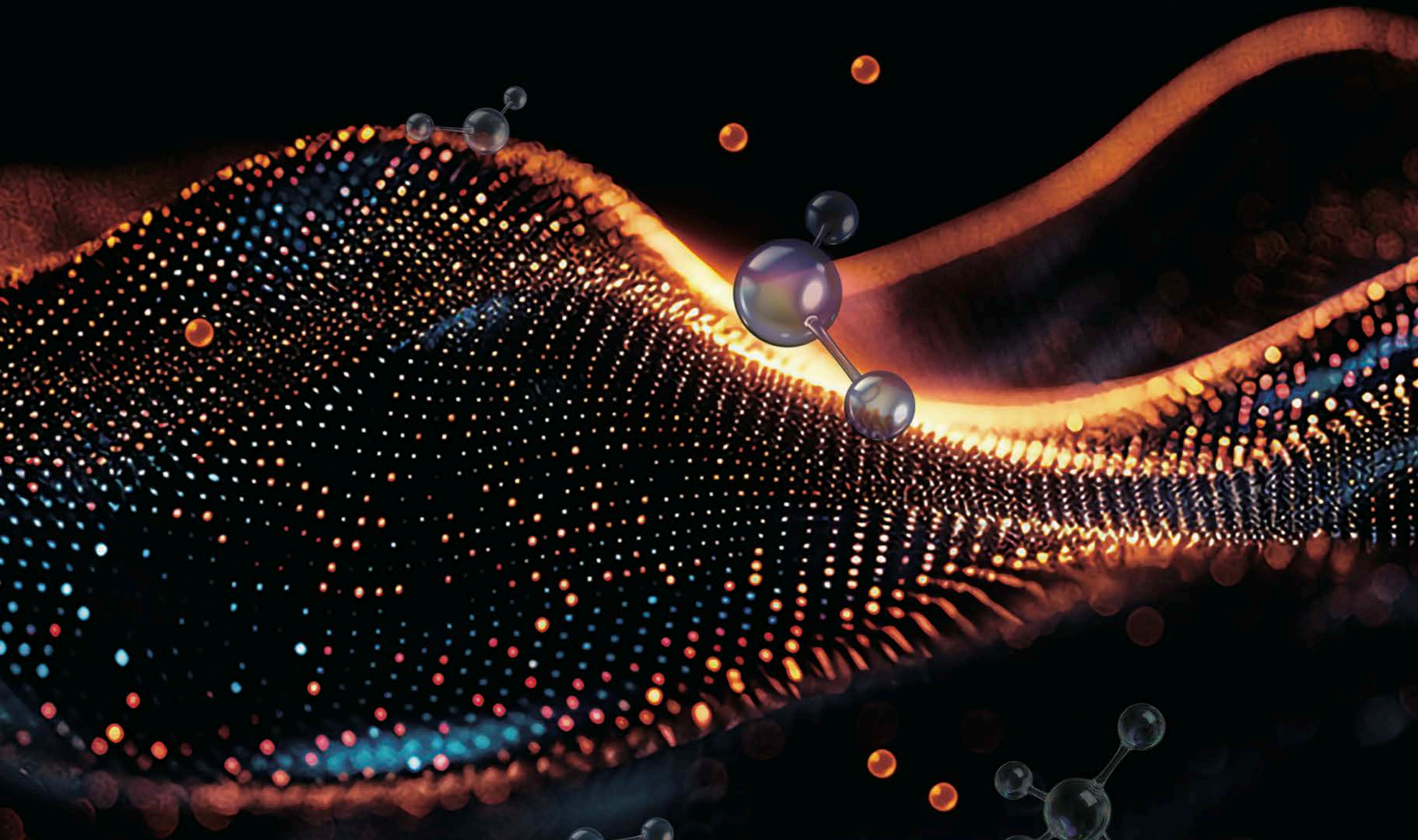
Institute of Atomic & Molecular Sciences

Academia Sinica

30th Anniversary Issue: 13-Year Establishment Phase + 30th Anniversary



The Wisdom and Courage to Bridge Generations

A Journey of Exploration in Atomic and Molecular Sciences

13+ 30 Anniversary Special Issue

Institute of Atomic & Molecular Sciences

Academia Sinica

30th Anniversary Issue: 13-Year Establishment Phase + 30th Anniversary

Contents

Message from the Director

Director
2025.9

Since the establishment of the Preparatory Office of the Institute of Atomic and Molecular Sciences (IAMS) in 1982 and its formal founding in 1995, we have steadfastly upheld Academia Sinica's philosophy of “fundamental science as the driving force”. We have dedicated ourselves to becoming a world-class research institution, focusing on frontier research in atomic, molecular, and optical sciences, while progressively expanding into fields such as physical chemistry, biophysics, nanomaterials, and quantum technology. By building a research community that fosters both innovation and interdisciplinary collaboration, we have achieved numerous significant research breakthroughs and nurtured many distinguished scholars, while attracting outstanding talent from home and abroad. This journey has relied not only on precise experimentation and rigorous research frameworks, but also on the courage and perseverance of our researchers in their unwavering commitment to the pursuit of scientific truth and empirical rigor.

Reflecting on the Institute's development over the past thirty years, we see more than a journey of scientific research; we see the fruition of dreams built, realized, and passed down by a group of dedicated visionaries. The achievements we witness today are the culmination of continuous hard work by countless researchers, administrative and technical staff, and our collaborative partners. At this momentous milestone, I extend my heartfelt gratitude to all colleagues for their contributions and dedication.

As the global landscape changes rapidly and scientific issues become increasingly complex, IAMS continues to identify and solve critical questions in fundamental research through interdisciplinary collaboration. In parallel, we have actively cultivated research talent equipped with both scientific capability and social responsibility, while strengthening partnerships with international academic institutions to enhance our global visibility.

IAMS will continue to advance while shouldering the mission and responsibility of pursuing "world-class, original research”, deepening the connections between fundamental science and society, education, and industry. With fundamental and applied sciences as our engine, we will accelerate knowledge innovation in Taiwan and globally. With thirty years of solid foundation, let us work together to reach the top of the world stage!

Ching-Ming Wei

Congratulatory Messages

Vice President, Academia Sinica
2025.9

The Preparatory Office of the Institute of Atomic and Molecular Sciences (IAMS) at Academia Sinica was established in 1982, and the Institute was formally inaugurated in 1995. On this occasion of its 30th anniversary, I extend my most sincere congratulations.

IAMS is a multifaceted center for fundamental research, bringing together scholars from diverse backgrounds in physics, chemistry, and engineering. This interdisciplinary composition has fostered a highly interactive research environment, giving IAMS a distinctive profile within Academia Sinica. By leveraging state-of-the-art instrumentation and cross-disciplinary methodologies, the research staff consistently pursues excellence and innovation. The Institute remains firmly committed to advancing research in Advanced Materials and Surface Science, Atomic Physics and Optical Science, Biophysics and Bioanalytical Technology, and Chemical Dynamics and Spectroscopy. Over the past three decades, its research teams have addressed critical scientific challenges while nurturing generations of outstanding talent. Through prolific scholarly achievements, IAMS has established a strong international presence and contributed significantly to the advancement of next-generation science. These accomplishments reflect not only the professionalism and dedication of IAMS colleagues but also Academia Sinica's enduring mission to lead at the frontiers of knowledge.

