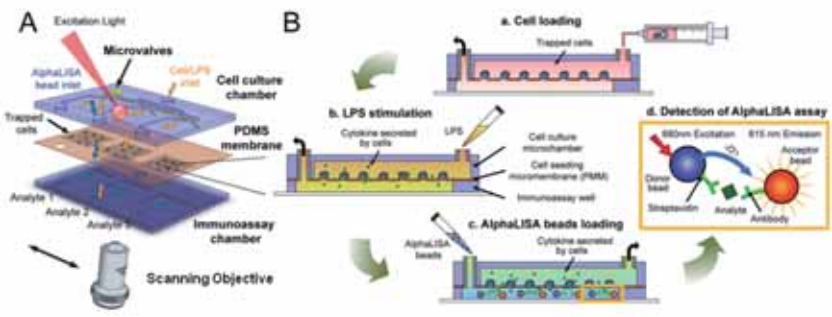


Figure 1 (A) Schematic of integrated optofluidic platform for cellular immunophenotyping；
(B) Schematic showing the immunophenotyping assay protocol used in this study.

■ **研究計畫** - 免標定侷限表面電漿共振感測系統應用於肺結核病患免疫系統檢測A Microfluidic Platform Integrating Localized Surface Plasma Resonance (LSPR) Sensing for Immunodiagnostics of Patients with Tuberculosis之代表圖說明：

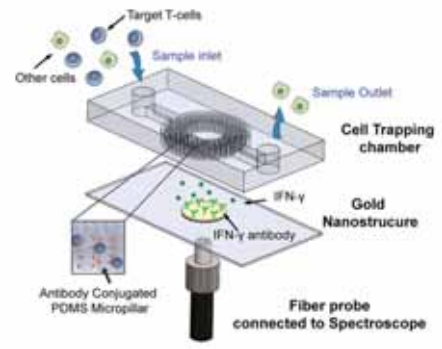


Figure 2 Schematic of microfluidic platform integrating LSPR sensing

E-mail: nthuang@ntu.edu.tw
Phone: +886-2-33661775
Office: 明達館522 (MD-522)
Website: http://homepage.ntu.edu.tw/~nthuang/index.html
Lab.: 明達館702 (MD-702)

傅楸善 教授

Chiou-Shann Fuh, Professor

國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣灣大學資訊工程學系教授
資訊網路與多媒體研究所教授

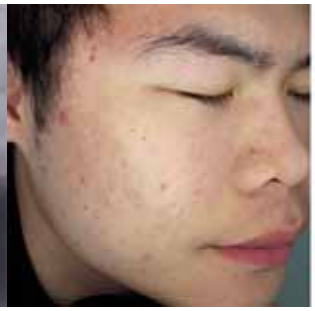
Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, Department of Computer Science and Information Engineering/ Graduate Institute of Networking and Multimedia, National Taiwan University

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, Winstar Technology, 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. 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
2. 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
3. 數位相機之影像處理：色彩內插、色彩校正、色彩管理
   Digital Image Processing for Camera: Color Interpolation, Color Calibration, Color Management
4. 行動視訊高畫質顯示調適技術
   High Quality Display Adaptation Technique for Mobile Video Device

■ **研究計畫** - 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之代表圖及中英文說明：

人臉特徵偵測與分析

Human Face Feature Detection and Analysis

E-mail: fuh@csie.ntu.edu.tw
Phone: +886-2-33664888*327
Office: 德田館327 (CSIE-327)
Website: http://www.csie.ntu.edu.tw/~fuh/
Lab. Phone: +886-2-33664888*328
Fax: +886-2-23628167
Lab.: 德田館328 (CSIE-328)

黃俊升 教授

Chiun-Sheng Huang, Professor

國立臺灣大學生醫電子與資訊學研究所合聘教授
國立臺灣大學醫學系外科教授
國立臺灣大學醫學院附設醫院外科主治醫師

Adjunct Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, Department of Surgery, National Taiwan University
Attending Physician, Department of Surgery, 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

1. 微核醣核酸調控腫瘤進展的微環境因子與分子機制--微核醣核酸在乳癌轉移的角色探討。
2. 全基因體關聯研究找到的單一核甘酸基因多形性變異與乳癌危險性，分子類型與預後的關係。
3. 自動乳房超音波之電腦輔助診斷
4. 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。
5. 乳房彩色彈性超音波之電腦輔助診斷。
6. 雙波段紅外線乳房影像系統之三維模型建立與血管增生定量分析。
7. 乳房磁振造影電腦輔助偵測與功能性評估系統之研發。
8. 家用型雙波段乳癌紅外線診斷系統。
9. 微流體平台進行藥物篩選與化療療效監測。
10. 經前婦女可切除乳癌之CYP19(TTTA)重複多型性研究。
11. 多國多中心、開放性、分為兩組的第三期試驗，評估 bevacizumab 輔助性治療對三項標記陰性乳癌之療效。

    BEATRICE (Protocol BO 20289): An international multicentre open-label 2-arm phase III trial of adjuvant bevacizumab in triple negative breast cancer.
12. 隨機分配、多國多中心、第二階段的臨床試驗，針對局部晚期、發炎性，或早期 HER2 陽性之乳房腫瘤的病人，評估trastuzumab 合併 docetaxel對trastuzumab 合併 docetaxel 及pertuzumab對trastuzumab 合併 pertuzumab治療。

    A randomised, multicenter, multinational Phase II study on trastuzumab plus docetaxel versus trastuzumab plus docetaxel plus pertuzumab versus trastuzumab plus pertuzumab in patients with locally advanced, inflammatory or early stage HER2 positive breast cancer.

13. 以Herceptin單一或合併Taxane療法作為第一線使用在先前HER2呈陽性初期乳癌時曾接受Herceptin輔助性治療後復發的轉移乳癌患者之第二階段臨床試驗。
    Phase II study of HerceptinÒ, alone or in combination with a taxane, as a first-line treatment for patients with metastatic breast cancer, who have relapsed after receiving Herceptin in the adjuvant setting for HER2 positive early breast cancer.
14. 以Lapatinib、Trastuzumab及其組合併用paclitaxel輔助治療罹患HER2/ErbB2陽性原發性乳癌婦女之隨機、多中心、開放性第三期臨床試驗。
    A randomised, multi-centre, open-label, phase III study of neoadjuvant lapatinib, trastuzumab, and their combine plus pailtaxel in women with HER-2/ErbB2 positive prrimary breast cancer
15. 一項隨機、多中心、開放性、第三期臨床試驗,、研究連續與合併使永輔助性之Lapatinib與Trastuzumab於治療HER2/ErbB2陽性之原發性乳癌病患。
    A randomised, multi-centre, open-label, phase III study of adjuvant lapatinib,trastuzumab, their sequence and their combination in patients with HER2/ErbB2 positive primary breast cancer
16. 第三期隨機分配之臨床試驗：比較黃體期或濾泡期進行卵巢切除術併用Tamoxifen用於停經前婦女荷爾蒙受體陽性轉移性乳癌之療效。
    Phase III randomizated study of luteal phase vs follicular phase surgical oophorectomy and tamoxifen in premenopausal women with metastastic hormone receptor- positive breast cancer.

E-mail: huangcs@ntu.edu.tw
Phone: +886-2-23123456*65080
Office: 臺大醫院東址 臨床研究大樓825
NTUH (East site) Clinical research building 825

阮雪芬 教授
Hsueh-FenJuan, Professor

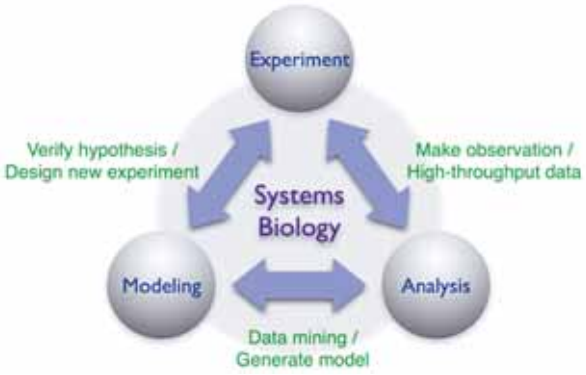
國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學生命科學系教授
國立灣大學分子與細胞生物學研究所教授
國立灣大學基因體與系統生物學學位學程

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, Department of Life Science/ Institute of Molecular and Cellular Biology/
Genome and Systems Biology Degree Program, National Taiwan University

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，及微型RNA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在ATP合成酶抑制劑誘導下乳癌及肺癌細胞進行細胞凋亡的作用機制；同時，利用系統生物學研究法來開發新的藥物。

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



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

主要研究領域 Major Research Areas

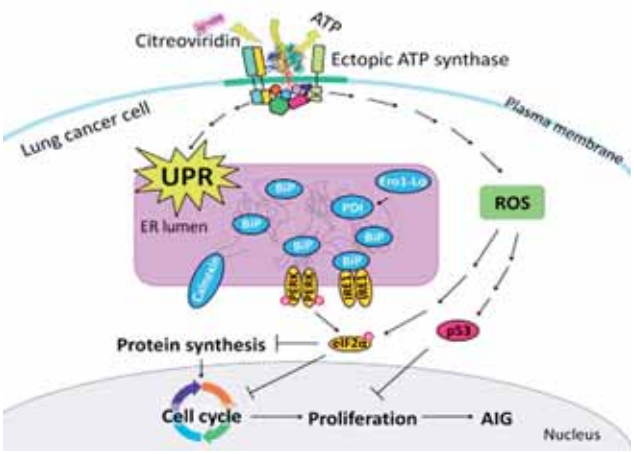
系統生物學、蛋白質體學、生物資訊

Systems Biology, Proteomics, Bioinformatics

研究計畫 Research Projects

1. 結合蛋白質體學和網路生物學研究細胞膜異位表達ATP合成酶的反應路徑
   Elucidating the response pathways of ectopic ATP synthase by combining proteomics and network biology
2. 新穎致癌蛋白ZNF322A之蛋白質交互作用網路與訊息路徑研究
   Studying protein interaction networks and signal pathways of novel oncoprotein ZNF322A
3. 整合體學探討微型核醣核酸於癌症轉移之調控網路
   Integrative omics and network study of miRNA regulation in cancer progression

■研究計畫 - 結合蛋白質體學和網路生物學研究細胞膜異位表達ATP合成酶的反應路徑Elucidating the response pathways of ectopic ATP synthase by combining proteomics and network biology之代表圖及中英文說明：



本圖顯示ATP合成酶抑制劑誘導肺癌細胞死亡的可能機制

Summary of the plausible mechanisms in lung cancer cell death induced by ATP synthase inhibitor citreoviridin.

E-mail: yukijuan@ntu.edu.tw
Phone: +886-2-3366-4536
Office: 生命科學館1105 (Life Science Building-1105)
Website: http://juan.lifescience.ntu.edu.tw
Lab. Phone: +886-2-3366-4536

高成炎 教授

Cheng-Yan Kao, Professor

國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學資訊工程學系教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, Department of Computer Science and Information Engineering, National Taiwan University

生物資訊實驗室

Bioinformatics Lab.

本研究室的研究方向為生物資訊與基因演算法。現有醫學、分子生物學、植物學、植物病理、資訊科學、電子電機工程等，多種背景的學生、研究人員及國內外學者，進行常態性的跨領域合作。目前正進行的研究題目包括–蛋白質交互作用網絡的架構、預測與分析，基因交互作用網絡的架構、預測與分析，第二代定序技術之序列重組、註記與量化分析等。

透過基因變異的比對、蛋白質與基因交互作用的定性資料、基因晶片的定量資料、以及目前日益普及的第二代定序技術所生產的大量序列片段，我們期望了解遺傳疾病、癌症、精神疾病等的致病機制，協助疾病的診斷、預防和治療。同樣的研究方法也應用在其它物種的研究工作上，藉此探究植物的抗(生物與非生物)壓力機制，以及植物與病菌間的蛋白質交互作用，協助開發抗壓抗病高產量高品質的農產品。除此之外，我們也分析大腸桿菌與酵母菌等重要模式物種的基因功能與生化路徑，辨識基因間或蛋白質間的交互作用，進一步推論其它物種的運作模式。許多植物與藻類均為重要的能源作物，可用於生產生質酒精或柴油等，目前的第二代定序技術除可用於模式物種外，針對於非模式物種也進行大量的解序與基因表現分析，龐大且複雜的序列資料讓這個高通量的技術無法徹底發揮潛能，特別是目前可用的資料處理工具甚為匱乏，本研究室除了分析此類資料外，亦開發相關工具和創新的演算法，提升此類資料處理的效率和準確度。

The research focuses of this laboratory are bioinformatics and Taiwanese research. In bioinformatics, our lab apply genetic algorithm and combinatorial optimization to biological problems, solving problems from microarray analysis, protein structure prediction, protein-protein interaction prediction, drug discovery and design, and virtual screening of drug leads. These diverse topics can also be combined into systems biology, study biological problems from a global view. We also tried to translate our researches into applications in clinical medicine and drug developments. In Taiwanese research, we have devoted to the computational linguistics of Taiwanese, including input (optical character recognition) and output (Taiwanese voice synthesis). In the future, we would like to incorporate other elements, and construct a more integrative Taiwanese-computer environment, and facilitate the education of mother tone and archival research.

主要研究領域 Major Research Areas

生物資訊、計算分子生物學、基因演算法

Bioinformatics, Computational Molecular Biology, Genetic Algorithm

研究計畫 Research Projects

1. 植物，真菌與微生物系統生物學分析工具與資料庫整合分析平台開發

   Developing bioinformatics tools and on-line platforms for analyzing systems biology databases of plants, fungi, and microbes

E-mail: cykao@csie.ntu.edu.tw
Phone: +886-2-33664888 *418
Office: 德田館418 (CSIE-418)
Website: http://cykao.csie.ntu.edu.tw/
Lab. Phone: +886-2-33664888*401
Lab.: 德田館401 (CSIE-401)

管傑雄 教授

Chieh-Hsiung Kuan, Professor

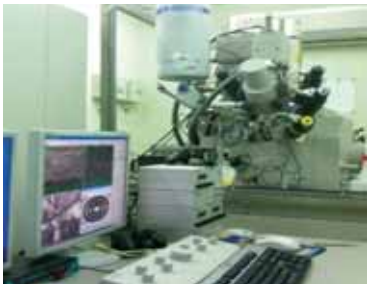
國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學電子工程學研究所教授
國立臺灣大學電機工程學系教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, 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.)

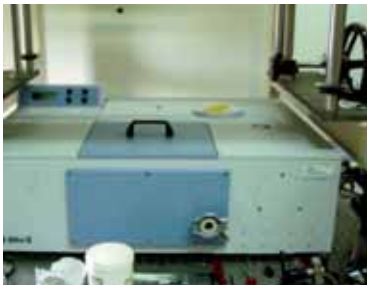


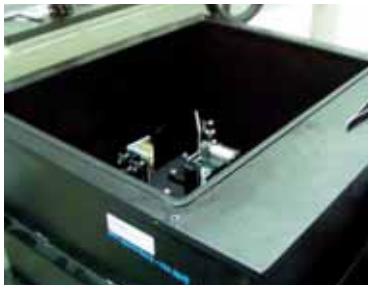
Focus Ion Beam -FIB,聚焦離子束設備

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

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、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

1. 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
2. 共振式太陽能電池Resonant Solar Cell
3. 發展奈米結構增強光偵測與光發射
   Development of nano-tructures to enhance light detection and emission
4. 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
5. 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
6. 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
7. 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
8. 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
9. 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

E-mail: chkuan@ ntu.edu.tw
Phone: +886-2-33663569
Office: 博理館513 (BL-513)
Website: http://cc.ee.ntu.edu.tw/~kuanlab
Lab. Phone: +886-2-33663700*426/129
Lab.: 電機二館426/129(EE-426/129)

郭柏齡 助理教授

Po-Ling Kuo, Assistant Professor

國立臺灣大學生醫電子與資訊學研究所助理教授
國立臺灣大學電機工程學系助理教授

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

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

1. Elucidate the role of hydrostatic pressure on cell physiology

Hydrostatic pressure is an important physical factor in tissue physiology and pathology. We investigated how hydrostatic pressure affects muscle differentiation, immunological activities, cell motility, and cancer invasiveness. Currently we are working on the possible biological signaling pathways involving these processes.

2. Evaluate the effects of multiple biophysical and biochemical stimuli on cell physiology

The cells in vivo are generally exposed to the coexistence of multiple biophysical and biochemical cues. Knowledge of how cells response to these complex stimuli is important for many disciplines such as regenerative engineering and cancer biology. Using BioMEMS techniques, we have developed several platforms allowing the coexistence of mechanical, electrical, and chemical stimuli for cultured cells. Currently we are delineating the antagonistic and agonistic roles between these stimuli.

3. Develop a 3D cell culture system that allows quantitatively accessing the mechanics of cell-matrix interactions

The changes of mechanical properties such as stiffness of a tissue usually are hallmarks of various physiological and pathological processes, such as arthrosclerosis and tumor malignant transformation. In vitro assays quantitatively measuring the mechanics of cell-matrix interactions are of great importance to understand the mechanisms and facilitate the development of corresponding therapeutic strategies of these processes. Cells cultured in a 3D environment behave far different from that cultured in 2D and recapitulate more physiological characteristics in vivo. An important ongoing project in our lab is to develop a 3D cell culture system using state-of-the-art imaging and scaffold fabrication techniques to quantitatively access the mechanics of live cell-matrix interactions.

