國 科 會 生 命 科 學 研 究 推 動 中 心

研討(習)會 結案報告

一、基本資料

中文名稱	臺灣生物物理學會與國際蛋白質工程中心聯合研討會
英文名稱	The Joint Symposium of the Taiwan Biophysical Society and International Network of Protein Engineering Centers
中文摘要報告	本次臺灣生物物理學會與國際蛋白質工程中心聯合研討會於 2024 年 5 月 22 日至 25 日在臺灣新竹國家同步輻射研究中心成功舉辦。研討會旨在促進生物物理學領域的交流和學術成果的分享，本年度總計有超過 350 位的與會者一同共襄盛舉。 在這次研討會中，國立臺灣大學醫學院生物化學暨分子生物學研究所以及國際蛋白質工程中心共同邀請超過 40 位來自國內外的頂尖講者與會，共同探討生物物理學領域的前沿議題。研討會包含了「結構生物學」、「人工智慧和深度學習於結構生物學之應用」、「感染以及免疫相關之分子結構」、「巨分子複合體之組裝和其機轉」、「無穩定構型蛋白質與液相分離及凝聚體」、「蛋白質摺疊動力學」、「蛋白質設計」等七大科學主題，以及「日本生物物理學會」與「國家同步輻射研究中心」兩個重要機構的分享。這些主題涵蓋了生物物理學的重要領域，提供了與會者一個跨領域、跨國際的交流和學習的平台。整體而言，本研討會的演講與討論為我們帶來了許多創新的啟發和見解，包含了世界前沿之研究成果、開創性的技術應用和未來的生命科學發展趨勢。此外，超過 100 位以上來自各國之與會者也踴躍參與口頭報告和海報展示，有效的促進國內外各大專院校學生間之學術交流和討論，相信能激發出不同的研究思路、提升台灣高教研究於國際間之能見度，並創造出更多與世界其他國家之合作機會。
英文摘要報告	The Joint Symposium of the Taiwan Biophysical Society and International Network of Protein Engineering Centers was successfully held at the National Synchrotron Radiation Research Center, Hsinchu, Taiwan from May 22 to 25, 2024. The seminar aimed to promote exchange and share academic achievements in the field of biophysics, with a total of over 350 participants joining the event this year. In this symposium, the Institute of Biochemistry and Molecular Biology, College of Medicine, National Taiwan University and the International Network of Protein Engineering Centers jointly invited more than 40 top speakers from both domestic and international backgrounds to discuss cutting-edge topics in biophysics. The symposium covered seven major scientific themes, including "Structural Biology", "AI/Deep Learning Approaches to Structural Biology", "Molecular Structures in Infection and Immunity", "Assembly of Macromolecular Complexes and Machineries", "Intrinsically Disordered Proteins/LLPS/Condensates", "Protein Folding/Misfolding and Dynamics", and "Protein Design". Additionally, there were contributions from two important institutions, Japan Biophysical Society and National Synchrotron Radiation Research Center. These themes encompassed