Looking ahead, amid rapidly evolving technological trends and global challenges, I sincerely hope that IAMS will continue to cultivate its innovative spirit, advance fundamental research in synergy with applied research, and play a leading role in addressing critical scientific issues. I am confident that, through the collective efforts of all colleagues, IAMS will reach new heights, infusing new momentum into the expansion of human knowledge and the sustainable development of society.

Mei-Yin Chou

Congratulatory Messages

Advisory Committee Member
2025.9

Time flies. This year marks the 30th anniversary of the Institute of Atomic and Molecular Sciences (IAMS) at Academia Sinica. Over the past three decades, through the collective dedication of six directors and their colleagues, IAMS has risen swiftly from a fledgling research unit to an internationally recognized center for fundamental scientific research—an achievement worthy of both pride and celebration.

The vision to establish IAMS was first proposed by three pioneers: Dr. Yuan Tseh Lee, Dr. Robert Ta-Pang Poe, and Dr. Chau-Ting Chang. After deliberation at the 1982 Academia Sinica Convocation, the proposal was unanimously approved. A Preparatory Office was subsequently established on the campus of National Taiwan University, with Dr. Chau-Ting Chang serving as its Director and Dr. Yuan T. Lee as Chairman of the Academic Advisory Committee.

The Advisory Committee comprised Dr. Sheng-Hsien Lin, Dr. Tung-Bin Lo, Dr. Edward Yen, Dr. Tu-Nan Chang, Dr. Ming-Chang Lin, and Dr. Ying-Nan Chiu. I was also honored to be invited to join this committee, thus beginning a long and enduring association with IAMS.

After Dr. Yuan T. Lee assumed the presidency of Academia Sinica, he entrusted me with the chairmanship of the IAMS Academic Advisory Committee. Working closely with the Institute's first Director, Dr. Sheng-Hsien Lin, I witnessed firsthand the formal establishment of IAMS and its early organizational planning. Although I stepped down from the chairmanship more than a decade later, I continued to serve on the Committee. Over more than forty years of observing IAMS's development and participating in the selection of several directors, I have gained a deep appreciation of the Institute and its researchers. It has been my great personal privilege to forge lasting friendships with many senior Research Fellows.

During the early days of the Preparatory Office, the construction process encountered numerous challenges. Nevertheless, through the tireless efforts of Dr. Yuan T. Lee, issues related to resource allocation and talent recruitment were successfully resolved. By the time IAMS was formally established in 1995, it had already taken on a clear and solid form, largely realizing the original vision of a diversified and comprehensive institute dedicated to fundamental scientific research.

Since its founding, IAMS has consistently produced outstanding research and earned widespread international recognition. Dr. Yuan T. Lee's decision to relocate his molecular beam laboratory from UC Berkeley to IAMS catalyzed the Institute's rapid ascent in chemical reaction dynamics, firmly establishing it as a world leader in the field. This momentum was further strengthened by the exceptional contributions of Dr. Kopin Liu. Equally noteworthy are achievements in other research areas. Dr. Huan-Cheng Chang's discovery of nitrogen-doped diamond nanoparticles has had far-reaching impacts on atomic physics, condensed matter physics, and quantum detectors. Dr. Yuh-Lin Wang successfully applied surface-enhanced Raman scattering (SERS) techniques to medical diagnostics, while Dr. Jyhpyng Wang developed the most powerful pulsed laser in Taiwan. In addition, Dr. Kuei-Hsien Chen's distinctive contributions to energy materials research, the advances by Dr. Ta-Chau Chang and Dr. Chia-Lung Hsieh in biomolecular and cellular detection technologies, and the excellence of Dr. Sheng-Hsien Lin, Dr. Mei-Yin Chou, and Dr. Ching-Ming Wei in theoretical calculations have all added great luster to IAMS.

As faculty members have changed over time, the Institute's research directions have naturally diversified. While today's strategic planning differs markedly from that of the early years, IAMS has remained firmly anchored at the forefront of international science. The Institute is now composed largely of outstanding young and mid-career researchers, full of energy and creativity. With thoughtful planning and continued support, they will undoubtedly make their mark on the global stage and usher in a new era of accomplishment for IAMS.

On the momentous occasion of the 30th anniversary of the Institute of Atomic and Molecular Sciences, I extend my heartfelt congratulations and best wishes. May IAMS continue to build upon its remarkable legacy, achieve ever-greater heights, and flourish for generations to come.

With my sincere congratulations,

Y. Ron Shen

IAMS Vision and Mission

As stated in the original proposal: "Recommendation for the Establishment of the Institute of Atomic and Molecular Sciences (IAMS)", IAMS has, since the inception of its Preparatory Office in 1982, carried a vision collectively advocated by the Academicians of Academia Sinica in Taiwan and scientists across related fields: to elevate the quality of scientific and technological research in Taiwan, and to shoulder the mission of leading the nation's research standards.

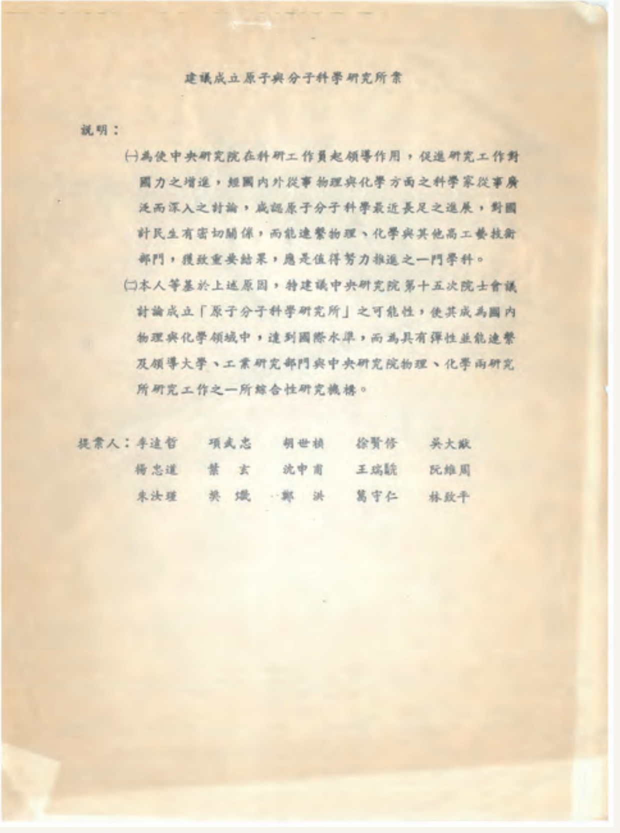
As of 2025, Taiwan had secured its position as home to the world's most competitive semiconductor industry. At this pivotal juncture, IAMS has reevaluated its research trajectory; by rooting itself in fundamental science and honoring its legacy, the Institute is proactively rising to meet the challenges of the future while pioneering new frontiers.