4. Develop clinical tools for treatment and monitoring of the mechanical dysfunction of dense connective tissues

Mechanical malfunction of dense fibrous tissues usually leads to protracted and debilitating conditions, such as joint capsule contracture, tissue fibrosis, and tendinosis. Our goal is to develop clinical tools that allow treating these disorders non-invasively, while the change of

mechanical function of the diseased tissues can be non-invasively and quantitatively monitored. We have combined the state-of-the-art ultrasonic techniques and developed a prototypical system for this purpose. Our ongoing project is to evaluate its effectiveness in various clinical conditions.

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

E-mail: poling@ ntu.edu.tw
Phone: +886-2-33669882
Office: 明達館519 (MD-519)
Website: http://www.ee.ntu.edu.tw/profile?id=762
Lab Phone: +886-2-33669883
Lab. : 明達館707(MD-707)

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

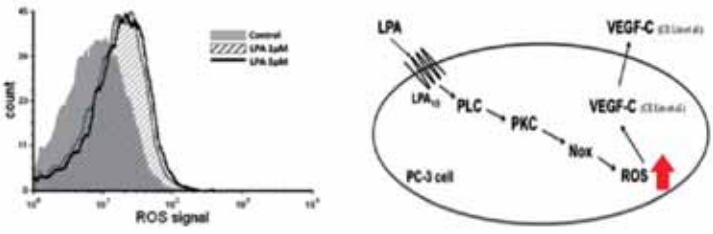
Professor, Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University
Professor, Department of Electrical Engineering, National Taiwan University / Department of Life Science, National Taiwan University

內皮細胞分子生物學實驗室
Laboratory of Endothelial Cell Molecular Biology

Research on Lysophospholipids

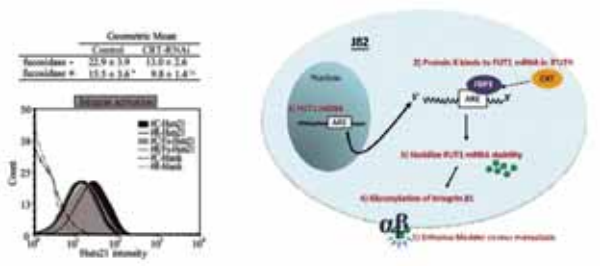
Lysophosphatidic acid (LPA) and sphingosine 1-phosphate (S1P) are two low molecular weight lysophospholipids (LPLs) highly enriched in serum. They are derived from enzymatic cleavage of membrane phospholipids. Through the efforts of my laboratory, we have demonstrated that LPLs enhance endothelial cell 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 α1,2-linkaged glycan on β1-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 β1-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.

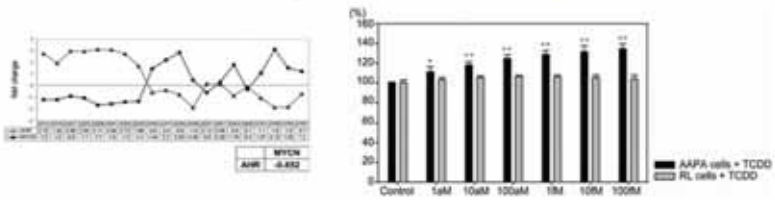


■ **右上圖說明：**

Calreticulin activates β1 integrin via fucosylation by fucosyltransferase 1 in J82 human bladder cancer cells
Biochem J. 2014 May 15;460(1):69-78

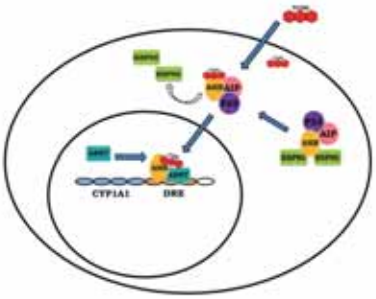
■ **右中圖說明：**

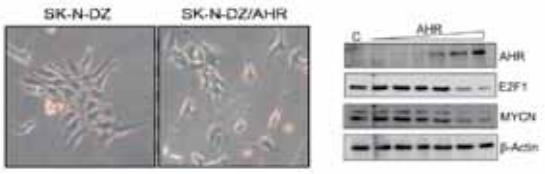
Aryl Hydrocarbon Receptor Down- regulates MYCN Expression and Promotes Cell Differentiation of Neuroblastoma
PLoS One. 2014 Feb 21;9(2):e88795.



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

E-mail: hsinyu@ntu.edu.tw
Phone: ++886-2-33662499
Office: 生命科學館 504 室(Life Science Building-504)

李枝宏 教授
Ju-Hong 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
國立臺灣大學生電信工程學研究所教授

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

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顳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顳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 emporomandibular 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.

主要研究領域 Major Research Areas

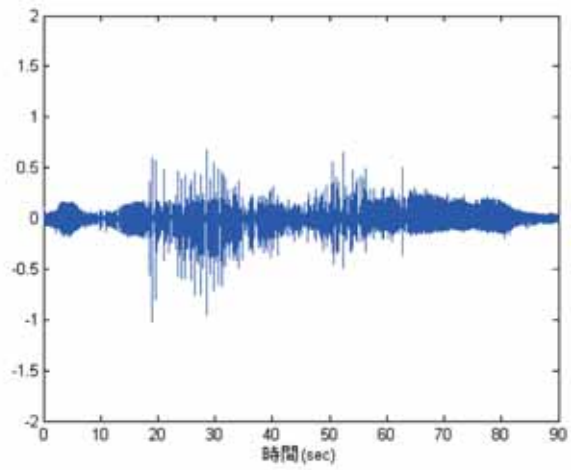
數位信號處理、智慧型天線與無線通訊信號處理、生醫信號處理、數位影像處理

Digital Signal Processing, Signal Processing for Smart Antennas and Wireless Communications, Biomedical Signal Processing, Digital Image Processing

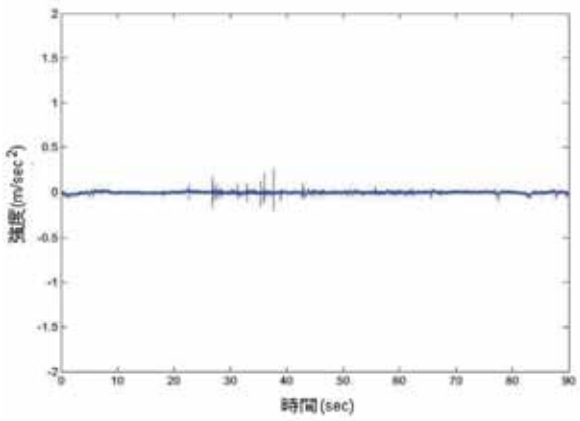
研究計畫 Research Projects

(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

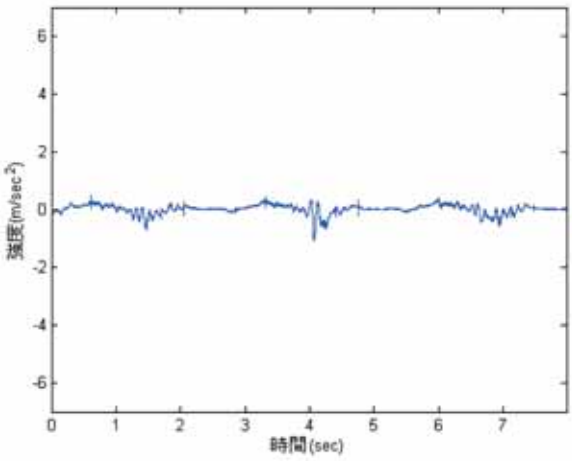
(2) 應用於通訊環境下可適性陣列信號處理理論與技術之研究
Theory and Techniques for Adaptive Array Signal Processing Under Communication Environments



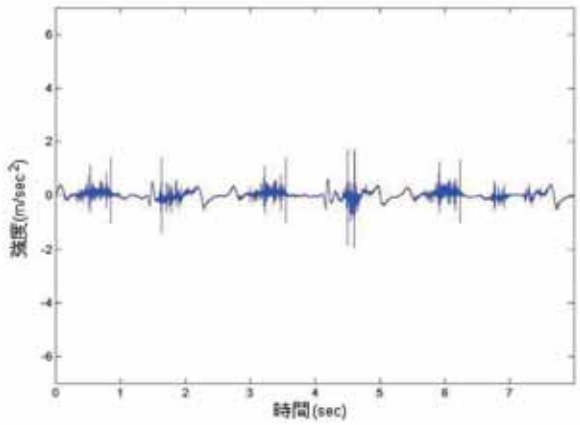
(A) 正常著膝關節在慢速擺動下所產生的振動訊號
(Physiological Patellofemoral Crepitus; PPC)



(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)

E-mail: jhlee@ntu.edu.tw
Phone: +886-2-33663657
Office: 電機二館517 (EE2-517)
Website: http://www.ee.ntu.edu.tw/profile?id=15
Lab. Phone: +886-2-33663700*553
Lab.: 電機二館553 (EE2-553)

李嗣涔 教授

Si-Chen 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

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

紅外線元件實驗室

IR Device Laboratory

紅外線元件實驗室（IR Device Laboratory）由李嗣涔教授領導，是台灣大學電子工程學研究所奈米電子組（Nano Electronics Group）的實驗室，實驗室的主要研究領域為：接近室溫量子點紅外線偵測器；兆赫等級之量子環偵測器；非晶矽、多晶矽、氧化物薄膜電晶體的創新製程研究等。本實驗室利用表面電漿效應，開發出室溫、窄頻且可調變波長之多波長表面電漿熱輻射發射器和波導熱輻射發射器。利用電漿子或波導型熱輻射紅外光源之窄頻寬 (半高寬0.5 μm)，可應用於研究窄頻紅外光對調控植物生長及增強癌症治療的效果。

近年研究發現，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Fig. 2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Fig. 3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。

The Infrared Device Laboratory is led by Professor Si-Chen Lee. It belongs to the Nano Electronics Group of the Graduate Institute of Electronics Engineering of National Taiwan University. The research directions of this lab are: Near room temperature operated quantum dot infrared photodetector, THz quantum ring infrared photodetector ; a-Si:H, poly-Si and oxide thin film transistors. Our lab has developed the narrow bandwidth, multiple wavelength and room temperature-operated infrared plasmonic thermal emitter and waveguide thermal emitter utilizing the surface plasmon polariton.The plasmonic thermal emitters or waveguide thermal emitters emits infrared radiation (IR) with very narrow bandwidth as shown in Fig. 1. The full width at half maximum (FWHM) is about 0.5 μm. It has been applied successfully to investigate effects of IR regulate the plant growth and combine with cancer treatment.

Recently,we found that 4~5μm IR for 24 hours increased up-expression of membrane proteins (OmpA, OmpF) and growth rates of E. coli colony as shown in Fig. 2. In addition, we found that 3~5μm IR for 72 hours regulated morphology and the genes expression of Arabidopsis, such as the GASA4, CHS, RbcS, NPQ4 and PSAK genes. The 3~5 μm IR can induced cell dilation and G2 /M cell cycle arrest in lung cancer A549 cells at 48 houras shown in Fig. 3. Moreover,we found that the narrow band IR 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.

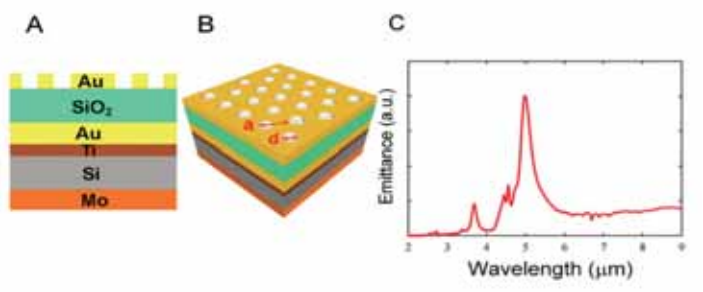


Fig.1 波導型熱輻射紅外光源(A) 側面圖與(B) 斜面圖，其晶格週期是a孔洞直徑是d(C)頻譜之主要峰值是位於5.0μm The waveguide thermal IR emitter. (A) side view and (B) tilted view. The lattice constant a and hole diameter d, respectively. (C) The peak wavelength of waveguide thermal emitter is 5.0 μm.

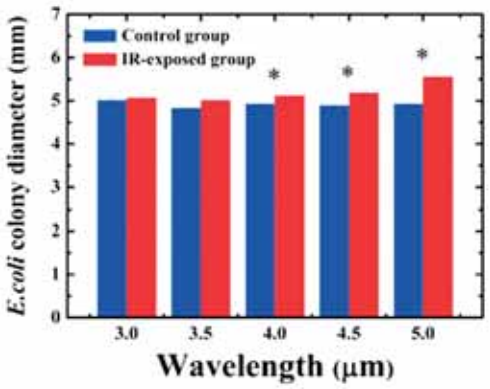


Fig.2 大腸桿菌照射窄頻紅外光24小時之菌落分析
Measurement of E.coli colony diameter under narrow band IR for 24 hours.

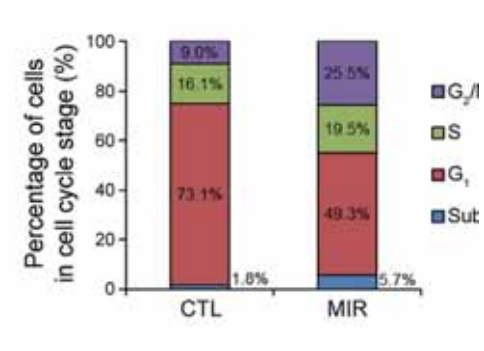


Fig.3 48小時窄頻紅外光照射造成肺癌細胞A549之細胞週期G2 M停滯
IR induced G2 /M cell cycle arrest in A549 cells at 48 hours.

主要研究領域 Major Research Areas

量子點及量子環偵測器、非晶及多晶矽薄膜電晶體、電漿子熱發射器及其在癌細胞、植物生長之應用、太陽電池
Quantum Dot and Quantum Ring Photodetector, Amorphous and Poly-Si Thin Film Transistor, Plasmonic Thermal Emitter and Its Application to Biotechnology and Cancer Cell, Solar Cell

研究計畫 Research Projects

1. 1~10 μm窄頻高功率紅外線光源研發及其在矽光子學，生物技術及癌症治療上的應用
   Development of 1~10 μm Narrow-band High Power Infrared Light Source with Applications in Si-photonics, biotechnology and cancer therapy (3/3)
2. 利用奈米微結構的高效率可撓式薄膜太陽能電池與異質接面矽晶太陽能電池
   High Efficiency Flexible Thin Film Solar Cells and Heterojunction Solar Cells by utilizing Nano-structure
3. 前瞻技術產學合作計畫-7-5nm半導體技術節點研究(1/5)
   Pathfinding for 7–5nm Semiconductor Technology Nodes

■研究計畫 - 1~10μm窄頻高功率紅外線光源研發及其在矽光子學，生物技術及癌症治療上的應用Development of 1~10μm Narrow-band High Power Infrared Light Source with Applications in Si-photonics, biotechnology and cancer therapy (1/3)之代表圖及說明：

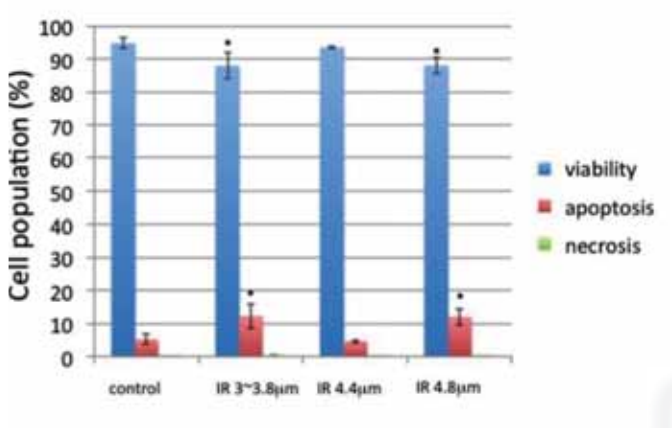


Fig. 子宮頸癌細胞HeLa接受不同波段中紅外光照射48小時之細胞凋亡分佈統計
Apoptotic cell population of human cervical cancer cell HeLa exposed by different wavelengths of middle infrared radiation for 48 hours.

E-mail: sclee@ntu.edu.tw
Phone: +886-2-33662000/33664962
Office: 電機二館440 (EE2-440)
Website: http://sclee.ee.ntu.edu.tw/
Lab. Phone: +886-2-33663700*451
Lab.: 電機二館451 (EE2-451)

林致廷 副教授
Chih-Ting Lin, 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
國家臺灣大學電子工程學研究所副教授

Associate Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Associate Professor, Department of Electrical Engineering/ 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。

The bio-related research activity is one of the major focuses in world wide research institutes. However, the advancement of bio-research is limited by costly instruments and time consuming analysis. To overcome this obstacle, in our research group, the nano-electronics and micro-mechanism are integrated to be a powerful tool for this emerging research field.

More specific, 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.