	significant areas of biophysics, providing participants with a platform for interdisciplinary and international exchange and learning. Overall, the lectures and discussions at this seminar brought many innovative insights and inspirations, including cutting-edge research findings, pioneering technological applications, and future trends in life sciences. Moreover, over 100 participants from various countries actively engaged in oral presentations and poster sessions, effectively promoting academic exchange and discussion among students from major universities both domestically and internationally. This is expected to inspire different research approaches, enhance the visibility of Taiwanese higher education research on the international stage, and create more opportunities for collaboration with other countries worldwide.
研討(習)會目的	2024 年度臺灣生物物理學會與國際蛋白質工程中心聯合研討會於 2024 年 5 月 22-25 日，於新竹國家同步輻射研究中心舉辦，由國立臺灣大學醫學院生物化學暨分子生物學研究所擔任主辦，並由中央研究院生物化學研究所以及國家同步輻射研究中心協助辦理。 本研討會為臺灣最大規模之生物物理研討會，以討論前端生物物理技術和相關研究為主軸，過去三年分別於國立宜蘭大學、國立成功大學以及花蓮慈濟大學舉辦。本次會議總計四天，至少包含七大主題和一個國際交流環節；討論主題涵蓋結構生物學、人工智慧和深度學習於結構生物學之應用、感染以及免疫相關之分子結構、巨分子複合體之組裝和其機轉、無穩定構型蛋白質與液相分離及凝聚體、蛋白質摺疊動力學、蛋白質設計等，將有超過 25 個專題演講，預計將有超過二分之一之國際講員，和超過十個國家之學者與會。國際交流環節則將由中華民國生物物理學會與日本生物物理學會進行平行會議，以促進國際研究資訊之流通，並提升本國研究之國際能見度。本研討會歷年參與人數皆超過 300 人，並有超過 100 幅的壁報論文，本會亦將同時舉辦全國生物物理學會之學生壁報展示及競賽，以鼓勵年輕學者參與。此外，本會也將邀集全國之相關領域之學者和生技廠商一同共襄盛舉，參與廠商預計將超過 10 家以上。
參加對象(含人數)	本研討會為國內難得之國際研討會，會議將以演講為主，與會人員素質高，皆為全國相關領域之頂尖學者及學生，講員除考慮地域性、國際性及各年齡層代表性外，均為國內外具有傑出研究以及高度聲望之學者。此外，本會亦廣邀國內新進研究人員參與，以增加更為多元之討論視野。本研討會所探討之相關主題皆為生命科學研究上之關鍵議題，為提升學術與產業間之交流以推進研究之發展，本會亦鼓勵由生技產業界所提供之特別演講，介紹產品及儀器新知，俾利促進產學界間之互動。綜上考量，本年度預期將有超過 300 位以上的人員一同共襄盛舉。
預期效益達成狀況	本年度之研討會順利邀請到 21 位國內以及 24 位來自美國、日本、加拿大、法國、義大利、南韓、澳洲、新加坡、西班牙、瑞士、奧地利、芬蘭、以色列、巴西以及烏拉圭等十多國之專家學者，與會人員超過 350 人，參展廠商共計 12 家，壁報競賽參與人數超過 120 人，並且亦有來自國外之學生參與，有效促進國際交流，而為期四天的會議中亦順利完成 7 大主題的專題演講以及台日生物物理學會的交流活動，效益超越原先之預期。

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三、議程

日期	議程時間	議程講員	議題主題
5/22	13:20-14:20	Wen-Guey Wu	From Neglected Venom Proteins to Neglected Tropical Disease
	14:20-15:10	David Baker	Design of New Protein Functions Using Deep Learning
	15:10-15:30	Yu-Feng Tseng	Comparative Studies of AlphaFold, RoseTTAFold and Modeller: A Case Study Involving the Use of G-protein-Coupled Receptors
	15:30-15:50	Roberto Chica	Computational Remodeling of an Enzyme Conformational Landscape for Altered Substrate Selectivity
	16:10-16:45	Jose Rizo-Rey	How Neurotransmitter Release is Triggered in Microseconds
	16:45-17:05	Ichio Shimada	Function-Related Dynamics of Proteins by NMR
	17:05-17:25	Kuang-Lei Tsai	Structure and Activation Mechanism of Eukaryotic Transcriptional Kinases
5/23	09:00-09:35	Daisuke Nakane	Bacterial Motility under Realistic Environmental Conditions: A Zoo-like Approach
	09:35-09:55	Yu-Ling Shih	Exploration from Molecular Mechanisms to Unveiling New Functions of Min Oscillations
	09:55-10:15	Yukinori Nishigami	Behaviors and Locomotion of Single-Celled Eukaryotic Microorganisms
	10:35-11:10	Keng-Hui Lin	Mechanical Waves Identify the Amputation Position During Wound Healing in the Amputated Zebrafish Tailfin
	11:10-11:30	Keita Kamino	Adaptive Tuning of Cell Sensory Diversity in Bacterial Populations
	11:30-11:50	Chien-Jung Lo	Aliivibrio fischeri in Motion
	13:10-13:45	Bostjan Kobe	TIR Domains: Protein Interaction Scaffolds, Enzymes and More?
	13:45-14:05	Meng-Chiao Ho	Cryo-EM and Cryo-ET in Visualizing Host Interaction and Genome Ejection Mechanism of Mycobateriophage
	14:05-14:25	Chun-Jung Chen	Structures of Honeybee-Infecting Virus Reveal Domain Functions and Capsid Assembly with Dynamic Motions
	14:45-15:20	Mikihiro Shibata	Visualizing Single-Molecule Dynamics of DNA Binding Proteins by High-Speed Atomic Force Microscopy
	15:20-15:40	Chyuan-Chuan Wu	Structural Insight into mtDNA Degradation Complex
	15:40-16:00	Hung-Wen Li	Exploring Protein Binding Dynamics on Single-Stranded DNA