Vision

Driven by curiosity and guided by a rigorous commitment to scientific truth, we employ innovative theoretical and experimental approaches to explore physical, chemical, and biological phenomena at the atomic and molecular scales, thereby advancing the frontiers of fundamental science.

Mission

- Develop and integrate advanced spectroscopic technologies to elucidate the fundamental principles governing matter and energy;
- Foster interdisciplinary collaboration across the physical sciences, chemistry, and life sciences;
- Empower the next generation of scientific talent and inspire them to leverage science for the benefit of society;
- Serve as a premier hub for world-class research and academic exchange, both within Taiwan and in the international community.



建議成立原子與分子科學研究所案

說明：

㈠為使中央研究院在科研工作負起領導作用，促進研究工作對國力之增進，經國內外從事物理與化學方面之科學家從事廣泛而深入之討論，咸認原子分子科學最近長足之進展，對國計民生有密切關係，而能連繫物理、化學與其他高工藝技術部門，獲致重要結果，應是值得努力推進之一門學科。

㈡本人等基於上述原因，特建議中央研究院第十五次院士會議討論成立「原子分子科學研究所」之可能性，使其成為國內物理與化學領域中，達到國際水準，而為具有彈性並能連繫及領導大學、工業研究部門與中央研究院物理、化學兩研究所研究工作之一所綜合性研究機構。

提案人：李遠哲　項武忠　胡世楨　徐賢修　吳大猷
楊忠道　葉　玄　沈申甫　王瑞駪　阮維周
朱汝瑾　樊　畿　鄭　洪　葛守仁　林致平

"Recommendation for the Establishment of the Institute of Atomic and Molecular Sciences" submitted by 15 Academicians of Academia Sinica.

The History of IAMS: Three Decades of Excellence

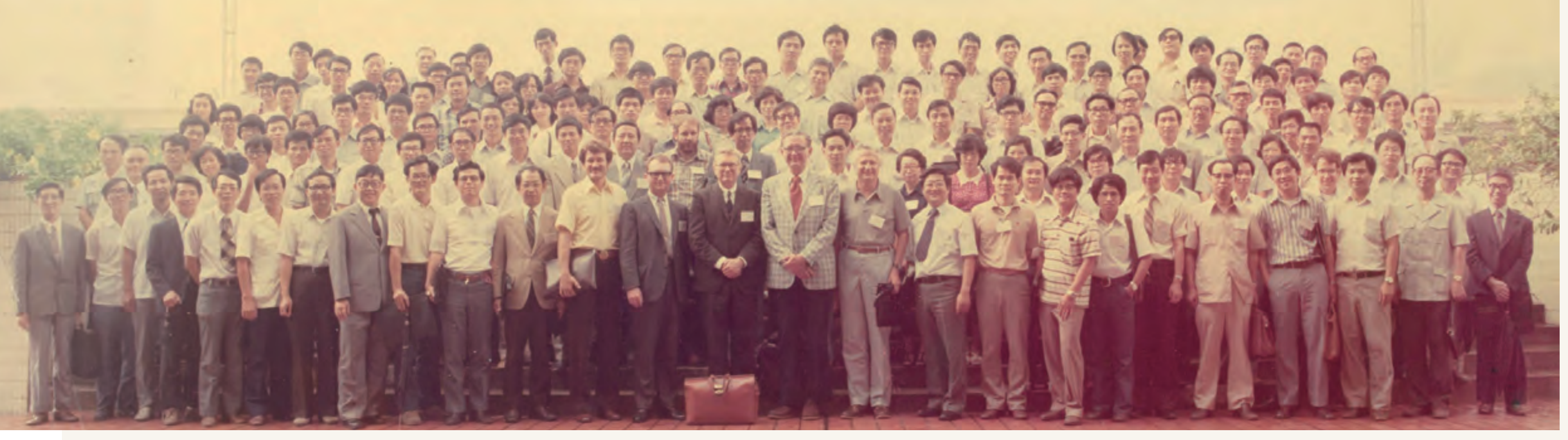
Before 1980

The Driving Force Behind the Establishment of IAMS

In the 1970s, laser technology and synchrotron radiation research developed rapidly, making atomic and molecular sciences an emerging field of study. Unlike traditional physics or chemistry, this new field utilized innovative research methods and technologies to explore the mechanisms of physical chemistry and chemical physics related to atoms and molecules.

In 1978, Dr. Yuan Tseh Lee (Yuan T. Lee), professor of chemistry at the University of California, Berkeley, met Dr. Robert T. Poe, a professor at the University of California, Riverside. The two, both with roots in Taiwan, had a great conversation and shared a common vision for the development of scientific research in Taiwan, hoping to contribute to its progress. To help Yuan T. Lee fulfill his wish to return to Taiwan and promote scientific advancement, Prof. Poe actively organized resources and connections to plan the first Taiwan International Science Symposium on Atomic and Molecular Sciences in 1979. Experts and scholars around the world who attended the symposium reached an initial consensus: Taiwan should establish a research institute specializing in atomic and molecular sciences and build a large-scale research facility, i.e., a synchrotron radiation accelerator, to enhance the country's scientific research capabilities.

Around the same time, Dr. Shih-Liang Chien, then President of Academia Sinica, visited the United States to discuss ways to bolster scientific research in Taiwan with several renowned scientists. These scholars unanimously agreed that Academia Sinica should establish new research institutes in emerging fields, one of which was the Institute of Atomic and Molecular Sciences (IAMS). They further recommended that Yuan T. Lee, the youngest among them and already a distinguished figure in the U.S. academic community, lead this initiative to build a world-class research institute for atomic and molecular sciences in Taiwan.



■ Group photo of attendees at the first Symposium on Atomic and Molecular Sciences in Taiwan, August 23, 1979. The symposium was organized by Prof. Robert T. Poe, with Prof. Yuan T. Lee returning to Taiwan to participate.

With the shared expectations of internationally renowned scientists and the joint efforts of Yuan T. Lee and Robert T. Poe, the establishment of the Institute of Atomic and Molecular Sciences at Academia Sinica was set into motion.

Source: Nobel Foundation (left); *Science Monthly*, Vol. 26, No. 4 (right).

■ The key figures behind the establishment of IAMS: Dr. Yuan T. Lee (left) and Dr. Robert T. Poe (right).

■ In early 2025, several junior PIs from IAMS interviewed Prof. Yuan T. Lee to document the founding history of the Institute.