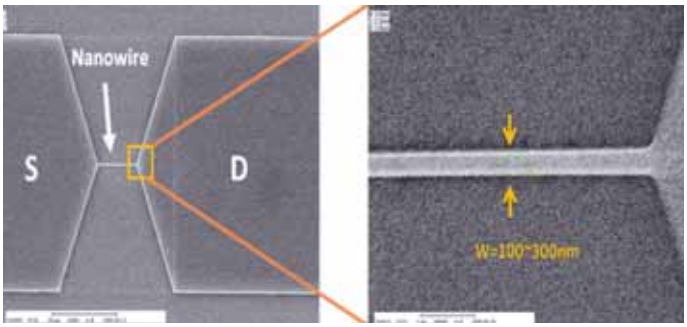
主要研究領域 Major Research Areas

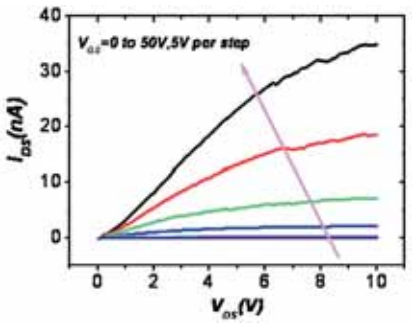
奈微米生物機電系統、生物晶片、生物分子量測技術、奈米製程技術、生物微感測器、軟性噴墨電子技術
Bio-NEMS, Bio-Chip, Nano fabrication, Biomolecular Detection Technology, Inkjet Printing Organic Electronics

研究計畫 Research Projects

1. 以病人為中心的無線醫療環境-腦與心的對話 – 子計畫三: 智慧型奈米多晶矽心血管疾病生物標誌診斷系統晶片之研發(3/3) (NSC 102-2220-E-002-009)
2. 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)
3. 整合阻抗分析、光學檢測和光流體晶片的定點照護系統之開發與系統驗證 (NSC 102-2627-E-002-004)
4. 以細胞治療進行毛囊再生：發展大量生產可控制知可注入式誘導性微組織的方法及特化其毛囊誘導特性 (NSC 99-2320-B-002-004-MY3)

■ **研究計畫** - 智慧型奈米多晶矽心血管疾病生物標誌診斷系統晶片之研發The development of poly-silicon nanowire sensor-system-on-chip for biomarkers in heart failure diagnosis之代表圖及中英文說明：





掃描式電子顯微鏡(SEM)拍攝多晶矽電晶體元件及通道。右圖為奈米線通道的多晶矽電晶體Ids-Vgs電性圖(L/W=10um/300nm，熱氧化二氧化矽=1um)，右圖為奈米線通道的多晶矽電晶體Ids-Vds電性圖(L/W=10um/300nm，熱氧化二氧化矽=1um)。

E-mail: timlin@ntu.edu.tw
Phone: +886-2-33669603
Office: 電機二館447 (EE2-447)
Website: http://bio-cmos.blog.ntu.edu.tw/
Lab. Phone: +886-2-33663719
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
Professor, 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, bioplamonics, 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.

林啟萬教授擔任第九屆亞洲化學感測器研討會之大會主席，成功於2011/11/14~17於劍潭青年活動中心落幕，ACCS2013將於泰國清邁舉辦。

本實驗室研究團隊參加「2011台灣生醫暨生農產業選秀大賽」獲得“潛力新秀獎”殊榮

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

1. 結核菌標準化血清抗體及丙型干擾素快速檢測系統之開發及應用(3/3)
   Development of standardized rapid Mycobacterium diagnosis platforms: serum antibody and interferon-γ detection
2. 新型超解析度電漿子成像平臺於量測單分子奈米陣列交互作用之研究(2/3)
   Novel Super-resolution Plasmonic Imaging Platform for Measurement of Single Molecular Interactions on Nano Array
3. 植入式射頻脈衝電刺激無線系統晶片於疼痛控制之應用
   Implantable Wireless Pulsed Radio-Frequency Stimulation CMOS SoC for Pain Control (2/2)
4. Toward Prevention of Sudden Cardiac Death on Smart ECG Patches (101-S-C07)

■ **研究計畫** - 植入式射頻脈衝電刺激無線系統晶片於疼痛控制之應用
Implantable Wireless Pulsed Radio-Frequency StimulationCMOS SoC for Pain Control之代表圖及說明：

E-mail: cwlinx@ntu.edu.tw
Phone: +886-2-33665272
Office: 展書樓607 (JanShu Hall-607)
Website: http://bionems.bme.ntu.edu.tw/
Lab. Phone: +886-2-33665271
Lab.: 展書樓605/608 (JanShu Hall-605/608)

林發暄 副教授
Fa-Hsuan Lin, Associate Professor

國立臺灣大學生醫電子與資訊學研究所副教授
國立臺灣大學醫學工程研究所副教授
國立臺灣大學腦與心智科學研究所副教授
國立臺灣大學醫學院醫學系放射線科副教授

Associate Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Associate Professor, Institute of Biomedical Engineering / Graduate Institute of Brain and Mind Sciences / Department of Radiology, School of Medicine, National Taiwan University

人腦實驗室
Lab of Brain Imaging and Modeling

近年來，科學界逐漸了解複雜的人類行為與認知功能是藉由腦中不同階層的神經系統交互作用所表現出來， 而非由單一的結構所掌控，有鑑於此，欲進一步了解人腦功能，則需要在結構與功能層面上研究以下三個問題： (1)什麼地方發生活動(2)這些活動是何時發生以及其發生順序為何(3)是如何藉由在大規模的神經網路中的訊息傳遞完成這些認知行為。現代非侵入性的醫學影像技術可幫助我們獲得高空間與時間解析度的神經活動資料，而定量的系統模擬將有助於解譯隱含於這些神經影像資料中協同完成感官、認知與行為歷程的動態神經活動.

本實驗室的研究方向為整合硬體研發、資料分析與數值模擬等工程技術來幫助我們了解複雜的人腦功能。進行中的研究計畫集中於結合結構與功能性核磁共振影像，腦磁圖與腦電圖之高時間空間解析度的神經影像技術，以及系統階層的神經信號模擬，以了解神經活動與行為間的關係。

Complex behavior and cognitive functions of the human brain are suggested to be "mapped at the level of multi-focal neural systems rather than specific anatomical sites, giving rise to brain-behavior relationships that are both localized and distributed". Further understanding of these brain mechanisms requires both structural and functional knowledge to answer (i) where are the foci of activity, (ii) when are these areas activated and what is the temporal sequence of activations, and (iii) how does the information flow in the large-scale neural network during the execution of cognitive and/or behavioral tasks. Advanced noninvasive medical imaging/recording modalities are able to localize brain activities at high spatial and temporal resolution. Quantitative modeling to interpret these data is needed to understand how large-scale distributed neuronal interactions underlying perceptual / cognitive / behavioral functions emerge and change over time.

Our research interests include the integration of hardware development, data analysis, and mathematical modeling to facilitate our understanding of brain cognition. Current research projects try to explore challenges of spatiotemporal brain imaging and modeling by using a combination of hardware and analytical approaches to enhance the spatiotemporal resolution of single (MRI) or combined (MRI/fMRI and MEG/EEG) modalities. In addition, mathematical approaches for identifying large-scale neural networks and their correlation to behavioral measurements are investigated.

主要研究領域 Major Research Areas

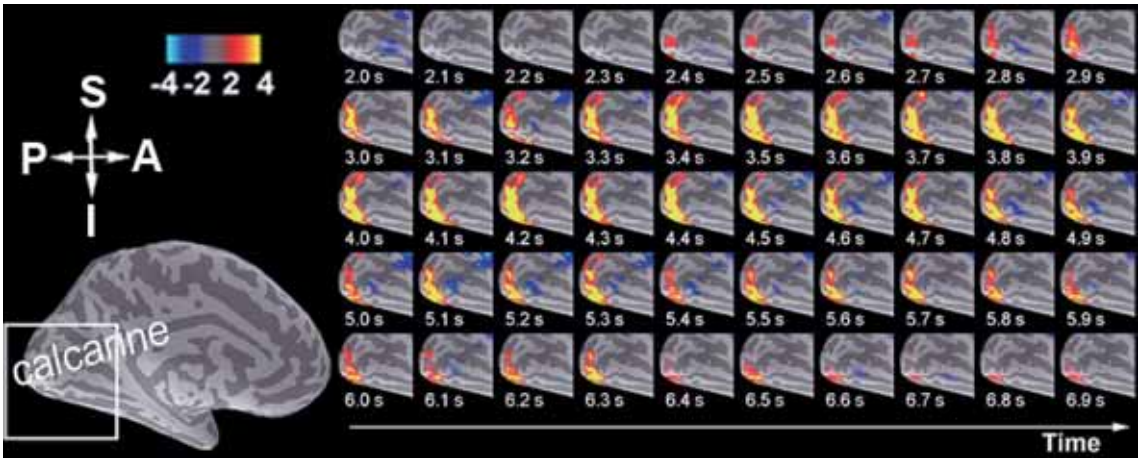
神經影像、核磁共振影像、腦磁圖、腦電圖、神經系統模擬

Neural imaging, Magnetic resonance imaging, Magnetoencephalography (MEG), Electroencephalography (EEG), Neuronal modeling

研究計畫 Research Projects

1. 國科會計畫 - 【平行化腦部磁振造影診斷系統】
   Parallel magnetic resonance neuro-imaging diagnosis system
2. 國科會計畫 - 【高度平行化之人腦核磁共振影像】
   Highly parallel magnetic resonance imaging of the human brain
3. 經濟部計畫 - 【腦連結體磁振造影系統】
   Brain Connectome MRI System
4. 國衛院計畫 - 【整合核磁共振逆影像與腦磁圖之高時間空間解析度人腦映像方法】
   High spatiotemporal resolution mapping of human brain function using MR inverse imaging and MEG
5. 教育部深耕型研究計畫 - 【使用腦磁圖進行高時空解析度之人腦活動映像與網路分析】
6. 教育部學術研究生涯發展計畫 - 桂冠型研究計畫【高度平行化之人腦核磁共振影像】

■ **研究計畫** - 利用多種神經影像進行人腦視覺系統之時空映像與系統模擬Multimodal spatiotemporal brain mapping and modeling of human visual system之代表圖及中英文說明：



單一受試者對於視覺刺激以100毫秒解析度INI重建之功能性核磁共振影像(fMRI)時間序列(TR/TE = 100/30毫秒，Flip angle = 20度，視野 = 200微米)。本實驗使用32通道頭部線圈陣列，資料從128次隨機呈現的刺激中取得，每此測試包含了6秒的baseline，跟接下來的0.5秒8Hz閃爍棋盤格刺激，以及接下來的23.5秒後刺激期 (每次總共30秒)。圖上的時間標記指的是閃爍棋盤格刺激開始後的時間。

A single-subject 100-ms resolution INI fMRI time series of activations to visual stimulation (TR/TE=100/30 ms, flip angle 20º, FOV=200 mm), co-registered to a flattened region of the left occipital cortex. The data were obtained using a 32-channel head coil array in 128 randomized trials, each of which consisted of 6 seconds pre-stimulus baseline, followed by 8-Hz flashing checkerboard flashing for 0.5 sec and subsequently 23.5 s post-stimulus (30 sec in total for each trial). The time stamps labeled in the figure indicate time after onset of the flashing checkerboard.

E-mail: fhlin@ ntu.edu.tw
Phone: +886-2-33665264
Office: 展書樓703 (JanShu Hall-703)
Lab. Phone: +886-2-33669702
Office: 展書樓702/703 (JanShu Hall-702/703)

呂學一 教授

Hsueh-I Lu, Professor

國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學資訊工程學系暨研究所教授
國立臺灣大學網路多媒體研究所教授

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

演算法實驗室

Algorithmic Research Lab.

演算法實驗室於2005年成立，本實驗室的研究專注於基礎演算法的設計、分析以及應用。

The Lab of Algorithmic Research was established in 2005. Our research focuses on fundamental algorithms and their applications.

主要研究領域 Major Research Areas

演算法、圖論

Algorithms, Graph Theory

研究計畫 Research Projects

1. 動態簡潔資料結構
   Succinct dynamic data structures

E-mail: hil@csie.ntu.edu.tw
Phone: +886-2-3366-4888*516
Office: 德田館516 (CSIE-516)
Website: http://www.csie.ntu.edu.tw/~hil/
Lab. Phone: +886-2-3366-4888*406
Lab.: 德田館406 (CSIE-406)

孫啟光 教授
Chi-Kuang Sun, Professor

國立臺灣大學生醫電子與資訊學研究所特聘教授
國立臺灣大學生醫分子影像研究中心主任
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
國立臺灣大學光電生物醫學研究中心教授
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

Distinguished Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Chief Director, Molecular Imaging Center
Distinguished Professor, Graduate Institute of Photonics and Optoelectronics/ Department of Electrical Engineering
Professor, Center for Optoelectronic Medicine, National Taiwan University.
Adjunct Research Fellow, Research Center for Applied Sciences / Institute of Physics, Academia Sinica.

奈米生醫光電實驗室
Bio-nanophotonics Lab.

主要研究領域 Major Research Areas

非侵入式光學奈米影像與操控、兆赫波與微波生醫應用、奈米超音波

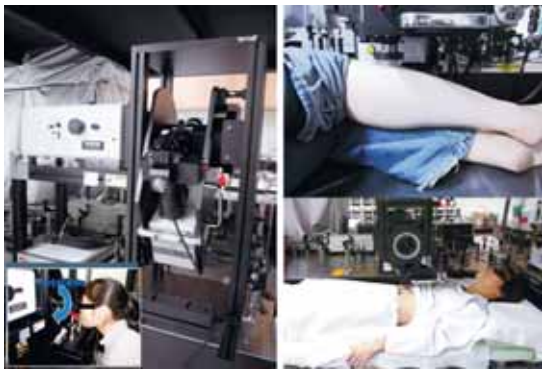
Non-invasive optical microscopy and manipulations, THz and Microwaves for biomedicine, nano-ultrasonics.

研究計畫 Research Projects

1. 光纖化兆赫波影像系統(2/3)
   Fiber-based THz imaging and sensing systems (2/3)
2. 台俄國合計畫-飛秒光纖CARS顯微光譜生物影像(2/3)
   Fiber format femtosecond CARS microspectroscopy techniques of biological Tissues (2/3)
3. 倍頻式光學虛擬活體切片術 (第一年)
   Harmonics-Based Invio Optical Virtual Biopsy
4. 倍頻式光學虛擬活體切片術 (第二年)
   Harmonics-Based Invio Optical Virtual Biopsy
5. 國立台灣大學邁向頂尖大學核心實驗室-分子生醫影像研究中心核心實驗室計畫
   Molecular Imaging Center Core Facility

6. 拔尖計畫-子計畫一: 以光學虛擬切片分子影像從事早期疾病診斷 (2013)
   Advanced Optical Virtual Biopsy for Early Disease Diagnosis
7. 拔尖計畫-子計畫一: 以光學虛擬切片分子影像從事早期疾病診斷 (2014)
   Advanced Optical Virtual Biopsy for Early Disease Diagnosis
8. 萌芽個案計畫-倍頻式光學切片術之商轉評估與認證實驗 (2013 ~ 2014)
   (I & II)
   Evaluation on the marketing potential and FDA application for multi-harmonic generation biopsy

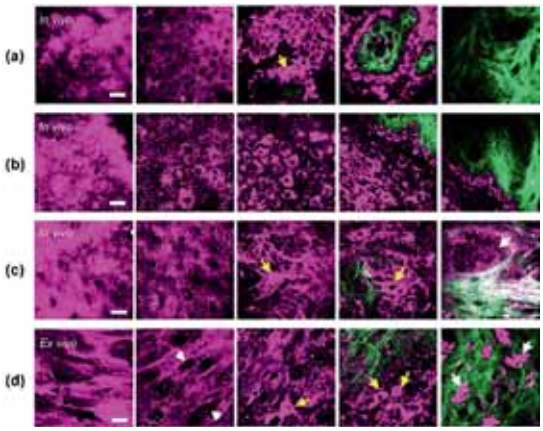
■ **研究計畫** - 倍頻式光學虛擬活體切片術
Harmonics-based in vivo optical virtual biopsy
之代表圖及中英文說明-1：



Version 1　　Version 2

頻式光學虛擬活體切片系統架構圖
Version 1 and 2 are the implementation of the HGM system for in vivo imaging. The rotatable system is adapted from a commercial scanning system (FV300).

■ **研究計畫** - 倍頻式光學虛擬活體切片術
Harmonics-based in vivo optical virtual biopsy
之代表圖及中英文說明-2：



圖A：色素性病灶在不同量測深度之倍頻影像，包括(a)痣(b)脂溢性角化症(c)基底細胞癌以及(d)黑色素細胞癌。

E-mail: sun@ntu.edu.tw
Phone: +886-2-3366-5085
Office: +886-2-3366-3614
Website: http://ufo.ee.ntu.edu.tw
Fax: +886-2-3366-3614

孫維仁 教授
Wei-Zen Sun, Professor

臺灣大學生物醫學與電子研究所合聘教授
臺灣大學醫學院麻醉科教授
臺灣大學醫學院緊急醫療研究中心主任
臺灣大學神經科學及認知中心副主任
臺灣大學腦與心智科學研究所合聘教授

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, Department of Anesthesiology, National Taiwan University
Chair, Center for Emergency Medical Service, National Taiwan University
Vice Chair, Neurobiology and Cognitive Science Center, National Taiwan University

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。2003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 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. Sunscope®(經濟部學界科專委託計畫)
3. Lidopat® / Lidocap®(美時製藥合作)
4. 健保資料庫分析(歐陽彥正教授合作)
5. 遠距緊急救護監測 - 同步互聯醫療網：開發以緊急救護技術員為中心的移動式整合播放站(新北市消防局中長程計畫，送審中)

■研究計畫 - 遠距緊急救護監測 - 同步互聯醫療網：開發以緊急救護技術員為中心的移動式整合播放站

Project title: Interactive Telemedicine in Emergent Medical System: Emergent Medical Technician-Based Mobile Broadcasting Station之代表圖及中英文說明：

本系統以ARM架構的處理器為中心，使用3.5G行動通訊網路連結相關醫療設備，如帽沿攝影機、隱藏式麥克風、藍牙耳機、氣管插管內視鏡、血氧濃度器、攜帶型生理監視器等急救器材，即時將病患的生命徵象數值(vital sign)傳遞至緊急救護資源整合平台，使得相關醫療專業人員，如救護指揮中心的護理師以及地方急救責任醫院的醫師均可即時得知病患的狀況，並及對EMT給予即時的醫療指導，有效的促進EMT、救護指揮中心之派遣員、護理師及醫療指導醫師、地方急救責任醫院的溝通與資源整合，即時的經由EMT進行最恰當的處置，給予病患必要且適當的照護，提高救護的品質與病患的存活率，以EMT為資訊中心的資訊連結架構圖如圖所示。

E-mail: wzsun@ ntu.edu.tw
Phone: +886-2-23123456*65522
Office: 臺大醫院研究大樓四樓(麻醉部第一實驗室)
NTUH Research Building 4F

田維誠 副教授
Wei-Cheng Tian, Associate Professor

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

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

微奈米分析技術及系統實驗室
Micro/Nano Analytical Technologies & Systems Lab.