	16:20-16:55	Jianxing Song	ATP: The Primordial Molecule that Controls Protein Homeostasis and Shapes Genome-Proteome Interface
	16:55-17:15	Kuo-Chiang Hisa	Microtubule-Based Condensate Transport Contributes to Centrosome Clustering in Cancer Cells
	17:15-17:35	Jean-Cheng Kuo	Phase Separation-Mediated Clustering Governs Non-muscle Myosin IIA-Driven Cell Migration
5/24	09:00-09:25	Human Rezaei	Dynamic of Prion Assemblies and the Consequences of the Coexistence of Multiple Prion Conformations
	09:25-09:50	Adele Di Matteo	Towards Unveiling the Aggregation Properties of FMRP
	09:50-10:15	Joseph Jen-Tse Huang	From Protein Misfolding to Therapeutic Strategy Against Amyotrophic Lateral Sclerosis
	10:35-11:10	Chung-I Chang	Activation Mechanism of the Lon AAA+ Proteolytic Machine
	11:10-11:30	Yi-Sheng Cheng	The Interaction Mechanism of WRKY63, HDA15, and FLC W-box in Regulating Flowering Time
	11:30-11:50	Hsin-Yang Chang	Structural and Functional Analyses of Novel Acyltransferase and Oxidoreductase in the Biosynthesis of Amino-polyketide Antibiotics
	14:40-15:40	Lee-Jene Lai	Interdisciplinary Research in Life Science at NSRRC
		Yao-Chang Lee	Medical Application by using Wax Physisorption Kinetics and FTIR Imaging
		Frodo Chao	X-Ray Protein Crystallography Core Facility at Taiwan Photon Source
		Ming-Tao Lee	What can Synchrotron Do on Lipid Nanoparticles (LNPs) Based Drug and Gene Delivery?
		U-Ser Jeng	Bio-SWAXS at TPS and SAS2024
5/25	09:00-09:30	Andreas Plückthun	A Sequence-Specific Modular Recognition System for Linear Epitopes
	09:30-09:55	Hak-Sung Kim	Design of a Protein Assembly with New Functionality
	09:55-10:20	Lari Lehtiö	Oligomerization Driven ADP-ribosylation Dependent Functions of DTX3L E3 Ubiquitin Ligase in Signaling
	11:05-11:30	Frans Mulder	Protein Electrostatics from NMR Spectroscopy Measurements
	11:30-11:55	Gideon Schreiber	SARS-CoV-2 Evolution is Driven by Parallel Forces Driving the Sequence of the Spike - ACE2 Protein-Protein Interaction
	11:55-12:20	Kuen-Phon Wu	Engineering Ubiquitin to Effectively Regulate Targeting Enzymes
	14:00-14:25	Jean-François Couture	Decoding the Histone H3.1 Variant and its Role in Epigenetic Signalling
	14:25-14:50	Aitziber Lopez	Engineered Hybrid Protein-Based Tools and

		Cortajarena	Biomaterials: New Tools for Biomedicine and Technology
	14:50-15:15	Richard Garratt	The Structural Rules Behind Septin Filament and Bundle Assembly
	16:00-16:25	Alejandro Buschiazzo	Bacterial Signaling and Motility: Fertile Ground for Protein Engineering
	16:25-16:50	Alberto Marina	A Complex Network of Antagonistic Interactions Between Phage and Host Factors Controls Arbitrium Lysis-Lysogeny Decision
	16:50-17:15	Martin Schmeing	Biosynthesis and Attempted Bioengineering of the Most Common and Interesting Natural Product You've Never Heard of