1982

Establishment of the IAMS Preparatory Office

In 1982, Professor Yuan T. Lee, who had already been elected as a member of both the U.S. National Academy of Sciences and Academia Sinica in Taiwan, along with several other academicians, formally proposed to Academia Sinica the establishment of the Institute of Atomic and Molecular Sciences (IAMS). The Council of Academia Sinica approved the proposal, and following authorization from the Presidential Office of Taiwan, the IAMS Preparatory Office was officially established. Academia Sinica then appointed a group of distinguished experts and scholars from both Taiwan and abroad to form the IAMS Academic Advisory Committee, consisting of Professors Ta-You Wu, Yuan T. Lee, Robert T. Poe, Chau-Ting Chang, Tu-Nan Chang, Kwong-Tin Tang, and Edward Yen, with Yuan T. Lee serving as the Chairman.

The establishment of a new research institute within Academia Sinica necessitates rigorous professional evaluation and long-term planning. Consequently, the formation of the IAMS Preparatory Office represented a significant milestone in the journey toward the Institute's official founding.

In December 1982, the Academic Advisory Committee appointed Professor Chau-Ting Chang, a highly respected and trusted scientist based in Taiwan, as the Director of the IAMS Preparatory Office. Under his leadership, the establishment of the Institute progressed smoothly.

中華民國七十三年十二月二十日 星期四 民生報 農曆甲子

民生報

MIN SHENG PAD

院士告訴院士：構想將成事實

原子分子研究所，是中研院籌設中的一個所，卻設在台大，是有其特殊含意。

這個所，是前幾天去世的浦大邦教授，因為在台灣辦了一個原子分子研討會，引起了許多與會院士的注意，並發現很多回國的研究人員由於沒有良好的研究環境，而使研究工作逐漸荒廢，為了使這些研究人才有一個研究園地，因此而決定建議設所，它可說是近年來中研院院士參與院務建設的一個例子。

昨天中研院院士看到這個他們一手促成的研究所的工地及模型，都相當高興，李遠哲院士（右一）是發起人之一，陪同籌備處主任張昭鼎（右二）向李政道院士（右三）及黃周汝吉院士說明這一段故事。

（本報記者楊海光攝）

■ In 1984, construction of the IAMS Research Building commenced on the National Taiwan University campus. That year, media reports featured the headline: "Academicians Tell Academicians: The Vision Becomes Reality". Pictured from right to left: Drs. Yuan T. Lee, Chau-Ting Chang, and Tsung-Dao Lee.

1984

Construction of the IAMS Research Building

The site selection for the IAMS research building was the result of extensive deliberation. Two key figures, Yuan T. Lee and Robert T. Poe, provided the vision for this direction, believing that research resources should be closely integrated with the university environment to foster academic exchange and cultivate the next generation of scientific talent. They further emphasized the necessity of a good living environment to support the work of researchers. Consequently, it was decided to establish the IAMS research building on the National Taiwan University (NTU) campus.

Realizing this plan required the full support of NTU. To that end, Yuan T. Lee met personally with NTU President Chao-Chung Yu to discuss the project's long-term benefits for the university. Following these discussions, President Yu and the NTU Campus Planning Committee approved the proposal, formally rooting IAMS within the NTU campus.

In 1984, construction of the IAMS research building officially commenced. To attract preeminent scientific talent, efforts were also made to develop dedicated on-campus housing for IAMS researchers. This infrastructure provided essential convenience and support, particularly for those conducting the long-term, intensive experiments that would define the Institute's success.

◎ The Passing and Commemoration of Dr. Robert T. Poe

In December 1984, while visiting Taiwan to attend a conference, Dr. Robert T. Poe tragically passed away following a heart attack. As a central figure in the establishment of IAMS, his loss was deeply felt. To honor his profound contributions to the Institute's founding, Director Chau-Ting Chang moved to name the main auditorium the "Dr. Poe Lecture Hall," ensuring that his legacy remains a permanent part of the IAMS community.

■ The Dr. Poe Lecture Hall and the IAMS building exterior, 2025.

■ Relief sculpture of Dr. Robert T. Poe (1935~1984) at the Dr. Poe Lecture Hall

1986

Inauguration of the IAMS Research Building

In 1986, the official inauguration of the IAMS research building marked a transformative phase for the Institute. This milestone established a solid foundation that has enabled IAMS to uphold academic freedom and excellence throughout its decades of growth. In 1991, the facility was further expanded to include a dedicated laser center, with a new wing consisting of one basement level and five above-ground floors. The expansion was completed in July 1994, providing the Institute with significantly increased laboratory space.

■ Completion of the IAMS Building, 1986.

■ IAMS Courtyard: the original Japanese-style garden.

■ The main entrance of IAMS, 2025

IAMS Courtyard: Originally designed as a serene Japanese-style garden, the IAMS Courtyard has evolved over the years into a vibrant open space. Now featuring a grapevine-covered pergola, it offers a welcoming setting for relaxation and the spontaneous academic exchange vital to our scientific community.

■ IAMS Courtyard, 2025

■ The buildings of IAMS in 2025.

1993

The Legacy of Dr. Chau-Ting Chang and the Evolution of IAMS

Dr. Chau-Ting Chang was a brilliant, dedicated, and selfless scientist, who earned the deep trust and respect of his colleagues. As the Director of the IAMS Preparatory Office, he was instrumental in the establishment of the Institute, laying the groundwork for its future success.

In 1993, Dr. Chang tragically passed away at the age of 59. Dr. Yuan T. Lee described his passing as a profound loss to the scientific community. He emphasized, however, that the ideals Dr. Chang championed would continue to guide IAMS. Following his passing, Dr. Sheng-Hsien Lin assumed the Directorship of the Preparatory Office, ensuring the continuity of Dr. Chang's vision and the ongoing development of IAMS.

A tribute to Dr. Chau-Ting Chang: a foundational figure in IAMS history. (Images reproduced from *The Life of Professor Chang, Chau-Ting* and the Chang Chau-Ting Memorial Foundation website.)

In 2005, the IAMS building underwent renovations, which included the establishment of a new lecture hall to honor Dr. Chau-Ting Chang's foundational contributions. Formally named the Chang Chau-Ting Memorial Hall, it stands as a tribute to his vital role in the Institute's history.

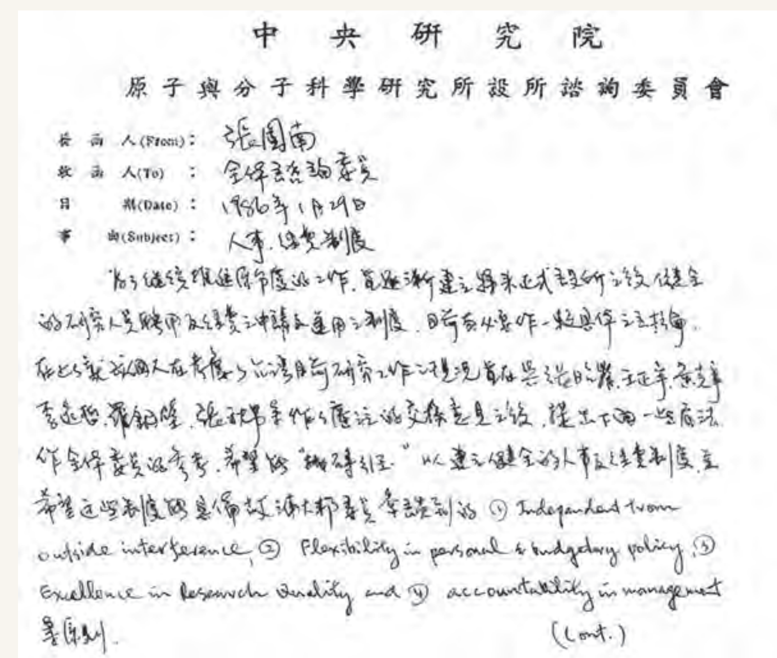
The Chang Chau-Ting Memorial Hall and the commemorative statue of Dr. Chang, Chau-Ting.