本實驗室由田維誠教授成立於2009年。本實驗室的研究方向為微奈米分析技術及系統在生醫檢測，醫療技術，及生物化學應用之研究。本實驗室的研究重心在微奈米機電、微奈米流體力學及有關元件系統整合、封裝及可靠性之研究，並希望與CMOS製程相結合。未來將以微奈米分析技術及系統儀器出發，希望能大幅改進臨床前、臨床及體外診斷之準確性、速度、成本及使用方便性。

My research interests are on biological, chemical, and medical applications of micro & nano technologies with the focus on the CMOS compatible integration, packaging, and reliability of the micro/nano devices and systems. The future goal is to improve the accuracy, speed, cost, and ease-of-use of pre-clinical, clinical, and in vitro diagnostics by using micro/nano-enabled systems or instrumentations.

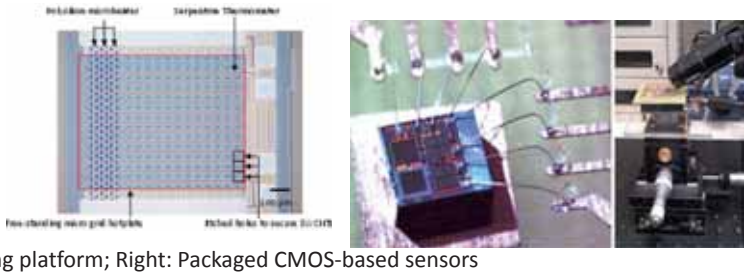
主要研究領域 Major Research Areas

微奈米分析及流體集成技術、微奈米機電系統儀器在生化醫療之應用
Micro and nano analytical & fluidic integrated technologies, MEMS/NEMS enabled instrumentation for biological, chemical, and medical applications

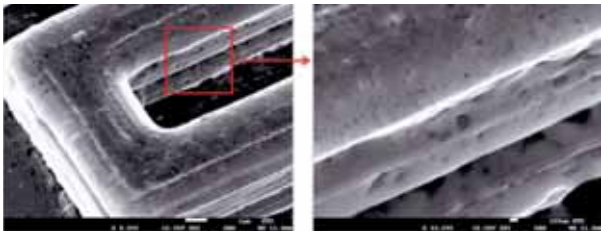
研究計畫 Research Projects

1. 人體呼吸氣體分析儀關鍵元件之研製與開發
   Research and Development of Key Components for Human Breath Analyzer
2. 混合式CMOS相容壓力微感測器陣列在非侵入血流監控之應用
   Mixed Mode CMOS-based Pressure Microsensor Arrays for Non-Invasive Hemodynamic Monitoring

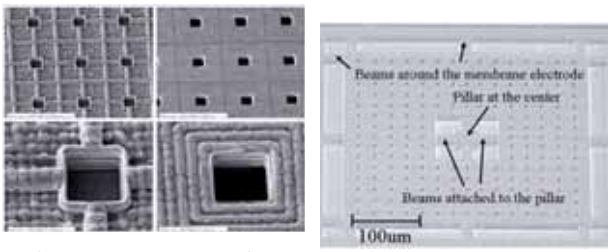
■研究計畫 - 混合式CMOS相容壓力微感測器陣列在非侵入血流監控之應用Mixed Mode CMOS-based Pressure Microsensor Arrays for Non-Invasive HemodynamicMonitoring之代表圖說明：



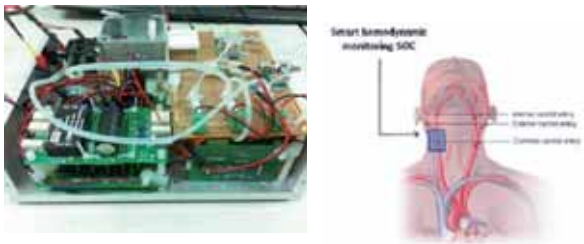
Left: CMOS MEMS sensing platform; Right: Packaged CMOS-based sensors



Left: Microstructures for sensor; Right: Nano-Au material coated on the sidewall



Left: MEMS membrane structures; Right: CMOS MEMS tactile sensors



Left: Assembled system of micro gas analyzer for breath analysis; Right: Concept of CMOS MEMS tactile sensors for blood monitoring

E-mail: wctian@ntu.edu.tw
Phone: +886-2-33669852
Office: 明達館517 (MD-517)
Website: http://www.ee.ntu.edu.tw/e_profile?id=100116
Lab.: 明達館509 (MD-509)

曹建和 副教授
Jen-Ho Tsao, Associate Professor

國立臺灣大學電信工程學研究所副教授
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
Associate Professor, Graduate Institute of Communication Engineering/Department of Electrical Engineering, National Taiwan University

數位信號處理實驗室
Digital Signal Processing Lab.

本實驗室的研究領域包括醫用超音波成像及通訊信號處理。醫用超音波成像研究包括3D立體成像、血流流速估測、超音波斷層掃描、超音波信號誤差校正、二維陣列波束成形架構設計、對比劑成像與非線性成像等。

Medical Ultrasound Imaging
Bio-signal Analysis
Underwater Acoustic Communication

主要研究領域 Major Research Areas

一、超音波成像

B-mode脈衝壓縮影像系統常被用在內科的診斷上，由於成像的發射和接收系統常是固定的設定參數，以及非適應性的訊號處理技術，以致影像的品質受到限制。我們提出–最佳化發射-可適性接收脈衝壓縮對比劑諧波成像系統，此技術主要包含兩部份，分別是最佳化發射訊號，以及回波訊號之可適性脈衝壓縮。特別考慮非線性參數組織和微汽泡之時變訊號的影響。由於(1)組織發生變異時，會導致其非線性參數特性改變，影響產生二倍頻諧波強度的機制，以及(2)氣泡濃度分布隨著時間的變化，在這兩個重要條件影響之下，使用一般固定發射頻率的超音波成像系統，無法達到最佳的對比度以及解析度，因此發射和接收的系統參數的最佳化是需要被研究的。本研究提出的最佳化系統，在發射系統方面透過Optimal Iterate Search Method 找出最佳發射頻率來提高回波訊號功率，且利用即時回波訊號頻譜估測，自動產生新的envelope function 發射訊號，達到Pre-enhancement的目的，進而提高解析度。在接收系統方面，將透過估測頻譜技術，對回波之諧波訊號進行可適性的脈衝壓縮，再一次提高訊號對比度以及解析度。透過發射和接收部分的兩次最佳化，有別於一般的脈衝壓縮影像系統，以期將來使用於心臟內科以及肝臟的臨床診斷。

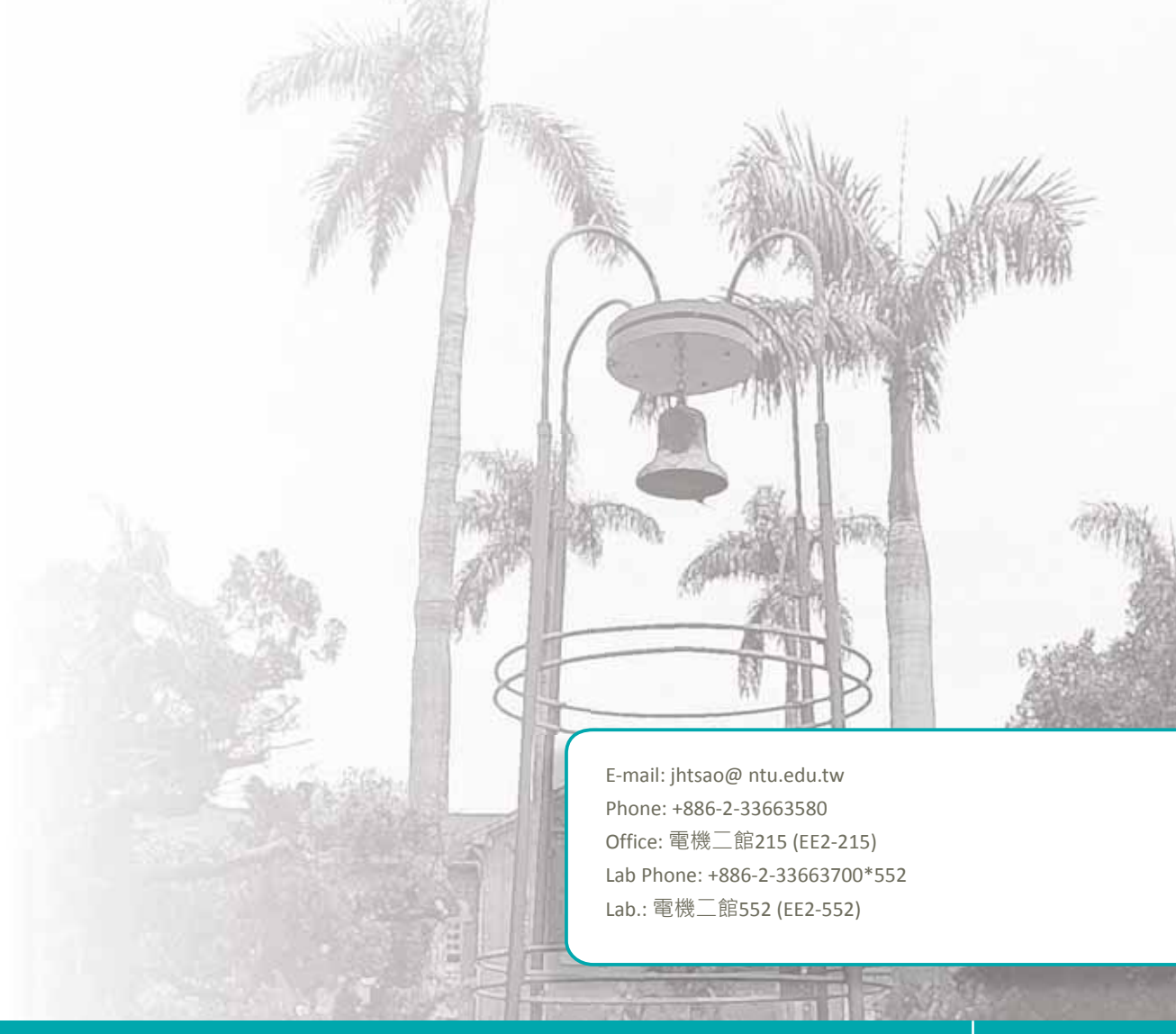
二、生醫訊號處理：

含麻醉生理訊號分析及胎兒心電圖的研究。

胎兒心電圖：胎兒心電圖的觀察有實際上的困難,因為胎兒位於母體之內，皮膚上的電極所紀錄的信號中，同時存在兩個本質上相同的來源，為母親和胎兒的心臟。尤其母親心電圖的信號強度遠大於胎兒心電圖，更增加了處理上的困難。另外，因為胎兒心電圖十分微弱，其他生理現象所產生的干擾或是量測上造成的雜訊，相對於胎兒心電圖的影響也會十分顯著。本研究著力於胎兒心電圖的信號取得。

研究計畫 Research Projects

1. 一個用於二次諧波脈衝壓縮成像之多頻合成技術　2010 ~ 2013
2. 超音波對比劑諧波成像之最佳訊號參數選擇　2013~ 2014



E-mail: jhtsao@ ntu.edu.tw
Phone: +886-2-33663580
Office: 電機二館215 (EE2-215)
Lab Phone: +886-2-33663700*552
Lab.: 電機二館552 (EE2-552)

王水深 教授
Shoei-Shen Wang, Professor

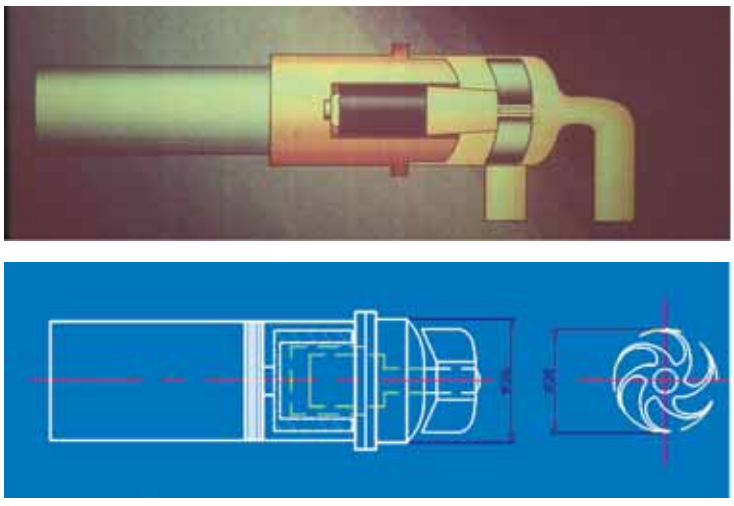
國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學醫學院心臟血管外科教授
國立臺灣大學附設醫院心臟移植及心肺移植召集人

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, Division of Cardiovascular Surgery, National Taiwan University
Director, Heart Transplantation and Heart-Lung Transplantation, National Taiwan University Hospital

心臟輔助器實驗室
Ventricular Assist Device Lab.

自1993年我們就積極研究流線型離心幫浦做為心臟衰竭的輔助循環，可在100mmHg阻力下提供8 L/min的輔助。而利用電壓的改變而改變葉輪的轉速造成博動流。包含馬達的總重量只有110 g，總長度只有7 cm，溶血系數只有0.020。此心臟輔助器擁有經濟部智慧財產局新型第一五四一O五號及新型第M 323290號專利。目前我們持續研究小而美的心臟輔助器以供幼兒使用。

We started to develop our own centrifugal pump with streamlined design in impeller type in 1993. It can produce 8L/min output at a resistance of 100 mmHg. It can provide pulsatile flow by changing the rotating speed of the impeller periodically via introducing a square wave form voltage into the driving motor coil of the pump. Together with the generator, it weighs only 110 gm with a total length of 7 cm, and index of hemolysis of only 0.020. Now we keep on developing a smaller pump to treat the intractable heart failure for infants.



臺大一號心室輔助器

主要研究領域 Major Research Areas

心臟外科包括冠狀動脈繞道手術、瓣膜手術、主動脈手術、心律不整手術、心臟衰竭手術等
血管外科包括胸主動脈瘤支架或手術、腹主動脈瘤支架或手術、周邊動脈阻塞重建手術、靜脈曲張手術、尿毒症血液透析之廔管手術等
心臟輔助循環包括葉克膜體外維生系統、心室輔助器等
移植手術包括心臟移植、心肺移植
Cardiac Surgery：Coronary Artery Disease Surgery, Valvular Heart Disease Surgery, AorticSurgery, Arrhythmia Surgery, Surgery for Heart Failure
Vascular Surgery：EndoVascular Stent-grafting for Thoracic Aortic Aneurysm or Abdominal Aortic Aneurysm, Revascularization for Peripheral Arterial Occlusive Disease, Varicose Vein Surgery, Arteriovenous Fistula Creation
Mechanical Circulatory Assist：Extracorporeal Membrane Oxygenation, Ventricular Assist Device
Transplantation：Heart Transplantation, Heart-Lung Transplantation

研究計畫 Research Projects

1. 人體心肺移植 (台大醫院計畫, 2006 ~ 2016) Heart-lung transplantation (NTUH, 2006 ~ 2016)
2. 運動處方對國人重大疾病的健康效益 - 臨床與代謝體指標的探討 -「運動處方對於冠狀動脈繞道手術病患的健康效益：臨床與代謝體指標的探討(整合型計畫-子計畫四) (1/3,2/3,3/3)
   Discussion of the health benefits on exercise prescription of major disease – the benefits of exercise prescription for coronary bypass patient–discussion of clinical and metabonomics
   (NSC100-2627-B-002-018, 2010/08/01~ 2013/07/31)
3. 新型玻尿酸水膠在心臟幹細胞治療的轉譯研究(整合型計畫-子計畫三) (1/2,2/2)
   Development of novel hyaluronan hydrogel for cardiac stem cell therapy — A translational approach.
   (DOH100-TD-PB-111-TM019, 2011/05/01~ 2012/04/30)
   (DOH101-TD-PB-111-TM029, 2012/05/01~ 2013/04/30)
4. 一個前瞻性、隨機、活性對照藥、開放性試驗，於第三及第四期週邊動脈阻塞性疾病患者比較乳化液劑型前列腺素E1與環糊精劑型前列腺素E1之療效及安全性
   A prospective, randomized, active controlled, open-label study to compare the efficacy and safety of PGE1 emulsion and PGE1-CD in patients with stages III–IV of peripheral arterial occlusive disease (PAOD).
   (台大醫院研究倫理委員會計畫QCR10018, 2012/03/06-2013/09/30)
5. 以綠色螢光蛋白(GFP)轉染的自體間葉幹細胞(MSC)探討MSC(G)/SF/HA心肌綴補片於含有幾丁聚醣微、奈米粒子傳遞紅血球生成素 (EPO) 對促進MI心臟之動物心肌再生之效應及機制的探討(1/2,2/2)
   Efficacy of using chitosan nanoparticles to delivery EPO and MSC(G) (GFP transfection MSC)/SF/HA patches on promoting MI heart re-modeling and vascularization, and related mechanisms- an in-vivo study
   (NSC101-2314-B-002-021-MY2, 2012/08/01~ 2014/07/31)

E-mail: wangp@ntu.edu.tw
Phone: +886-2-23123456*65074
Office Address: No.7 Chung-Shan S. Rd. Taipei, Taiwan

吳文超 副教授
Wen-Chau Wu, Associate Professor

國立臺灣大學生醫電子與資訊學研究所合聘副教授
國立臺灣大學腫瘤醫學研所副教授
國立臺灣大學醫學院附設醫院影像醫學部合聘副教授
國立臺灣大學臨床醫學研究所合聘副教授

Adjunct Associate Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Associate Professor, Graduate Institute of Oncology / Graduate Institute of Clinical Medicine, National Taiwan University
Associate Professor, Department of Medical Imaging, National Taiwan University Hospital

臨床磁振影像實驗室
Clinical Magnetic Resonance Imaging Lab.