四、活動照片和影片

- 照片(至少 10 張，請填寫照片說明)

圖一、中華民國生物物理學會理事長詹迺立教授進行研討會開場

圖二、演講期間之與會人員一景

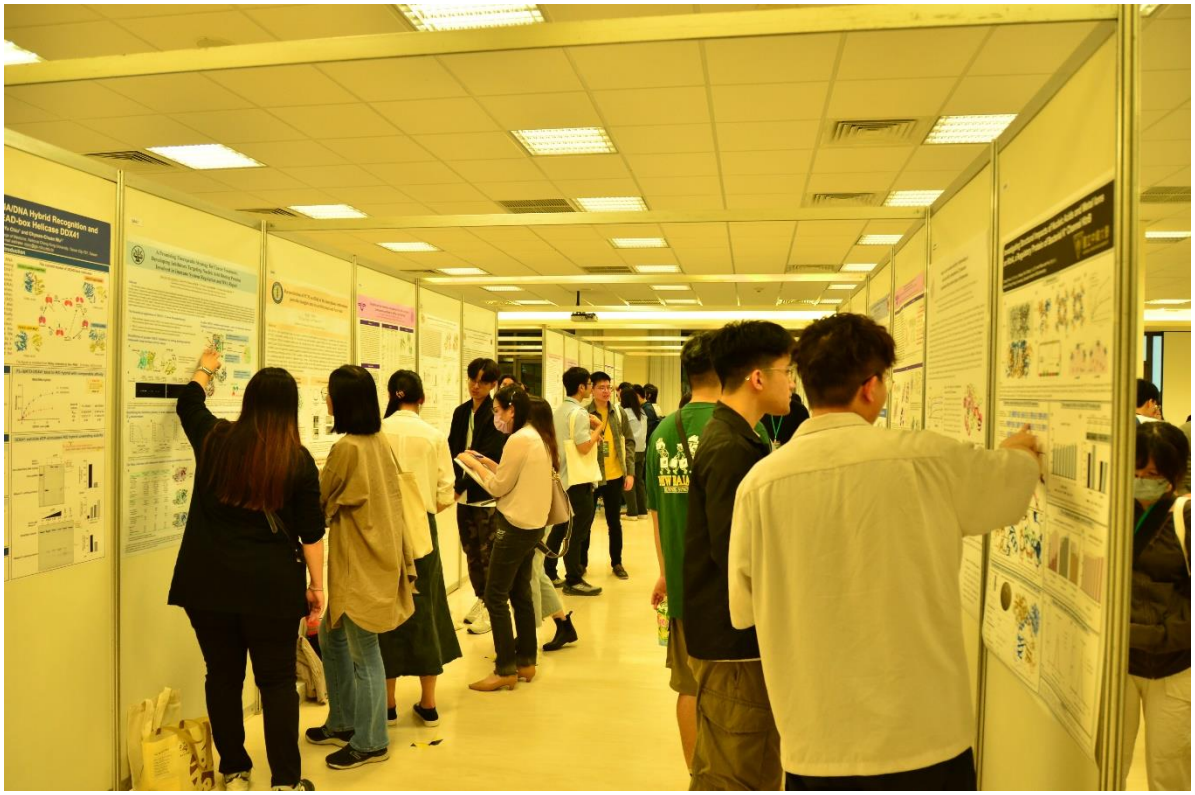
圖三、中央研究院化學研究所吳台偉所長為吳陳映雪博士紀念講座進行開場

圖四、本次研討會之 Distinguished Lecturer — 美國華盛頓大學蛋白質設計研究所所長 Dr. David Baker 利用預錄影片進行演說

圖五、台日生物物理學會交流 — 日本電氣通信大學中根大介教授進行專題演講

圖六、國家同步輻射研究中心陳俊榮博士進行專題演講

圖七、瑞士蘇黎世大學 Dr. Andreas Plückthun 進行專題演講



圖八、壁報評審以及學生在壁報展示期間進行討論

圖九、A 組壁報競賽優勝者與詹迺立理事長合影

圖十、B 組壁報競賽優勝者與詹迺立理事長合影

圖十一、C 組壁報競賽優勝者與詹迺立理事長合影

圖十二、本次研討會之大合影