Core Values of IAMS

During his lifetime, Dr. Robert T. Poe established the fundamental principles that remain the cornerstone of the Institute's academic identity. These core values continue to guide our mission:

- **Independence from external interference**
- **Flexibility in personnel and budgetary policies**
- **Excellence in research quality**
- **Accountability in management**

By adhering to these principles, IAMS remains committed in its pursuit of becoming a world-class academic institution while safeguarding its essential autonomy.



中央研究院
原子與分子科學研究所設所諮詢委員會

發函人(From)：張圖南
收函人(To)：全體諮詢委員
日期(Date)：1986年1月29日
事由(Subject)：人事、經費制度

... ① Independent from outside interference, ② Flexibility in personal & budgetary policy, ③ Excellence in research quality and ④ accountability in management ...

(Cont.)

A 1986 manuscript provided by Prof. Tu-Nan Chang, documenting the institutional principles championed by Dr. Robert T. Poe.

1995

The Establishment of IAMS

After years of preparation and development, IAMS was officially approved by the Office of the President of Taiwan as a formal research institute under Academia Sinica in April 1995 and began fully dedicating itself to academic research.

Third row, from left:

Shen-Maw Lin, Keh-Ning Huang, John F. Ogilvie, Wunshain Fann, Ker-Jar Song, Chau-Chung Han

Second row, from left:

Andy Kung, Huei Tarng Liou, Jiing-Chyuan Lin, Dah-Yen Yang, Ta-Chau Chang, Tung J. Chuang, Jyhpyng Wang, Yuh-Lin Wang, Yit-Tsong Chen, Wen-Bih Tzeng, Kuei-Hsien Chen, Shang-Bin Liu

First row, from left:

Edward Yen, San-Yang Chu, Chu-Nan Chang, Ming-Chang Lin, Ying-Nan Chiu, Yuan T. Lee, Sheng-Hsien Lin, Y. Ron Shen, Kwong-Tin Tang , Tu-Nan Chang

■ Group photo of IAMS research faculty and academic advisory committee members taken in 1995, the year IAMS officially became a research institute at Academia Sinica.

Anniversary Celebrations

2005

10th Anniversary Celebration

■ Group photo of Prof. Chau-Ting Chang's family and former Directors at the inauguration of the Chau-Ting Chang Memorial Lecture Hall during the IAMS 10th Anniversary Celebration, 2005.

2015

20th Anniversary Celebration

■ Group photo of researcher follows and distinguished guests at the IAMS 20th Anniversary Celebration, 2015.

■ **Group photo of former directors and deputy directors, academic advisory committee members, and distinguished guests at the IAMS 30th Anniversary Celebration, 2025.**

Back row, from left:
Chi-Kung Ni, Jim Jr-Min Lin, Kuei-Hsien Chen, Ching-Ming Wei, Mei-Yin Chou, Kopin Liu, Yuh-Lin Wang, Jer-Lai Kuo, Chia-Lung Hsieh

Front row, from left:
C. Lebrilla, I. Cirac, G. Schatz, S. Louie, Y. Ron Shen, Yuan T. Lee, Yu Wang, Hai-Lung Dai, R. Austin, D. Chandler, H. Akimoto

2025 30th Anniversary Celebration

Forth row, from left:
Ya-Ping Hsieh, Yen-Chang Lin, Wei-Hua Wang, Cheng-Tien Chiang, Yang-Hao Chan, Liang-Yan Hsu, Hsiang-Hua Jen, Chun-Chia Chen, Shayne Bennetts

Third row, from left:
Jessie Yunn-Shin Shiue, Pei-Ling Luo, Ying-Cheng Chen, Juen-Kai Wang, Szu-yuan Chen, Ming-Shien Chang, Ching-Wei Lin, Tsyr-Yan Yu, Charles Pin-Kuang Lai, Yu-Ju Lin

Second row, from left:
Chi-Kung Ni, Jim Jr-Min Lin, Kuei-Hsien Chen, Ching-Ming Wei, Mei-Yin Chou, Kopin Liu, Yuh-Lin Wang, Jer-Lai Kuo, Chia-Lung Hsieh, Huan-Cheng Chang

First row, from left:
C. Lebrilla, I. Cirac, G. Schatz, S. Louie, Y. Ron Shen, Yuan T. Lee, Yu Wang, Hai-Lung Dai, R. Austin, D. Chandler, H. Akimoto

■ **Group photo of IAMS research faculty, academic advisory committee members, and distinguished guests at the IAMS 30th Anniversary Celebration, 2025.**

Directors: Past and Present

1995

Dr. Sheng-Hsien Lin, who had been serving as the Director of the Preparatory Office, was appointed as the inaugural Director of IAMS. He was reappointed for a second term in 1998.

Dr. Sheng-Hsien Lin (right), the first Director of IAMS, receiving the official seal from President of Academia Sinica Dr. Yuan T. Lee (left) in 1995.

2004

Dr. Yuh-Lin Wang assuming office as the 4th and 5th Director.

IAMS Director Transition Ceremony in 2004. From left: Drs. Yuh-Lin Wang, Ts'ui-jung Liu (Vice President of Academia Sinica), and Kopin Liu.

2011

Dr. Mei-Yin Chou was appointed as the 6th and 7th Director.

IAMS Director Transition Ceremony in 2011. From left: Drs. Yuh-Lin Wang, Chi-Huey Wong (President of Academia Sinica), and Mei-Yin Chou.

2023

Dr. Ching-Ming Wei was appointed as the the 10th Director.

IAMS Director Transition Ceremony in 2023: From left: Drs. Kuei-Hsien Chen, James C. Liao (President of Academia Sinica), and Ching-Ming Wei.

2001

Dr. Kopin Liu was appointed as the 3rd Director of IAMS.

Press conference photo following Dr. Kopin Liu's election as an Academician of Academia Sinica in 2004.

2016

Dr. Kuei-Hsien Chen assuming office as the 8th and 9th Director of IAMS (acting in 2016; formal transition in 2017).

IAMS Director Transition Ceremony in 2017. From left: Drs. Mei-Yin Chou, James C. Liao (President of Academia Sinica), and Kuei-Hsien Chen.