本實驗室由吳文超教授成立於2010年，主要從事磁共振影像技術開發與臨床應用之相關研究，目前以微灌流影像與功能性影像為研究重點，並與台大醫院影像醫學部、核子醫學部合作，建立多模技術平台，提高於臨床診斷及預後的準確性。

Professor Wen-Chau Wu founded the Laboratory of Clinical Magnetic Resonance Imaging in the summer of 2010. The main research focus has been placed on the technical development and clinical applications of magnetic resonance imaging (MRI). Currently, we are conducting three NSC funded projects using advanced MRI techniques, including multi-modal functional MRI, perfusion MRI (arterial spin labeling, dynamic susceptibility contrast enhanced imaging, and dynamic contrast enhanced imaging), and diffusion-weighted MRI. We closely collaborate with the Departments of Medical Imaging and Nuclear Medicine in National Taiwan University Hospital to build up a multi-modal framework to improve the accuracy of diagnosis and prognosis in various diseases.

主要研究領域 Major Research Areas

微灌流磁共振影像、功能性磁共振影像、醫學影像處理、生醫信號分析

Perfusion Magnetic Resonance Imaging (Arterial Spin Labeling and Bolus Tracking), Functional Magnetic Resonance Imaging, Medical Image Processing, Biomedical Signal Analysis

研究計畫 Research Projects

1. 速度選擇動脈氫質子標記法微灌流磁振造影
   Velocity-selective arterial spin labeling perfusion magnetic resonance imaging
2. 四肢肌肉之功能性磁振造影
   Functional magnetic resonance imaging in extremity muscles
3. 使用動態對比劑增強及動脈標定磁振造影技術定量腎臟血流灌注並評估臨床應用之可行性
   Clinical feasibility of dynamic contrast enhanced MRI and arterial spin labeling MRI in quantitative assessment of renal perfusion

E-mail: wenchau@ntu.edu.tw
Phone: +886-2-23123456*88653
Office: 明達館704 (MD-704) (temporary)
Website: http://homepage.ntu.edu.tw/~ntuoncology/faculty/wenchauwu/index.htm

楊泮池 教授

Pan-Chyr Yang, Professor

國立臺灣大學生醫電子與資訊學研究所教授
國立臺灣大學醫學院內科教授
中央研究院生物醫學研究所合聘研究員
中央研究院院士
國立臺灣大學校長

Professor, Graduate Institute of Biomedical Electronics and Bioinformatics
Professor, Department of Internal Medicine, College of Medicine, National Taiwan University
Research Fellow, Institute of Biomedical Sciences, Academia Sinica
President, National Taiwan University

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 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

E-mail: pcyang@ntu.edu.tw
Phone: +886-2-33662000
Lab Phone: +886-2-33661778

柒 發表論文 Publications

趙坤茂教授 Kun-Mao Chao, Professor

※學術期刊論文 Journal articles

1. Lien, Y.-c., Wang, J.-Y., Lee, M.-C., Shu, C.-C., Chen, H.-Y., Hsieh, C.-H., Lee, C.-H., Lee, L.-N., and Chao, K.-M., "Urinary Tuberculosis Is Associated with the Development of Urothelial Carcinoma but Not Renal Cell Carcinoma: A Nationwide Cohort Study in Taiwan " , British Journal of Cancer, 2013, accepted [SCI]
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莊曜宇教授 Eric Y. Chuang, Professor

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6. Lai TY, Wu SD, Tsai MH, Chuang EY*, Chuang LL, Hsu LC, Lai LC, “Transcription of Tnfaip3 Is Regulated by NF- B and p38 via C/EBP in Activated Macrophages ” , PLoS One.2013 Sep 2; 8(9):e73153. doi: 10.1371/journal.pone.0073153.

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3. Y.C. Chiu, E. Y. Chuang, T.H. Hsiao, and Y. Chen, “Modeling competing endogenous RNA regulatory networks in glioblastoma multiforme (PDF)” ,Oral presentation at 2013 IEEE International Conference on Bioinformatics and Biomedicine, December 18–21, 2013, Shanghai, China.

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鍾孝文教授 Hsiao-Wen Chung, Professor

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6. Lai JCW, Cheng CC, Chung HW (2014) , "Susceptibility-weighted imaging using unbalanced steady-state free precession gradient-echo imaging with multiple echoes ", in International Society of Magnetic Resonance in Medicine, 22nd Annual Meeting, #1785, Milan, Italy.
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17. Cheng CM, Chung HW, Chang HC, Yeh TC, Hsieh JC, Lin SJ, Wang CY (2013) , " Multi-echo susceptibility-weighted imaging with adaptive averaging.",International Society of Magnetic Resonance in Medicine, 21st Annual Meeting, #1232,Salt Lake City, U.S.A.

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賴飛羆教授 Fei-Pei Lai, Professor

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2. Xiao-Ou Ping, Yufang Chung, Yi-Ju Tseng, Ja-Der Liang, Pei-Ming Yang, Guan-Tarn Huang, Feipei Lai, "A Web-Based Data Querying Tool Based on Ontology-Driven Methodology and Flowchart-Based Model," JMIR Medical Informatics, Vol. 1, Oct. 2013.
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※研討會論文 Conference & proceeding papers

1. Lichin Chen, Hui-Chu Yu, Hung-Chang Lee, Yufang Chung, Rung-Ji Shang, Hsiu-Yun Liu, Ching-Ting Tan, Feipei Lai, “Improving Inpatient Fall Prevention Strategies Using Interactive Data Repository Information System,” The 12th International Congress on Nursing Informatics, June 21-25, 2014, Taipei, Taiwan.
2. Xiao-Ou Ping, Feipei Lai, Yi-Ju Tseng, Ja-Der Liang, Guan-Tarn Huang, Pei-Ming Yang, “On handling missing data during the development of predictive model,” The Sixth International Conference on Bioinformatics, Biocomputational Systems and Biotechnologies, April 20 - 24, 2014 - Chamonix, France.
3. Jin-Ming Wu, Te-Wei Ho, Xing-Yu Su, and Feipei Lai, “Smartphone Application for Post-operative Gastric Patients: Surgery Diary,” The Sixth International Conference on Bioinformatics, Biocomputational Systems and Biotechnologies, April 20 - 24, 2014 - Chamonix, France.
4. Lichin Chen, Feipei Lai, Chiou-Shiang Wang, I-Ching Wang, Hui-Chu Yu, Hui-Yu Peng, Hui-Chuen Chen, Chia-Hsiun Chang, Tien-Jyun Chang, Yi-Der Jiang, Lee-Ming Chuang, "Patient-centric Data Warehouse Design - An Empirical Study Applied in Diabetes care," The Sixth International Conference on Bioinformatics, Biocomputational Systems and Biotechnologies, April 20 - 24, 2014 - Chamonix, France.
5. Wei Chen, Yan-Yu Lam, Chia-Ping Shen, Hsiao-Ya Sung, Jeng-Wei Lin, Ming-Jang Chiu, and Feipei Lai, "Ultra-fast Epileptic Seizure Detection Using EMD based on Multichannel Electroencephalogram," 13th IEEE International Conference on BioInformatics and BioEngineering, November 10-13, 2013, Chania, Greece.
6. Han-Ping Chen, Wei-Hsin Chen, Xing-Yu Su, Feipei Lai, Yi-Ju Chen, Kuo-Chin Huang, "A Web-Based Telehealthcare System with Mobile Application and Data Analysis for Diet People," 15th International Conference on e-Health Networking, Application and Services, October 9-12, 2013, Lisbon, Portugal.
7. Yi-Ju Tseng, Jung-Hsuan Wu, Xiao-Ou Ping, Hui-Chi Lin, Ying-Yu Chen, Rong-Ji Shang, Ming-Yuan Chen, Feipei Lai, Yee-Chun Chen, "A Web-Based Multidrug-Resistant Organisms Surveillance and Outbreak Detection System with Rule-Based Classification and Clustering," 6th Medicine 2.0'13, London, UK, September 23-24, 2013.
8. Hsin-Tsung Peng, William W.Y. Hsu, Chih-Hung Chen, Feipei Lai, and Jan-Ming Ho, "FinancialCloud: Open Cloud Framework of Derivative Pricing," 2013 ASE/IEEE International Conference on Economic Computing, Washington D. C. USA, September 8-14, 2013.
9. Ming-Hsien Hiesh, Yan-Yu Andy Lam, Chia-Ping Shen, Wei Chen, Feng-Sheng Lin, Hsiao-Ya Sung, Jeng-Wei Lin, Ming-Jang Chiu, and Feipei Lai, "Classification of Schizophrenia using Genetic Algorithm-Support Vector Machine (GA-SVM)," the 35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'13,) Osaka, Japan, July 3-7, 2013.
10. Chia-Ping Shen, Weizhi Zhou, Feng-Sheng Lin, Hsiao-Ya Sung, Yan-Yu Andy Lam, Wei Chen, Jeng-Wei Lin, Ming-Kai Pan, Ming-Jang Chiu, and Feipei Lai, "Epilepsy Analytic System with Cloud Computing," the 35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'13,) Osaka, Japan, July 3-7, 2013.
11. Feng-Sheng Lin, Chia-Ping Shen, Hsiao-Ya Sung, Yan-Yu Andy Lam, Jeng-Wei Lin, and Feipei Lai, "A High Performance Cloud Computing Platform for mRNA Analysis," The 35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'13,) Osaka, Japan, July 3-7, 2013.
12. Li-Chin Chen, Chiou-Shiang Wang, I-Ching Wang, Hui-Yu Peng, Lee-Ming Chuang, Feipei Lai, "Effectiveness of Telehealthcare System Supporting Patients in Lifestyle Management," Asian-Pacific Chinese Diabetes Forum, Taipei, Taiwan, May 18, 2013.

13. Huai-Te Chen, Mei-hui Tseng, Lu Lu, Jheng-Yi Sie, Yu-Jyuan Chen, Yufang Chung, and Feipei Lai, "Cloud Computing-Based Smart Home-Based Rehabilitation Nursing System for Early Intervention," 2013 International Conference on Internet Services Technology and Information Engineering (ISTIE 2013), Bogor, Indonesia, May 10-11 2013.

14. Yi-Ju Tseng, Jung-Hsuan Wu, Hui-Chi Lin, Hsiang-Ju Chiu, Bo-Chiang Huang, Rung-Ji Shang, Ming-Yuan Chen, Wei-Hsin Chen, Huai-Te Chen, Feipei Lai, and Yee-Chun Chen, "Rule-based Healthcare-associated Bloodstream Infection Classification and Surveillance System," Engineering and Medical Informatics and the European Federation of Medical Informatics (EFMI), special topic conference (STC)"Data and Knowledge for Medical Decision Support, April 17-19 2013, Prague, Czech.

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

※學術期刊論文Journal articles

1. B.-Y. Hsieh, S.-L. Chen, T. Ling, L. Jay Guo and P.-C. Li, " All-optical scanhead for ultrasound and photoacoustic imaging: imaging-mode switching by dichroic filtering", Photoacoustics, Vol. 2, pp. 39-46, 2014.
2. Y.-H. Chuang, Y.-H. Wang, T.-K. Chang, C.-J. Lin, and P.-C. Li, "Albumin Acts Like TGF- 1 in Microbubble-Based Drug Delivery", Ultrasound in Medicine and Biology, Vol. 40, No. 4, pp. 765–774, April, 2014.
3. Y.-H. Chen, Y.-M. Lin, K.-Y. Ho, A.-Y. Wu, and P.-C. Li, Low-Complexity Motion-Compensated Beamforming Algorithm and Architecture for Synthetic Transmit Aperture in Ultrasound Imaging, IEEE Transactions on Signal Processing, Vol. 62, No. 4, pp. 840-851, February, 2014.
4. Y.-S. Luo, J.-R. Wang, W.-J. Huang, J.-Y. Tsai, Y.-F. Liao, W.-T. Tseng, C.-T. Yen and P.-C. Li, S.-I. Liu, Ultrasonic Power/Data Telemetry and Neural Stimulator with OOK-PM Signaling, IEEE Transactions on Circuits and Systems II, Vol. 60, No. 12, pp. 827-831, December, 2013.
5. C.-L. Yeh, P.-C. Li, W.-P. Shih, P.-S. Huang and P.-L. Kuo, "Imaging monitored loosening of dense fibrous tissues using high-intensity pulsed ultrasound", Physics in Medicine and Biology, Vol. 58, pp. 6779-6796, October, 2013.
6. A.-H. Liao, S.-Y. Wu, H.-E. Wang, C.-H. Weng, M.-F. Wu and P.-C. Li, "Evaluation of 18F-Labeled Targeted Perfluorocarbon-Filled Albumin microbubbles as a probe for microUS and microPET in tumor-bearing mice," Ultrasonics, Vol. 53, pp. 320-327, Feb. 2013.
7. Y.-H. Chuang, P.-W. Cheng and P.-C. Li, "Combining Radiation Forces with Cavitation for Enhanced Sonothrombolysis", IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control, Vol. 60, No. 1, pp. 97-104, January, 2013.
8. P.-W. Cheng, C.-C. Shen and P.-C. Li, "MPEG compression of ultrasound RF channel data for a real-time software-based imaging system," IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control, Vol. 59, No. 7, pp. 1413-20, Jul. 2012.
9. Y.-F. Li and P.-C. Li, "Ultrasound Beamforming Using Compressed Data," IEEE Transactions on Information Technology in Biomedicine, Vol. 16, No. 3, pp. 308-313, May 2012.
10. A.-H. Liao, H.-L. Liu, C.-H. Su, M.-Y. Hua, H.-W. Yang, Y.-T. Weng, P.-H. Hsu, S.-M. Huang, S.-Y. Wu, H.-E. Wang, T.-C. Yen and P.-C. Li*, "Paramagnetic Perfluorocarbon-Filled Albumin-(Gd-DTPA) Microbubbles for the Induction of Focused-Ultrasound-Induced Blood–Brain Barrier Opening and Concurrent MR and Ultrasound Imaging", Physics in Medicine and Biology, vol. 57, no. 9, pp. 2787-2802, May, 2012.
11. J.-K. Chen, M.-L. Wang, X.-Y. Cheng, Y.-H. Wang, P.-C. Li* and J.-C. Cheng, "A Photoacoustic Imager with Light Illumination through an Infrared-Transparent Silicon CMUT Array", IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control, Vol. 59, No. 4, pp. 766-775, April, 2012.
12. Y.-H. Wang, A.-H. Liao, J.-H. Chen, C.-R. Wang and P.-C. Li*, "A Photoacoustic/Ultrasound Dual-Modality Contrast Agent and its Application to Thermotherapy", Journal of Biomedical Optics, Vol. 17, No. 4, 045001, April, 2012.

13. B.-Y. Hsieh, S.-L. Chen, T. Ling, L. Jay Guo and P.-C. Li*, "All-optical scanhead for ultrasound and photoacoustic dual-modality imaging", Optics Express, Vol. 20, No. 2, pp.1588-1596, 2012.