Laurels of Excellence

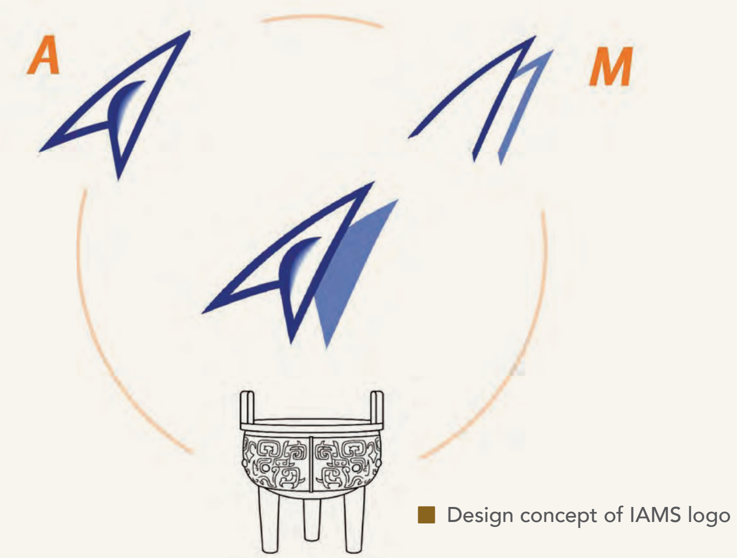
Three Nobel Laureates at the 2014 Atomic and Molecular Sciences Symposium hosted by IAMS. All three distinguished scholars served as members of the IAMS Academic Advisory Committee. From left: Dr. Yuan T. Lee, Dr. William D. Phillips, and Dr. William E. Moerner.

The IAMS Academic Advisory Committee has long been composed of elite scholars of global distinction. In 1986, Dr. Yuan T. Lee, then Chairman of the Academic Advisory Committee of IAMS Preparatory Office, was awarded the Nobel Prize in Chemistry. This tradition of excellence continued in 2014, when Dr. William E. Moerner, a member of the Committee, was also awarded the Nobel Prize in Chemistry. Guided by the wisdom of the Academic Advisory Committee and the leadership of successive directors, IAMS researchers continue to strive for world-class scientific breakthroughs.

IAMS Fun Facts

IAMS Logo

In 1995, IAMS invited Taiwanese artist Ms. Jill Lin to design the institute's logo. The design integrates the letters "A" (Atomic) and "M" (Molecular) while incorporating the Chinese character " 鼎 ", a three-legged ritual vessel symbolizing stability and strength. This logo embodies the fusion of science and art while also serving as a tribute to Dr. Chau-Ting Chang, whose Chinese name includes the character " 鼎 ".



Design concept of IAMS logo

The Unveiling ceremony and banquet for the donation of Cooperative Rivalry at IAMS, 2010. From left: Sculptor Mr. Wei-Jong Sheu, MA-tek General Manager Dr. Yong-Fen Hsieh, President of Academia Sinica Dr. Yuan T. Lee, and Director of IAMS, Dr. Yuh-Lin Wang.

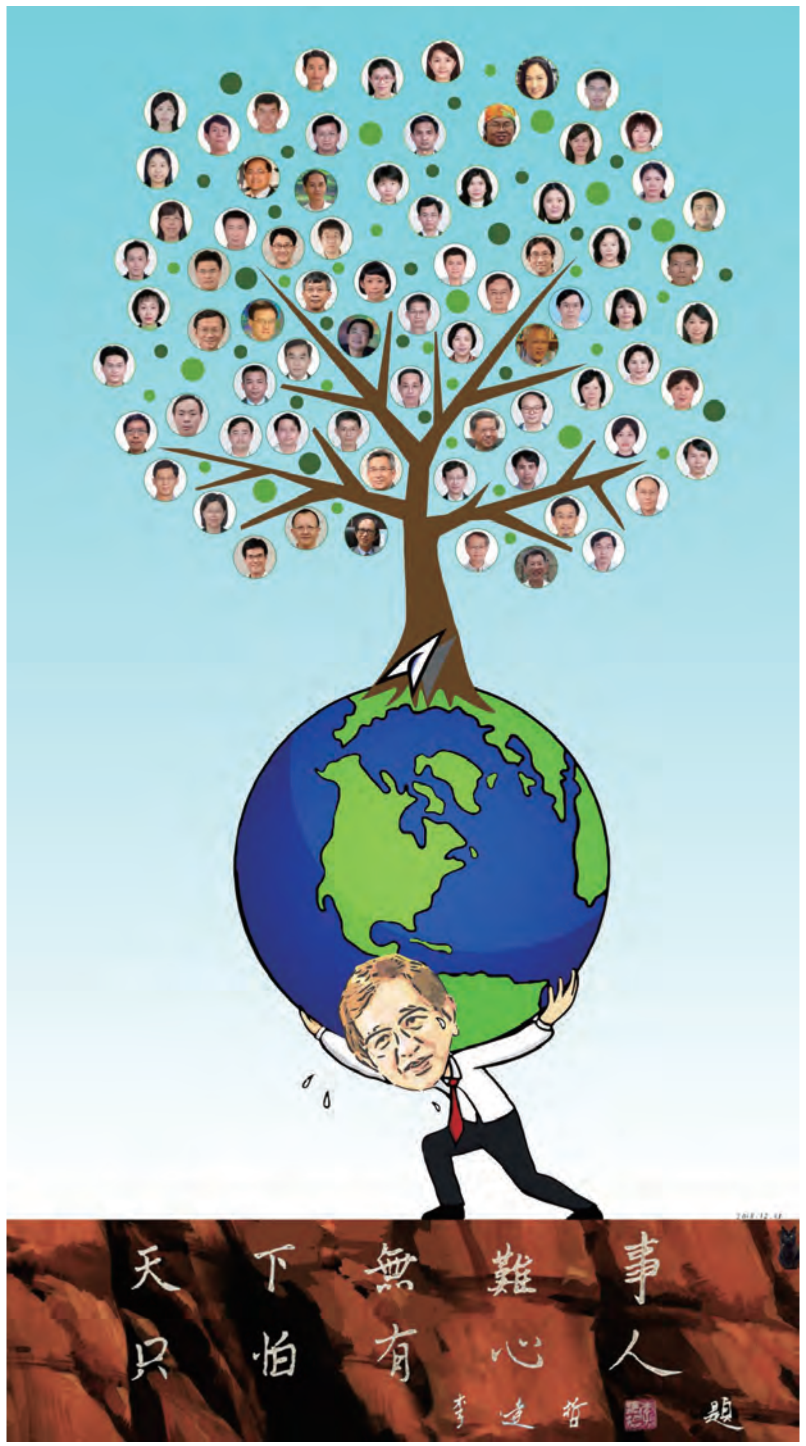
The Public Art Bronze Sculpture "Cooperative Rivalry"

Following the renovation of the Dr. Poe Lecture Hall in 2009, the new public art bronze sculpture 'Cooperative Rivalry' was installed outside the hall. The sculpture, designed and created by Taiwanese sculptor Mr. Sheu, Wei-Jong and generously donated by Materials Analysis Technology Inc. (MA-tek), was unveiled in early 2010 at a special ceremony. The 'Cooperative Rivalry' symbolizes a place where talented researchers drive each other toward excellence through friendly competition and heartfelt collaboration.

The IAMS Tree: Past and Present

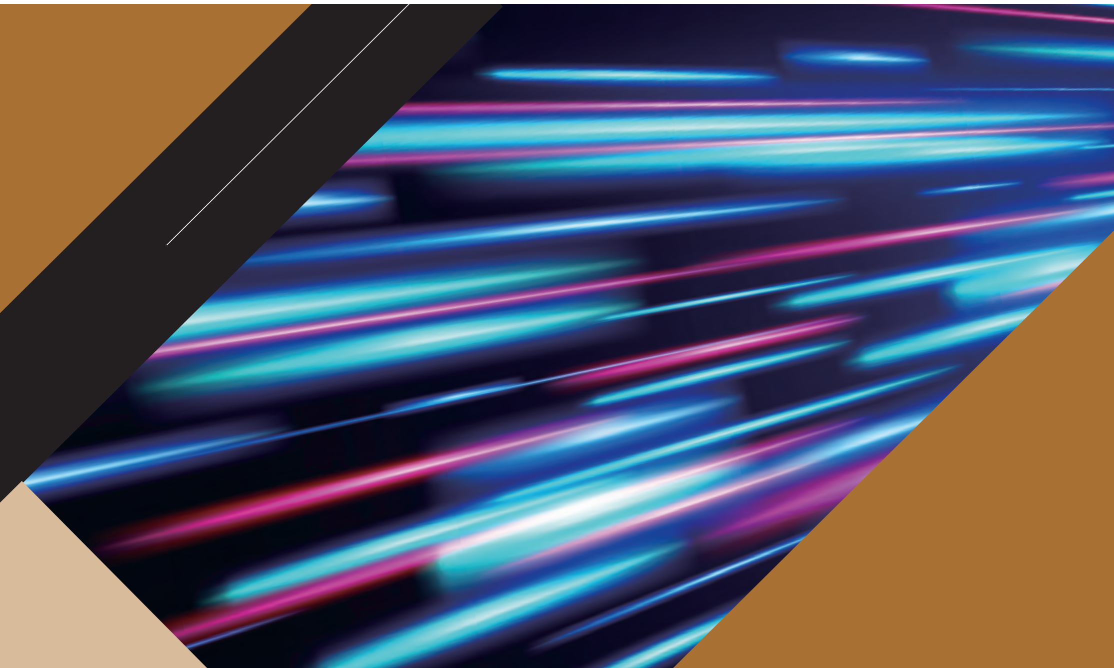
At IAMS's 20th anniversary in 2015, an artwork titled "The IAMS Tree" was created and presented as a gift to former President Yuan T. Lee to commemorate and honor his profound contributions to the Institute. In 2025, "The IAMS Tree" has continued to grow and flourish.

2015



2025

Research Areas



IAMS research focuses on the atomic and molecular levels, exploring the physical, chemical, and biological phenomena of nature through integrated theory and experimentation. While the Institute's initial focus was centered on chemical reaction dynamics, its scope has since evolved to encompass a broad range of energy-matter interactions. Over the past two decades, the research faculty has been structured into four Research Groups:

- Advanced Materials and Surface Science
- Atomic Physics and Optical Science
- Biophysics and Bioanalytical Technology
- Chemical Dynamics and Spectroscopy

Although researchers are affiliated with specific groups, they are encouraged to explore and participate in themes across other groups, fostering a culture of interdisciplinary collaboration and exchange.

Entering 2025, in response to the rapid progress of scientific research, the Institute has re-envisioned and restructured its five major research directions for the future.

Future Research Directions

Advanced Material Sciences and Technology

By integrating cutting-edge experimental techniques with theoretical calculations, we synthesize novel material structures and investigate their physical and chemical properties, advancing next-generation materials science and quantum device development.

Atmospheric Science and Molecular Spectroscopy

Rooted in our strength in molecular spectroscopy and laboratory kinetics, we focus on understanding critical atmospheric processes in gas-phase, aerosol to interfaces at the molecular level.

Biophysics and Bioanalytical Technology

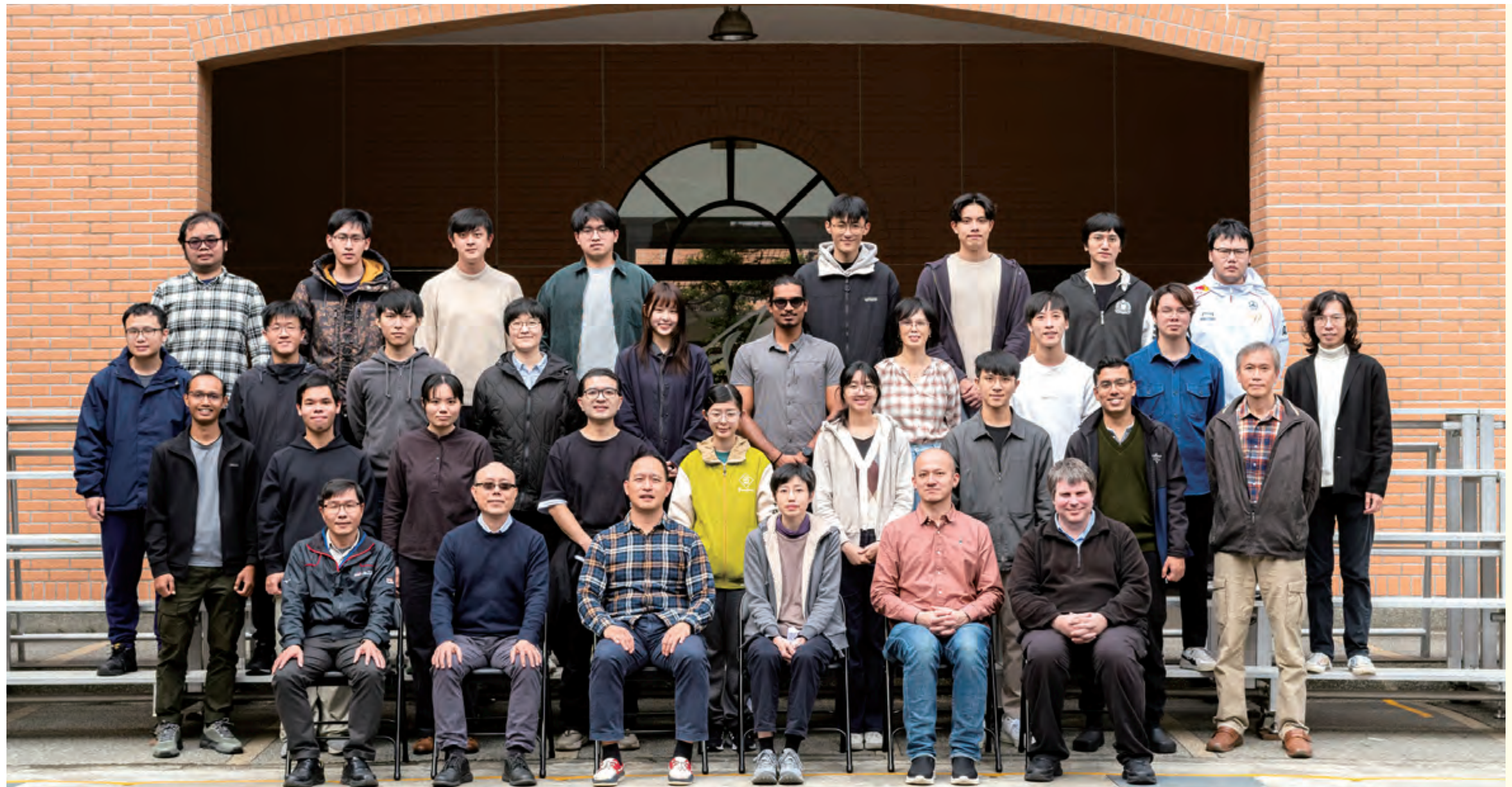
Grounded in a deep understanding of fundamental physics and chemistry, we pioneer the development of advanced technologies to extract critical information and deliver key insights into essential questions in biological systems.