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1. S.-Y. Hung, B.-Y. Hsieh, and P.-C. Li, "Optical generation of narrowband high frequency ultrasound", SPIE Photonics West 2014, San Francisco, California, February 1-6, 2014.
2. P.-C. Li, "Ultrasound and photoacoustic dual-modality molecular probes for theranosis", keynote speech, 7th East Asian Consortium on Biomedical Engineering, Taipei, Taiwan, November 18-19, 2013.
3. C.-Y. Lee, T.-L.Truong, P.-C. Li, "Automatic Conformal Scanning for Ultrasound Screening", Annual Symposium on Biomedical Engineering and Technology, Hsinchu, Taiwan, November 15-16, 2013.
4. S.-Y. Hung, B.-Y. Hsieh, P.-C. Li, "Optical Generation of Frequency Adjustable Ultrasound with Multilayer Structure", Annual Symposium on Biomedical Engineering and Technology, Hsinchu, Taiwan, November 15-16, 2013.
5. S.-W. Liu, P.-C. Li, "Gold Nanoparticle Delivery Using Acoustic Cavitation and Optical Absoprption", Annual Symposium on Biomedical Engineering and Technology, Hsinchu, Taiwan, November 15-16, 2013.
6. T.-Y. Lee, P.-C. Li, "GPU-based 3D Ultrasound Parallel Beamforming", Annual Symposium on Biomedical Engineering and Technology, Hsinchu, Taiwan, November 15-16, 2013.
7. U.-W. Lok, P.-C. Li, "Lossless Data Compression with Fast Walsh Transform to Improve performance of a GPU-Based Beamformer", Annual Symposium on Biomedical Engineering and Technology, Hsinchu, Taiwan, November 15-16, 2013.
8. C.-T. Li, C.-H. Tsai, T.-Y. Ye, P.-C. Li, P.-L. Kuo, "Quantitative Assessment of Cell Elasticity Change in a 3D Culture System", Annual Symposium on Biomedical Engineering and Technology, Hsinchu, Taiwan, November 15-16, 2013.
9. T.-T. Chu, P.-C. Li, P.-L. Kuo, "Simulations of Tendon Mechanical Properties for Elasticity Imaging by ABAQUS", Annual Symposium on Biomedical Engineering and Technology, Hsinchu, Taiwan, November 15-16, 2013.
10. K.-D. Liao, P.-C. Li, "Ultra-wideband Radar 3D Respiration Detection", Annual Symposium on Biomedical Engineering and Technology, Hsinchu, Taiwan, November 15-16, 2013. (Best paper award)
11. S.-C. Lin, P.-C. Li, "Information Theoretic Parameter for Assessment of the Quality of Ultrasound Channel Data-compressed Images", Annual Symposium on Biomedical Engineering and Technology, Hsinchu, Taiwan, November 15-16, 2013. (Best paper award)
12. C.-L. Yeh, P.-L. Kuo, P.-C. Li, "Characterization of Normal and Diseased Tendon Using Shear Wave Elasticity Imaging", Annual Symposium on Biomedical Engineering and Technology, Hsinchu, Taiwan, November 15-16, 2013. (Best paper award)
13. P.-C. Li, "Ultrasound/Photoacoustic Multi-Modality Molecular Imaging and Targeted Therapy", invited talk, Annual Symposium on Biomedical Engineering and Technology, Hsinchu, Taiwan, November 15-16, 2013.
14. P.-C. Li, " Ultrasonic Wireless Neural Stimulation and Detection of Implantable Devices", International Workshop on Lead-free Ferro-/Piezoelectric Materials and Their Applications, invited talk, Shanghai, China, October 27-31, 2013.

15. Y.-R. Liou, Y.-H. Wang, C.-Y. Lee and P.-C. Li, "Isolating Cancer Cells with Targeted Biotinylated Albumin Microbubbles", 2013 Conference of the Federation of Asian Societies for Molecular Imaging, Taipei, Taiwan, R.O.C., October 25-27, 2013.

16. U-W. Lok, G.-W. Fan and P.-C. Li, "Ultrasound Baseband Data Compression Using Fast Walsh Transform to Enhance Performance of Data Transfer in a Gpu-based Beamformer", International Conference on Biomedical Ultrasound (ICBMU 2013), Taipei, Taiwan, R.O.C., October 22-23, 2013.

17. C.-L. Yeh, P.-C. Li, and P.-L. Kuo, "Accessing Mechanical Malfunction of Tendons Using Shear Wave Elasticity Imaging", International Conference on Biomedical Ultrasound (ICBMU 2013), Taipei, Taiwan, R.O.C., October 22-23, 2013.

18. C.-L. Yeh, B.-R. Chen, P.-L. Kuo, and P.-C. Li, "In Vivo Measruement of Liver Elasticity on Mice Using a Single Element Preclinical Ultrasound System", International Conference on Biomedical Ultrasound (ICBMU 2013), Taipei, Taiwan, R.O.C., October 22-23, 2013.

19. Y.-R. Liou, Y.-H. Wang , C.-Y. Lee and P.-C. Li, "Application of Targeted Biotinylated Albumin Microbubbles on Buoyancy Activated Cell Sorting", International Conference on Biomedical Ultrasound (ICBMU 2013), Taipei, Taiwan, R.O.C., October 22-23, 2013.

20. B.Y. Hsieh, S.-Y. Hung, S.-L. Chen, T. Lin, L.- J. Guo and P.-C. Li, " All-optical Ultrasound and Photoacoustic Imaging Probes", International Conference on Biomedical Ultrasound (ICBMU 2013), Taipei, Taiwan, R.O.C., October 22-23, 2013.

21. S.-W. Liu and P.-C. Li, "Nanogold Droplets Development and Characterization as an Ultrasound Contrast Agent", The 5th Annual Coference on Ultrasound Contrast Imaging(ACUCI), paper award, Taipei, Taiwan, R.O.C., October 19-20, 2013.

22. Y.-H. Wang and P.-C. Li, "Enhanced Delivery of AuNPs with Acoustic Cavitation for Photoacoustic Imaging and Photothermal Therapy", JSAP-OSA Joint Symposia, invited talk, Kyoto, Japan, September 16-20, 2013.

23. P.-C. Li, "Applications of ultrasound in small animal imaging", Imaging Workshop, invited talk, Liverpool, U.K., September 4, 2013.

24. Y.-M. Wei and P.-C. Li, " Ultrasound Image Quality Optimization with Adaptive Global Sound Speed Correction", IEEE International Ultrasonics Symposium (IUS), Prague, Czech Republic, July 21-25, 2013.

25. F.-Y. Lin, W.-C. Tien, and P.-C. Li, " CMOS-based Capacitive Micromachined Ultrasonic Transducers Operating without External DC Bias", IEEE International Ultrasonics Symposium (IUS), Prague, Czech Republic, July 21-25, 2013.

26. I.-C. Wu and P.-C. Li, " Microstructure Design for Detection of Implantable Device Using Ultrasound", IEEE International Ultrasonics Symposium (IUS), Prague, Czech Republic, July 21-25, 2013.

27. U.-W. Lok, G.-W. Fan, and P.-C. Li, " Lossless Compression with Parallel Decoder for Improving Performance of GPU-based Beamformer", IEEE International Ultrasonics Symposium (IUS), Prague, Czech Republic, July 21-25, 2013.

28. C.-L. Yeh, P.-L. Kuo, and P.-C. Li, " Correlation between the shear wave speed in tendon and its elasticity properties",IEEE International Ultrasonics Symposium (IUS), Prague, Czech Republic, July 21-25, 2013.

29. Y.-R. Liou, Y.-H. Wang, and P.-C. Li, " Cell Sorting Using Targeted Biotinylated Albumin Microbubbles", IEEE International Ultrasonics Symposium (IUS), Prague, Czech Republic, July 21-25, 2013.

30. P.-C. Li, "Acoustics-based multi-modality molecular imaging and targeted therapy", 4th Ultrasound Molecular Diagnosis and Therapy Conference (第4回超音波分子診断治療研究会), invited talk, Fukuoka, Japan, March 2, 2013.

31. Y.-H. Wang, A.-H. Liao, J.-Y. Lin, C.-R. Lee, C.-H. Wu, T.-M. Liu, C.-R. Chris Wang and P.-C. Li, "Enhanced delivery of gold nanoparticles by acoustic cavitation for photoacoustic imaging and photothermal therapy", SPIE Photonics West 2013, San Francisco, California, February 2-7, 2013.

32. Y.-L. Sheu, Y.-C. Ho and P.-C. Li, "Acoustic and photoacoustic scattering from transverse isotropic tissues", SPIE Photonics West 2013, San Francisco, California, February 2-7, 2013.

歐陽彥正教授Yen-Jen Oyang, Professor

※學術期刊論文 Journal articles

1. Pin-Liang Chen, Wei-Ju Lee, Wei-Zen Sun, Yen-Jen Oyang, and Jong-Ling Fuh, "Increased Risk of Dementia after Anesthesia and Surgery", British Journal of Psychiatry, 204:188-193,2014.
2. Pin-Liang Chen, Wei-Ju Lee, Wei-Zen Sun, Yen-Jen Oyang, Jong-Ling Fuh. "Risk of Dementia in Patients with Insomnia and Long-term Use of Hypnotics: A Population-based Retrospective Cohort Study", PLoS One 10.1371/journal.pone.0049113, Nov. 2012.
3. Meng-HanYang, Peng-Hui Wang, Shuu-Jiun Wang, Wei-Zen Sun, Yen-Jen Oyang, and Jong-Ling Fuh, "Women with Endometriosis Are More Likely to Suffer from Migraines: A Population-Based Study", PLoS One 10.1371/journal.pone.0033941, March 2012.

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

※學術期刊論文Journal articles

1. Kung-Bin Sung*, Kuang-Wei Shih, Fang-Wei Hsu, Hong-Po Hsieh, Min-Jie Chuang, Yi-Hsien Hsiao, Yu-Hui Su, and Gen-Hao Tien, "Accurate extraction of optical properties and top layer thickness of two-layered mucosal tissue phantoms from spatially-resolved reflectance spectra," Journal of Biomedical Optics,19(7), 077002, Jul. 2014
2. Jing-Wei Su, Wei-Chen Hsu, Jeng-Wei Tjiu, Chun-Ping Chiang, Chao-Wei Huang, and Kung-Bin Sung*, "Investigation of influences of the paraformaldehyde fixation and paraffin embedding-removal process on refractive indices and scattering properties of epithelial cells," Journal of Biomedical Optics, accepted, Jun. 2014
3. Wei-Chen Hsu, Jing-Wei Su, Te-Yu Tseng, and Kung-Bin Sung*, "Tomographic diffractive microscopy of living cells based on a common-path configuration," Optics Letters, 39(7), 2210-2213, Apr. 2014
4. Yu-Ren Liou, Wen Torng, Yu-Chiu Kao, Kung-Bin Sung, Chau-Hwang Lee, Po-Ling Kuo*, "Substrate Stiffness Regulates Filopodial Activities in Lung Cancer Cells," PLoS ONE, 9(2), e89767, Feb. 2014
5. Jing-Wei Su, Wei-Chen Hsu, Cheng-Ying Chou, Chen-Hao Chang, and Kung-Bin Sung*, "Digital holographic microtomography for high-resolution refractive index mapping of live cells," Journal of Biophotonics, 6(5), 416-424, May 2013
6. Kung-Bin Sung, Ke-Pan Liao, Yen-Lin Liu, and Wei-Cheng Tian*, "Development of a nanofluidic preconcentrator with precise sample positioning and multi-channel preconcentration," Microfluidics and Nanofluidics, 14(3), 645-655, Mar. 2013

※研討會論文 Conference & proceeding papers

1. H.P. Hsieh, K.B. Sung, and F.W. Hsu, "Construct a new method accurately extracting parameters associate with absorption and scattering coefficients of epithelium and stroma: using perpendicular and oblique fiber bundle probes," Proceedings of SPIE, Vol. 9129, 91291S, Brussels, Belgium (Apr. 2014)
2. J.W. Su, W.C. Hsu, and K.B. Sung, "Investigation of the correlation between acetic acid-induced structural changes and backscattering of epithelial cells based on three-dimensional refractive

index distributions of living cells," Symposium on Biomedical Applications of Light Scattering IX, SPIE Photonics West, paper 8952-32, San Francisco, CA, USA (Feb. 2014)

3. J.W. Su, W.C. Hsu, and K.B. Sung, "Determination of light scattering properties of thin slices of epithelial tissue based on three-dimensional refractive index mappings of the tissue slices," Symposium on Optical Interactions with Tissue and Cells XXV, SPIE Photonics West, paper 8941-35, San Francisco, CA, USA (Feb. 2014)
4. S.C. Wei, T.L. Chuang, K.B. Sung, H.H. Lu, and C.W. Lin, "Metallic Tip Enhanced Fluorescence for DNA Replication Monitoring," Conference Proceedings of the IEEE Engineering in Medicine and Biology Society, 2013, 488-491, Osaka, Japan (Jul. 2013)
5. P.T. Yang, S.C. Wei, Y.L. Lu, T.H. Wu, H.H. Lu, K.B. Sung, C.W. Lin, "Scanning surface plasmon resonance microscope for nano-array biochip imaging," 35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Osaka, Japan (Jul. 2013)
6. K.B. Sung, K.W. Shih, Y.H. Su, F.W. Hsu, H.P. Hsieh, and M.C. Huang, "Experimental validation of estimating the optical properties of a two-layered tissue model," European Conferences on Biomedical Optics (ECBO), paper EW2A.3, Munich, Germany (12-16 May 2013).
7. J.W. Su, W.C. Hsu, and K.B. Sung, "Applicability of Homogeneous Spheroidal Scatterer Models on Estimation of Nuclear Size from Spectral or Angular Backscattering Patterns," European Conferences on Biomedical Optics (ECBO), paper EM2A.6, Munich, Germany (12-16 May 2013).

※專書Book Chapters

1. J.W. Su, C.Y. Chou, and K.B. Sung*, "Three-dimensional refractive index imaging of cells to study light scattering properties of cells and tissue," Chap. 5 in 3D Reconstruction: Methods, Applications and Challenges, J. Ashworth and K. Brasher, Eds., pp. 107-124, Nova Science Publishers, Hauppauge, NY (Jan. 2014).

曾宇鳳教授 Y. Jane Tseng, Professor

※學術期刊論文Journal articles

1. Lin SW, Kang WY, Lin DT, Lee J CS, Lin Wu FL, Chen CL, Tseng YJ*, "Comparison of warfarin therapy clinical outcomes following implementation of an automated mobile phone-based critical laboratory value text alert system", BMC Medical Genomics 2014, 2014 May 8;7(Suppl 1):S13, (IF = 3.466, Ranking=57/161, 35% Category: Genetics & Heredity)
2. Tsai IL, Weng TI, Tseng YJ, Tan HK, Sun HJ, Kuo CH, "Screening and Confirmation of 62 Drugs of Abuse and Metabolites in Urine by Ultra-High-Performance Liquid Chromatography-Quadrupole Time-of-Flight Mass Spectrometry", J Anal Toxicol., 2013 Nov-Dec;37(9):642-51, (IF = 2.107, Ranking=33/75, 44% Category: Chemistry, Analytical)
3. Liu CT, Rajasekaran R, Lin SH, Wang SY, Kuo CH, Tseng YJ, Sheen LY, "Metabolomics of Ginger Essential Oil against Alcoholic Fatty Liver in Mice", J Agric Food Chem., 2013 Nov 20;61(46):11231-40, (IF = 2.906, Ranking=1/57, 1%, Category: Agriculture, Multidisciplinary)
4. Su BH, Huang YS, Chang CY, Tu YS, Tseng YJ*, "Template-Based de Novo Design for Type II Kinase Inhibitors and Its Extented Application to Acetylcholinesterase Inhibitors", Molecules, 2013 Oct 31;18(11):13487-509, (IF = 2.428, Ranking=24/57, 42%, Category: Chemistry, Organic)
5. Kuo TC, Tian TF, Tseng YJ*, "3Omics: a web-based systems biology Tool for analysis, integration and visualization of human transcriptomic, proteomic and Metabolomic data", BMC Syst Biol., 2013 Jul 23;7:64, (IF = 2.98, Ranking= 7/47, 9.5%, Category: Mathematical & Computational Biology) [SCI]

6. Tsai IL, Kuo TC, Ho TJ, Harn YC, Wang SY, Fu WM, Kuo CH, Tseng YJ*, "Metabolomic dynamic analysis of hypoxia in MDA-MB-231 and the comparison with inferred metabolites from transcriptomics data", Cancers, 2013 May 3;5(2):491-510.

7. Huang CC, McDermott MM, Liu K, Kuo CH, Wang SY, Tao H, Tseng YJ*, "Plasma metabolomic profiles predict near-term death among individuals with lower extremity peripheral arterial disease", Journal of Vascular Surgery, 2013 Oct;58(4):989-96, (IF = 2.88, Ranking= 24/199, 12%, Category: Surgery) [SCI]

8. Tseng YJ*, Martin E, Bologa C, Anang S, "Cheminformatics Aspects of High Throughput Screening: from Robots to Models: Symposium Summary", J. Comput. Aided Mol. Des., 2013 May;27(5):443-53, (IF =3.17, Ranking = 11/100, 11%, Category: Computer Science, Interdisciplinary Applications)

9. Chang CY, Hsu MT, Esposito EX, Tseng YJ*, "Oversampling to Overcome Overfitting: Exploring the relationship between data set composition, molecular descriptors, and predictive modeling methods", J. Chem. Inf. Model., 2013 Apr 22;53(4):958-71, (IF =4.34, Ranking = 3/100, 3%, Category: Computer Science, Interdisciplinary Applications) [SCI]

10. Tsai DM, Kang JJ, Lee SS, Wang SY, Tsai IL, Chen GY, Liao HW, Li WC, Kuo CH, Tseng YJ*, "Metabolomic Analysis of Complex Chinese Remedies: Examples of Induced Nephrotoxicity in the Mouse from a Series of Remedies Containing Aristolochic Acid", Evidence-Based Complementary and Alternative Medicine, 2013; 2013:263757, (IF =1.72, Ranking = 8/22, 36%, Category: Integrative & Complementary Medicine) [SCI]

11. Tseng YJ, Kuo CT, Wang SY, Liao HW, Chen GY, Ku YL, Shao WC, Kuo CH, "Metabolomic characterization of rhubarb species by capillary electrophoresis and ultra-high-pressure liquid chromatography", Electrophoresis, 2013 Oct;34(19):2918-27, (IF = 3.26, Ranking= 14/75, 18%, Category: Chemistry, Analytical) [SCI]

12. Ho TJ, Kuo CH, Wang SY, Chen GY, Tseng YJ*, "True ion pick (TIPick): a denoising and peak picking algorithm to extract ion signals from liquid chromatography/mass spectrometry data", J. Mass Spectrom., 2013 Feb; 48(2):234–242, (IF= 3.214, Ranking = 6/43, 14%, Category: Spectroscopy) [SCI]

13. Shao CY, Chen SZ, Su BH, Tseng YJ*, "Esposito EX, Hopfinger AJ, Dependence of QSAR Models on the Selection of Trial Descriptor Sets: A Demonstration Using Nanotoxicity Endpoints of Decorated Nanotubes", J. Chem. Inf. Model., 2013 Jan 28;53(1):142–158, (IF =4.34, Ranking = 3/100, 3%, Category: Computer Science, Interdisciplinary Applications) [SCI]

14. Wang KC, Wang SY, Kuo CH, Tseng YJ*, "Distribution-Based Classification Method for Baseline Correction of Metabolomic 1D Proton Nuclear Magnetic Resonance Spectra", Analytical Chemistry, 2013 Jan 15;85(2):1231–1239, (IF=5.69, Ranking = 3/75, 4%, Category: Chemistry, Analytical) [SCI]

15. Wang SY, Kuo CH, Tseng YJ*, "Batch Normalizer: a fast total abundance regression calibration method to simultaneously adjust batch and injection order effects in Liquid Chromatography/Time-of-Flight Mass Spectrometry-Based Metabolomics Data and Comparison with Current Calibration Methods", Analytical Chemistry, 2013 Jan 15;85(2):1037-46, (IF=5.69, Ranking = 3/75, 4%, Category: Chemistry, Analytical) [SCI]

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1. Lin SW, Kang WY, Lin DT, Lee J, Wu FL, Chen CL and Tseng YJ*, "Comparison of warfarin therapy clinical outcomes following implementation of an automated mobile phone-based critical laboratory value text alert system", Translational Bioinformatics Conference, Seoul, Korea, October 2-4, 2013

2. Tseng YJ*, "BaselineCorrector: A distribution-based classification method for baseline correction of metabolomic 1D proton nuclear magnetic resonance spectra", 246th ACS National Meeting, Indianapolis, Indiana, September 8-12, 2013
3. Tseng YJ*, "GAME: Gpu accelerated mixture elucidator", 246th ACS National Meeting, Indianapolis, Indiana, September 8-12, 2013
4. Tseng YJ*, "Drug discovery through Teach-Discover-Treat initiative", 246th ACS National Meeting, Indianapolis, Indiana, September 8-12, 2013.
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邱銘章教授 Ming-Jang Chiu, Professor

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周迺寬副教授 Nai-Kuan Chou ,Clinical Associate Professor

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黃念祖助理教授 Nien-Tsu Huang, Assistant Professor

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黃俊升教授 Chiun-Sheng Huang , Professor

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阮雪芬教授 Hsueh-Fen Juan, Professor

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1. C.-K. Sun, "Optical Molecular Imaging for Clinical Applications, " The 1st International Conference in Biophotonics Taiwan 2013, Taipei, Taiwan (2013). Invited Speaker
2. C.-K. Sun, "Nonlinear optical microscopy for clinical imaging, " The Second Biophotonics Conference, Taipei, Taiwan (2013). Tutorial Speaker.
3. C.-K. Sun, "Fiber-based THz imaging in vivo, " Workshop on THz Systems and Components in Communications, Sensing and Imaging, European Microwave Week 2013, Nürnberg, Germany (2013). Invited Speaker
4. C.-K. Sun, "THz dielectric fiber based imaging: in vivo molecular imaging of water, " 38th International Conference on Infrared, Millimeter, and Terahertz Waves, Mainz, Germany (2013). Plenary Speaker
5. C.-K. Sun, "Dielectric THz fibers and fiber-based directional couplers, " 2013 International Symposium on Microwave/Terahertz Science and Application (MTSA 2013), Shanghai, China (2013). Keynote Speaker

6. S.-C. Yang, P.-K. Wei, T.-W. Liao, M.-L. Tsai, P.-A. Mante, Y.-R. Huang, I-J. Chen, H.-Y. Chen, and C.-K. Sun, "Strong suppression of angle and period dependency of surface-plasmon-polaritons in gold nanodisks by combining a nanorod substrate, " in Technical Digest of Conference on Lasers and Electro-Optics (CLEO2013:Laser Science to Photonic Applications), paper JTu4A.63, San Jose, CA (2013).
7. C.-K. Sun, "Guided coherent acoustic phonon propagation in nanorods, " Abstract Book of the 3rd International Symposium on Laser Ultrasonics and Advanced Sensing (LU2013), paper In12, pp. 162, Yokohama, Japan (2013). Invited Speaker
8. C.-K. Sun, "Nanoultrasonic imaging by using THz sound waves, " in Program and Abstracts of 32nd International Acoustical Imaging Symposium (AI 32), pp. 29, Singapore (2013). Keynote Speaker
9. C.-K. Sun, "Nanoultrasonics based on piezoelectric superlattices, " in Program and Abstracts of 2013 International Congress on Ultrasonics (ICU 2013), pp. Info-9, Singapore (2013). Keynote Speaker
10. C.-K. Sun, "Optical harmonic generation biopsy of human skin, " Optics & Photonics International Congress 2013, Yokohama, Japan (2013). Invited Speaker
11. C.-K. Sun, "THz Dielectric Fibers and Fiber-based THz Bio-Imaging, " International Workshop on Terahertz Science and Technology 2013 (OTST2013), Kyoto, Japan (2013). Invited Speaker
12. T.-F. Tseng, J.-M. Wun, W. Chen, S.-W. Peng, J.-W. Shi, and C.-K. Sun, "High-Resolution 3-Dimensional Radar Imaging Based on a Few-Cycle W-band Photonic Millimeter-Wave Pulse Generator, " in Technical Digest of The 2013 Optical Fiber Communication Conference and Exposition and the National Fiber Optic Engineers Conference (OFCNFOEC2013), paper OTu2H.5, Anaheim, CA (2013).
13. H.-Y. Chung and C.-K. Sun, "Using a Mini Aspheric Lens as the Objective of a Miniaturized Video-rate Nonlinear Optical Microscope, " Design and Quality for Biomedical Technologies V, Photonics West, paper 8573-10, San Francisco, CA (2013).
14. C.-Y. Lin, C.-F. Lin, and C.-K. Sun, "Characterization of oral precancerous lesions based on higher-harmonic generation microscopy, " Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology, Photonics West, paper 8565-77, San Francisco, CA (2013).
15. Y.-H. Cheng, C.-F. Lin, and C.-K. Sun, "A Novel Intravital Multi-Harmonic Generation Microscope for Early Diagnosis of Oral Cancer, " Optical Biopsy X, Photonics West, paper 8577-25, San Francisco, CA (2013).
16. M.-R. Tsai, Y.-H. Liao, and C.-K. Sun, "Differential diagnosis of pigmented skin lesions based on harmonic generation microscopy, " Photonics in Dermatology and Plastic Surgery, Photonics West, paper 8565-6, San Francisco, CA (2013).
17. M.-R. Tsai, Y.-H. Liao, and C.-K. Sun, "Applying tattoo dye as third-harmonic generation contrast agent for in vivo optical biopsy of human skin, " Multiphoton Microscopy in the Biomedical Sciences XIII, Photonics West, paper 8588-109, San Francisco, CA (2013).
18. P.-A. Mante, M.-H. Lin, H.-Y. Chen, S. Gwo, and C.-K. Sun, "Ultrafast phonon dynamic in plasmonic supracrystal, " Ultrafast Phenomena and Nanophotonics XVII, Photonics West, paper 8623-33, San Francisco, CA (2013). Invited Paper

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1. S.-Y. Chen and C.-K. Sun, "Combined SHG/THG Imaging, in Second Harmonic Generation Imaging ",F. S. Pavone and P. J. Campagnola Ed., CRC Press (2013).
2. C.-H. Laiand C.-K. Sun, "Terahertz-Wave Plastic Fibers and Their Applications, in Handbook of Terahertz Technologies: Devices and Applications, T. Nagatsuma and Ho-Jin Song Ed. ", Pan Stanford Publishing (2013).

孫維仁教授 We-Zen Sun, Professor

※學術期刊論文Journal articles

1. Anne Chao, Chia-Hsin Lai, Kuang-Cheng Chan, Chi-Chuan Yeh, Hui-Ming Yeh, Shou-Zen Fan,Wei-Zen Sun*, “Skill acquisition of central venous catheterization by medical students: a retrospective study of students’ logbooks.”, BMC Medical Education, revised, 2014.
2. Yong-Xiang Chen, Hsi-Chung Chen, Wei-Zen Sun, I-Ping Hung, “ Two-Channel Persuasion System for Promoting Compliance to Cognitive Behavioral Therapy for Insomnia. ”,IEEE Trans Biomed Eng, revised, 2014.
3. Wei-Zen Sun, Jiun-Yu Yu*, Kuan-Wu Chang, “A conceptual model for improving the efficiency and evaluating the performance of emergency medical services. ”, J Formos Med Assoc, revised, 2014.
4. Wei Chen, Zih-Heng Wu, Chin-Jung Yang, Zhen-Kai Liao, Fei-Pei Lai, Chia-Lin Hsu, Wei-Zen Sun*, “Pulse Analysis System with a Novice Periodic Function Examination Method on Sepsis Survival Prediction. ”, Proc Comput Sci, in press, 2014.
5. Hsiao-Hsuan Liu, Albert Y Chen, Chun-Yi Dai, Wei-Zen Sun*, “Physical Infrastructure Assessment for Emergency Medical Response. ”, J Comput Civil Eng, in press, 2014.
6. Yong-Xiang Chen, Hsi-Chung Chen, Li-Xiang Chen, Jia-Wei Hu, Chuen-Kai Shie, Yu-Shan Lin, Pradnya Borade, Chau-Che Yeh, Han-Hong Lin, Siek-Siang Chiang, Yu-Chun Chen, Wei-Zen Sun*, Yi-Ping Hung*, “ A framework for Promoting Compliance to Cognitive Behavioral Therapy for Insomnia. ”,Human Computer Interaction 2013, in press.
7. Wei-Zen Sun*, “Anesthetic or analgesic effect of N2O in acute pain model? ”,Reg Anesth Pain Med, 39(3):263, 2014.
8. Pin-Liang Chen, Chih-Wen Yang, Yi-Kuan Tseng, Wei-Zen Sun, Jane-Ling Wang, Shuu-Jiun Wang, Yen-Jen Oyang, Jong-Ling Fuh*, “ Increased risk of dementia after anesthesia and surgery”, Br J Psychol 204(3):188–93, 2014.
9. Ming-Yu Lo, Jaung-Geng Lin, Ming-Wei Ong, Wei-Zen Sun*, “ Cerebral hemodynamic responses to acupuncture in migraine patients: a systematic review”, J Tradit Complement Med 3(4):213-20, 2013.
10. Wen-Fang Cheng, Ming-Cheng Chang, Wei-Zen Sun, Chi-An Chen*, “Fusion protein vaccines targeting two tumor antigens generate synergistic anti-tumor effects”,PLoS One, 2013 Sep 13;8(9):e71216. doi: 10.1371/journal.pone.0071216.
11. Yen-Hsuan Hsu, Feng-Sheng Lin, Chi-Cheng Yang, Chih-Peng Lin, Mau-Sun Hua*, Wei-Zen Sun*, “Evident cognitive impairments in seemingly recovered patients after midazolam-based light sedation during diagnostic endoscopy”,J Formos Med, 2013 Sep 11.

※研討會論文 Conference & proceeding papers

1. Wei-Zen Sun, “麻醉與玉米、土豆的戰爭. (Plenary Lecture) ”, The 6th Annual Congress of the Fujien Society of Anesthesiology, Fuchou, China, 2014.
2. 孫維仁, “教師身心健康促進。”,臺大醫學院102學年度醫學教育研討會, 99-151, 2014.
3. Wei-Zen Sun, “Taichi, kung fu that kills pain. (Plenary Lecture) ”, AAFPS, 2nd Asian Congress on Pain, Taipei, Taiwan, s29, 2014.
4. Wei-Zen Sun, “Acupuncture and Migraine Headache: Evidence-based Perspective. (Plenary Lecture) ”, AAFPS, 2nd Asian Congress on Pain, Taipei, Taiwan, s40, 2014.

5. Wen-Ying Lin, Feng-Sheng Lin, Chi-Peng Lin, Wei-Zen Sun*, " Updated Intervention Guidelines for Low Back Pain and Sciatica --- National Taiwan University Hospital Pain Clinic ", AAFPS, 2nd Asian Congress on Pain, Taipei, Taiwan, 216-7, 2014.
6. Hsiao-Chun Lin, Wen-Ying Lin, Yu-Hsin Huang, Chen-Tung Yen, Wei-Zen Sun*, " Gabapentin reversed central hypersensitivity and suppressed medial prefrontal cortical glucose metabolism in mechanical allodynia of neuropathic rats ", AAFPS, 2nd Asian Congress on Pain, Taipei, Taiwan, 215-6, 2014.
7. Chen, A. Y., Yu, T.Y., Lai, J. S., Yeh, C. H., Ma, M.H., Wei-Zen Sun*, " Ambulance Service Area Considering the Disturbance of Disasters on the Transportation Infrastructure." Geohubei, Sustainable Civil Infrastructures: Innovative Technologies and Materials, Hubei, China, July 20-22, 2014.
8. Ming-Yu Lo, Jaung-Geng Lin, Ming-Wei Ong, Wei-Zen Sun*, "The effect of standardized acupuncture on the analgesic and cerebral hemodynamic response in migraine patients: a randomized, placebo controlled trial. ",台北國際中醫藥學術論壇, 2014 Taipei Traditional Chinese Medicine International Forum, Taiwan, s387-9, 2014.
9. Wei-Zen Sun, "The magical bullet to prove acupuncture efficacy for intractable headache: Measuring cerebral hemodynamics in a randomized-controlled trial design. (Plenary Lecture) 當針灸遇上頑固型偏頭痛—結合客觀的科學工具來驗證神奇的針刺療效（大會演講。", 台北國際中醫藥學數論壇, 2014 Taipei Traditional Chinese Medicine International Forum, Taiwan, s73, 2014.
10. Wei-Zen Sun*, Yeong-Ray Wen, Chen-Tung Yen, " Awake or asleep? Behavioral correlates of the brain metabolic activity and functional connectivity by pregabalin, alpha-2-delta antagonist, in awake neuropathic pain model ", The 5th Asian Pain Symposium, Okazaki, Japan, 2013.
11. Wei-Zen Sun, "如何設計SCI論文題目：以多模式鎮痛案例(大會演講)。" 天津全國麻醉年會 Annual Meeting of 2013 Chinese Society of Anesthesiology, Tienging, China, 2013.
12. Wei-Zen Sun, "Multimodal analgesic strategy by combining NSAID and opioid. (Plenary Lecture) ", 第十二屆華東六省一市麻醉學術會議, Xiameng, China, 44-51, 2013.
13. Chen, A. Y., Lai, J. S., Yeh, C. H., and Sun W. Z. , " Post Disaster Service Area Study of the Emergency Medical System Considering the Transportation Infrastructure.", 2013 The 9th APRU symposium on Multi-Hazards Around the Pacific Rim, Taipei, Taiwan, October, 28-29, 2013.
14. Wei-Zen Sun, "Multimodal analgesic strategy by combining NSAID and opioid. (Plenary Lecture),"上海兩岸麻醉與疼痛研討會, Shanghai, China, 2013.
15. Jiun-Yu Yu, Wei-Zen Sun*, "Performance Improvement for Emergency Medical Services via Systems Thinking and GIS. ", INFORMS Annual Meeting, Minneapolis, USA, 6-9 Oct. 2013.
16. Wei-Zen Sun, " The scientific approach to Taichi with evidence-based medicine. (Plenary Lecture) ", 2013 International Forum on Taichi and health promotion: when medical doctors meet Taichi masters, Taipei, Taiwan, 2013.
17. Huang, D. C., Liu, H. H., Chen, A. Y., Wei-Zen Sun*, "GIS Assessment of the Emergency Medical Response Infrastructure.", 2013 ASCE International Workshop on Computing in Civil Engineering (IWCCE), Los Angeles, USA, June 23-25, 2013.
18. Chi-Peng Lin, Wen-Ying Lin, Feng-Sheng Lin, Wei-Zen Sun*, "Initial assessment of cerebrospinal fluid metabolomic profile alterations between naïve and tolerant subjects. ", Chinese J Pain, 3(1S): s78;A09, 2013.
19. Wen-Ying Lin, Yu-Hsin Huang, Yu-Ting Cheng, Hsiao-Chun Lin, Chen-Tung Yen, Wei-Zen Sun*, "Low dose ketorolac potentiates tramadol's analgesic efficacy in rat spared nerve injury model. ", Chinese J Pain, 3(1S): s77;A08, 2013.
20. Wen-Ying Lin, Feng-Sheng Lin, Chi-Peng Lin, Wei-Zen Sun*, "Management of refractory cancer pain-- National Taiwan University Hospital Pain Clinic Guideline. ", Chinese J Pain, 3(1S): s79;B10, 2013.

21. Wen-Ying Lin, Feng-Sheng Lin, Chi-Peng Lin, Wei-Zen Sun*, "Intervention for Low Back Pain and Sciatica-- National Taiwan University Hospital Pain Clinic Guideline. ", Chinese J Pain, 3(1S): s79;B11, 2013.
22. Chi-Peng Lin, Wen-Ying Lin, Yin-Shi Chen, Wei-Han Chou, Feng-Sheng Lin, Wei-Zen Sun*, "Repeated heme arginate infusions cause accelerated total implantable vascular access device occlusion among porphyria patients. ", Chinese J Pain, 3(1S): s79;B16, 2013.
23. Wei-Han Chou, Yi-Chia, Wang Feng-Sheng Lin, Chi-Peng Lin, Shih-Yu Chen, Wei-Zen Sun*, "Periodical intravenous ketamine infusion for refractory neuropathic pain after spinal cord injury– a case report. ", Chinese J Pain, 3(1S): s80;C05, 2013.
24. Wei-Zen Sun, "Tips in fibromyalgia treatment. (Plenary Lecture) ",Know Pain Symposium of Fibromyalgia, Taipei, s10-2, 2013.
25. 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 Decreases Airway Inflammation, Improves Pulmonary Function and Quality of Life in Asthmatic Children ",2013 Asia Pacific Congress of Asthma, Allergy, and Clinical Immunology (APCAACI), O13-353.
26. Yu-Ting Cheng, Yu-Hsin Huang, Wen-Ying Lin, Chen-Tung Yen, Wei-Zen Sun*, "Multimodal Synergism on Spontaneous and Evoked Neuropathic Pain: Interaction among Tramadol, Ketorolac and Pregabalin. ", BioMed Sci, 2013.
27. Hsiao-Chun Lin, Wei-Zen Sun, Chen-Tung Yen, "Gabapentin Enhanced Periaqueductal Gray and Suppressed Insular Cortex Glucose Metabolism in Conscious Rats with Neuropathic Pain: a PET Study. ", BioMed Sci, 2013.
28. D.C Huang, H.H Liu, A Chen, Wei-Zen Sun*, " GIS Assessment of the Emergency Medical Response Infrastructure. (182) ", IWCCE, 2013.

※專書Book Chapters

1. 黎乃良、許哲彰、彭文玲、鄭鴻鈞、陳啓明、孫維仁 *, " 減少氣管插管、降低術後不適的乳癌手術麻醉新境界 脊側神經阻斷術。" 台灣醫界, 57(3):8-12, 2014。
2. 胡新實、孫維仁、黃安年 , " 末期疾病疼痛的幾轉、分類、診斷、檢查與評估"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, pp1-42, 2013.
3. 孫維仁 , " 帶狀皰疹為何難根治？146位名醫問診-重大疾病篇。"商業周刊出版社, 1st ed, p 203-6, 2013.
4. Wei-Zen Sun, "When medical doctors meet Taichi masters ", 2013 International Forum on Taichi and health promotion, Taipei, Taiwan, 台灣疼痛醫學會出版, 2013.
5. 孫維仁及台灣糖尿病周邊神經痛專家小組(Taiwan Diabetic Peripheral Neuopathic Pain Advisory Board)合著, " 糖尿病周邊神經痛之治療共識。"台灣疼痛醫學會出版, 1st ed, pp1-76, 2013.
6. Jiann-Shing Shieh, Ya-Ting Chan, Maysam F Abbod, Wei-Zen Sun, and Yeong-Ray Wen, " Adaptive Neuro-Fuzzy System Applied to Patient-Controlled Analgesia Analysis. ", In: Fuzzy Logic: Applications, Systems and Technologies, Dinko Vukadinovic (Ed.), Nova Science Publishers, pp 1-15, 2013.

田維誠副教授 Wei-Cheng Tian, Associate Professor

※學術期刊論文Journal articles

1. Wei-Cheng Tian*, Yu-Hsuan Ho, Chao-Hao Chen and Chun-Yen Kuo, "Sensing Performance of Precisely Ordered TiO2 Nanowire Gas Sensors Fabricated by Electron-Beam Lithography, " Sensors, 13; doi:10.3390/s130100865, 865-874, Jan. 2013
2. Wei-Cheng Tian*, Yu-Hsuan Ho, and Chao-Hung Chou, "A Photoactivated TiO2 Gas Chromatograph Detector for Diverse Chemical Compounds Sensing at Room Temperature, " IEEE Sensors Journal, 2013

曹建和副教授 Jenho Tsao , Associate Professor

※學術期刊論文Journal articles

1. Lin Y. T., Wu H. T., Tsao J., Yien H. W., Hseu S. S., "Time-varying spectral analysis revealing differential effects of sevoflurane anesthesia: nonrhythmic to rhythmic ratio, " Acta Anaesth. Scan., Vol. 58(2), pp. 157–167, Feb. 2014. (SCI)
2. P.F. Lin, M. T. Lo, J. Tsao, Y. C. Chang, C. Lin and Y. L. Ho, "Correlations between the Signal Complexity of Cerebral and Cardiac Electrical Activity: A Multiscale Entropy Analysis, " PLoS ONE 9(2): e87798, Feb. 2014. (SCI)
3. Huang, S.H., Tsao, J., Yang, T.C., and Cheng, S.W. , "Model-based signal subspace channel tracking for correlated underwater acoustic communication channels, " IEEE J. Ocean. Eng. Vol. 39 (2), pp. 343-356, April 2014. (SCI)

※研討會論文 Conference & proceeding papers

1. Tsao J. and Chen M.H., "An Adaptive Pulse Compression Filter for Ultrasound Contrast Harmonic Imaging, "Engineering, 2013, 5, pp. 118-122, The 7th International Conference on Bioinformatics and Biomedical Engineering (iCBBE 2013), Sept 26-28, 2013 Beijing, China. (NSC102-2221-E-002-024).

王水深教授 Shoei-Shen Wang, Professor

※學術期刊論文Journal articles

1. Lai CY, Wu PJ, SR Roffler, ST Lee, Hwang SM, Wang SS, Wang K, Hsieh PCh, " Clearance kinetics of biomaterials affects stem cell retention and therapeutic efficacy. " , Biomacromolecules 2014 Feb 10;15(2):564-73. doi: 10.1021 /bm401583b.
2. Chien CY, Chien CT, Wang SS, " Progressive Thermopreconditioning Attenuates Rat Cardiac Ischemia/Reperfusion Injury via Mitochondria-mediated Antioxidant and Anti-apoptotic Mechanisms. " , The Journal of Thoracic and Cardiovascular Surgery 2014 Jan 15 pii: S0022-5223(14)00042-7. doi: 10.1016/j.jtcvs.2013.12.065.
3. Chou HW, Chan CY, Wang SS, Wu IH, " How to size the main aortic endograft in a chimney procedure. " , J Thorac Cardiovasc Surg. 2014 Mar;147(3):1099-101.
4. Wu CY, Chan CY, Huang SC, Chi NS, Wang SS, Wu IH, " Outcomes following endovascular or open repair for ruptured abdominal aortic aneurysm in a Chinese population. " , Heart Vessels 2014;29:71-7.
5. Chi NH, Huang CH, Huang SC, Yu HY, Chen YS, Wang SS, Wu IH, ".Robotic mitral valve repair in infective endocarditis. " , J Thorac Dis. 2014;6:56-60.
6. Wu IH, Chan CY, Liang PC, Huang SC, Chi NH, Wang SS(correspondence author) , " One stage hybrid repair to thoracoabdominal aortic aneurysm. " , Ann Vasc Surg 2014;28:201-8.
7. Chung TW, Lin PY, Wang SS(correspondence author), Chen YF, " ADP Adenosine diphosphate-decorated chitosan nanoparticles shorten blood clotting times, influencing the structures and varying the mechanical properties of the clots. ", International Journal of Nanomedicine 2014:9:1655-64.

8. Yang FC, Shih FJ, Tseng PH, Wang SS(correspondence author), and Shih FJ(correspondence author) , " Holistic Care for Pediatric Organ Transplant Recipients and Their Families during Their Dark Post-operative Recovery Stage in the Hospital. " , Transplant Proc 2014; 46(4):1026-8.

9. Yang FC, Tseng PH, Shih FJ, Wang SS(correspondence author) and Shih FJ(correspondence author) , " Caring dilemmas and coping strategies for organ transplant recipients and their families: perspective of health professionals in Taiwan. " , Transplant Proc 2014;46(4):1022-5.

10. Shih FJ, Shih FJ, Pan YJ, RN, Chen HM, Wang SS(correspondence author) , "Dilemma of applying telehealth for overseas organ transplantation: comparison on perspectives of health professionals and e-health information & communication technologists in Taiwan. ", Transplant Proc 201;46(4):1019-21.

11. Shih FJ, Fan YW, Chiu CM, Shih FJ, Wang SS(correspondence author) , " Needs in providing overseas organ transplant medical function with eHealth telecare systems-instrument development for health professionals in Taiwan. " , Transplant Proc 201;46(4):1014-8.

12. Su CC, Chen JW, Chou NJK, Chen YS, Huang SC, Chi NH, Wang SS(correspondence author) , " Ocular manifestations of patients receiving heart transplantation - a single center experience of 311 consecutive cases. " , Transplant Proc 2014;46:937-40.

13. Chen SY, Lu PC, Lan C, Chou NK, Chen YS; Lai JS, Wang SS(correspondence author) , " Six-minute walk test among heart transplantation recipients. " , Transplant Proc 2014;46:929-33.

14. Hsu CY, Chi NH, Chou NK, Shun CT, Chen YS, Huang SC, Yu HY, Wang SS(correspondence author) , "Antibody-mediated rejection after orthotopic heart transplantation: a 9-year single institutional experience. " , Transplant Proc 2014;46:925-8.

15. Luo CM, Wang SS(correspondence author), Chou NK, Chi NH, Chen YS, M.D. Yu HY, Tsao CI, Wang CH, Chang CH, "The effect of statin on cardiac allograft survival. " , Transplant Proc 2014;46:920-4.

16. Chen JW, Wang SS(correspondence author), Chen YS, Chi NH, Huang SC, Yu HY, Chou NK, Wang CH, "Risk factors and prognosis of patients with primary graft failure after heart transplant: An Asian center experience. ", Transplant Proc 2014;46:914-9.

17. Tseng PH, Shih FJ, Yang FC, Shih FJ, Wang SS(correspondence author) , " Factors contributing to poor sleep quality as perceived by post-heart transplant recipients in Taiwan. " , Transplant Proc 2014;46:903-6.

18. Chen HM, Shih FJ, Pan YJ, Shih FJ, Wang SS(correspondence author) , "The needs and expectations of overseas liver transplant recipients' families in Taiwan: across different transplant stages. ", Transplant Proc 2014;46(3):782-4.

19. Wang SS, Wang CH, Chou NK, Chi NH, Huang HC, Yu HY, Wu IH, Chen YS, Ko WJ, Tsao CI; Shun CT, Chu SH," Current status of heart transplantation in Taiwan. Transplant Proc 2014;46:911-3.

20. Chou TH, Fang CC, Yen ZS, Lee CC, Chen YS, Ko WJ, Wang CH, Wang SS, Chen SC, " An observational study of extracorporeal CPR for in-hospital cardiac arrest secondary to myocardial infarction." , Emerg Med J 2013 Oct 9. doi: 10.1136/emermed-2012-202173.

21. Wang CH, Wang SS, Ko WJ, Chen YS, Chang CY, Chang RW, Chang KC, "Acetyl-L-Carnitine and Oxfenicine on cardiac pumping mechanics in streptozotocin-induced diabetes in male wistar rats. " , PLoS One 2013; 8(7):e69977. doi: 10.1371/journal.pone.0069977.

22. Chou NK, Chi NH, Yu YH, Lin JW, Wang CH, Wang SS, Chen YS, "Extracorporeal rescue for early and late graft failure after cardiac transplantation: short result and long-term follow up. " , The Scientific World Journal 2013 Oct 8;2013:364236. doi: 10.1155/2013/364236.

23. Tsai JH, Chou NK, Wang SS, Shun CT, " Isolated cardiac sarcoidosis: case experience in heart transplantation. ", J Formos Med Assoc 2013 Aug;112(8):499-500.

24. Chen JW, Chen YS, Chi NS, Wang SS, Wu IH, " Ventricular septal rupture following an acute inferior wall myocardial infarction detected by computed tomography imaging. ", J Card Surg 2013;28:273.

25. Eisen HJ, Kobashigawa J, Starling RC, Pauly DF, Kfoury A, Ross H, Wang SS, Cantin B, Bakel AV, Ewald G, Hirt S, Lehmkuhl H, Keogh A, Rinaldi M, Potena L, Zuckermann A, Dong G, Cornu-Artis C, Lopez P, "Everolimus versus mycophenolate mofetil in heart transplantation: A randomized, multicenter trial. ", American Journal of Transplantation 2013;13:1203-1216.

26. Kobashigawa J, Ross H, Bara C, Delgado JF, Dengler T, Lehmkuhl HB, Wang SS, Dong G, Witte S, Junge G, Potena L, "Everolimus is associated with a reduced incidence of cytomegalovirus infection following de novo cardiac transplantation. ", Transpl Infect Dis 2013;15:150-62.

27. Zuckermann A, Wang SS, Epailly E, Barten MJ, Sigurdardottir V, Segovia J, Varnous S, Turazza FM, Potena L, Lehmkuhl HB, "Everolimus immunosuppression in de novo heart transplant recipients: What does the evidence tell us now ? ", Transplant Reviews 2013;27:76-84.

28. Wu YW, Lee CM, Liu YB, Wang SS, Huang HC, Tseng WK, Jui HY, Wang SY, Horng HE, Yang HC, Wu CC, "Usefulness of magnetocardiography to detect coronary artery disease and cardiac allograft vasculopathy. ", Circ J 2013;77:1783-90.

29. Wu IH, Chan CY, Chen YS, Huang SC, Wang SS, Chi NH, "Crossover Chimney Technique to Preserve the Internal Iliac Artery in Abdominal Aortic Aneurysm With Common Iliac Artery Aneurysms. ", J Endovasc Ther 2013;20:298-302.

30. Chen CH, Wang SS, Wei EI, Chu TY, Hsieh PCh, "Hyaluronan enhances bone marrow cell therapy for myocardial repair after infarction. ", Molecular Therapy 2013;21(3):670-9.

31. Chi NH, Yang MC, Chung TW, Chou NK, Wang SS(correspondence author) , "Cardiac repair using chitosan-hyaluronan/silk fibroin patches in a rat heart model with myocardial infarction. ", Carbohyd Polym 2013;92(1):591-7.

※研討會論文 Conference & proceeding papers

1. Wang SS, "Clinical Application of Extracorporeal Membrane Oxygenation Support in Heart Transplantation", The 22th Annual Meeting of the Asian Society for Cardiovascular and Thoracic Surgery (ASCVTS), Istanbul, Turkey, April 3-6, 2014

2. Wang SS, "Clinical Application of ECMO in Heart Transplantation", The Symposium of Korea Artificial Organ Center (KAOC), Seoul, Korea, February 7, 2014

3. Wang SS, "Hybrid Technical Consideration for Aortic Arch Surgery", The 5th Catholic VESSEL Update 2013, Seoul, Korea, December 5-7, 2013

4. Wang SS, "Developing a Comprehensive Heart Failure Program (ECMO, HeartMate and Transplant)", The 4th Asia Pacific Mechanical Circulatory Support Conference, Singapore, November 15-17, 2013

5. Wang SS, "Extracorporeal Membrane Oxygenation Support to Rescue", The 23rd Annual Congress of the Association of Thoracic and Cardiovascular Surgeons of Asia (ATCSA), Singapore, October 10-13, 2013

6. Wang SS, "Extracorporeal Membrane Oxygenation Support for Circulatory Collapse", The 5th Congress of the International Federation for Artificial Organs (IFAO2013), Yokohama, Japan, September 27-29, 2013

7. Wang SS, "Current Status and Future Aspects of Heart Transplantation and Mechanical Circulatory Support in Taiwan.", The 13th Congress of Asian Society of Transplantation (CAST), Kyoto, Japan, September 2-6, 2013

8. Wang SS, "Venous Diseases in Taiwan ", The 7th China Southern Endovascular Congress (CSEC 2013), Guangzhou, China, July 25, 2013

9. Wang SS, "Primary Graft Failure in Heart Transplantation", International Society for Heart & Lung Transplantation (ISHLT) 33rd Annual Meeting and Scientific Sessions, Montreal, Canada, April 24-27, 2013
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捌 教師得獎、專利及技術轉移
Award、Patents and Technology Transfer

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3. 賴飛羆，2013台灣遠距照護傑出貢獻獎 (Telehealthcare Distinguished Contribution Award) ，2013
4. 成佳憲，台灣大學102學年度學術研究績效獎勵（傑出期刊3），2013
5. 曾宇鳳，American Chemical Society Chemluminary award，2013
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