Quantum Science and Technology

We focus on advancing our fundamental understanding of light-matter interactions with novel atomic and optical platforms, and their applications, including quantum sensing, metrology, communication, computation, and simulation.

Theoretical and Computational Sciences

Based on first-principles theories on electrons, nuclei, and photons, we develop computational methods to investigate the structures of matter and their physical and chemical properties, advancing the frontiers of fundamental science and quantum technology.



Atomic Physics and Optical Science

Research Group Profile

Since the formal establishment of IAMS in 1993 to 2003, the Atomic Physics Theory Group, comprising Dr. Keh-Ning Huang and Dr. Yew Kam Ho, operated in parallel with the Physical Chemistry Theory Group led by Director Sheng-Hsien Lin (1995–2001). During this period, the Optics Group, consisting of Dr. Jyhpyng Wang and Dr. Andy Kung, was designated as the Technical Development Group of the "Laser Center." The Atomic Physics Theory Group focused on precise calculation of atomic energy levels and collisions, while the Laser Center concentrated on advanced laser technology and their applications. At that time, these two research clusters had not yet developed shared research themes. After 2003, IAMS began to focus on the revolution in experimental atomic physics that had occurred eight years prior, specifically the realization of the Bose-Einstein Condensate (BEC) in 1995. Consequently, IAMS successively recruited a series of researchers specializing in cold atom physics and quantum optics. Following the rise of experimental atomic physics and the retirement of Dr. Sheng-Hsien Lin, the Laser Center underwent a transformation that facilitated the convergence of atomic physics and optics research at IAMS. This evolution ultimately resulted in the formation of the current Atomic Physics and Optics Research Group.

Dr. Szu-Yuan Chen joined the Optics Division in 1999, focusing on laser plasma physics and its applications. Together with Dr. Jyhpyng Wang (joining IAMS in 1990), he introduced high-field ultrafast laser technology, applying it to research in plasma nonlinear optics, laser-driven particle acceleration, and X-ray lasers. In parallel, Dr. Andy Kung developed synthesized harmonic attosecond light sources and multiple-plate self-focusing supercontinuum light sources.

The Atomic Physics Division was significantly expanded with the addition of Dr. Ying-Cheng Chen and Dr. Wang-Yau Cheng in 2005, Dr. Ming-Shien Chang in 2009, and Dr. Yu-Ju Lin in 2010. Research topics during this period included optical frequency combs, quantum optics and quantum information science, spinor BEC and quantum simulation, as well as spin-orbit coupled BEC.

In 2020 and 2024, Dr. Hsiang-Hua Jen and Dr. Chun-Chia Chen joined the group, respectively. Dr. Jen focuses on quantum optics theory, while Dr. Chen is constructing continuous atom lasers and continuous optical clocks for quantum measurement. In 2025, Dr. Shayne Bennetts joined, specializing in the development of quantum measurement and quantum engineering based on atomic nanofiber platforms.

The Atomic Physics and Optics Science Group currently comprises six Research Fellows and two Joint Appointment Research Fellows. Research areas include:

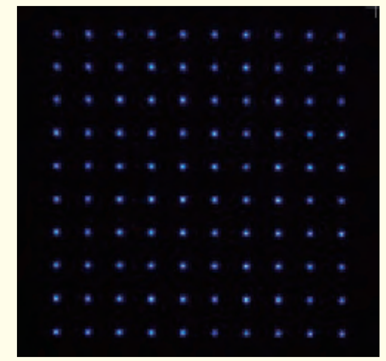
1. Quantum optics and quantum information science based on cold atoms, atom-nanophotonics, and solid-state spins in diamond; 2. Quantum computation and simulation based on neutral atoms with Rydberg interactions; 3. Atomic physics involving quantum metrology, continuous atom lasers, and continuous optical clocks; 4. Quantum control of atoms in atom interferometers and optical lattices; 5. Theoretical and experimental studies of ultracold atomic gases, including superfluidity, synthetic gauge fields, and spinor condensates.

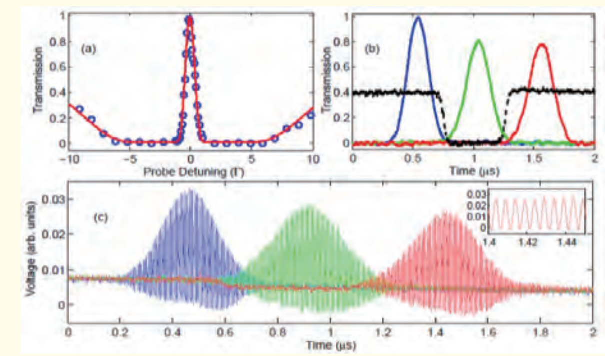
Research Overview

Research Fellow

Ying-Cheng Chen, Ph.D.

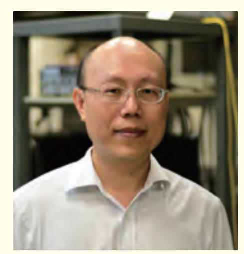
There are two ongoing projects in Dr. Ying-Cheng Chen's research team. First, they are building a quantum processor based on two-dimensional single-atom arrays utilizing Rydberg dipolar interactions to entangle atom pairs. This is a national project on quantum technology. Second, they are working on high-performance optical quantum memory based on cold atomic ensembles. Previously, they have used the electromagnetically-induced-transparency protocol to realize a record-high memory efficiency of 92%. They plan to push the memory bandwidth towards GHz range utilizing superradiance-mediated memory protocol.



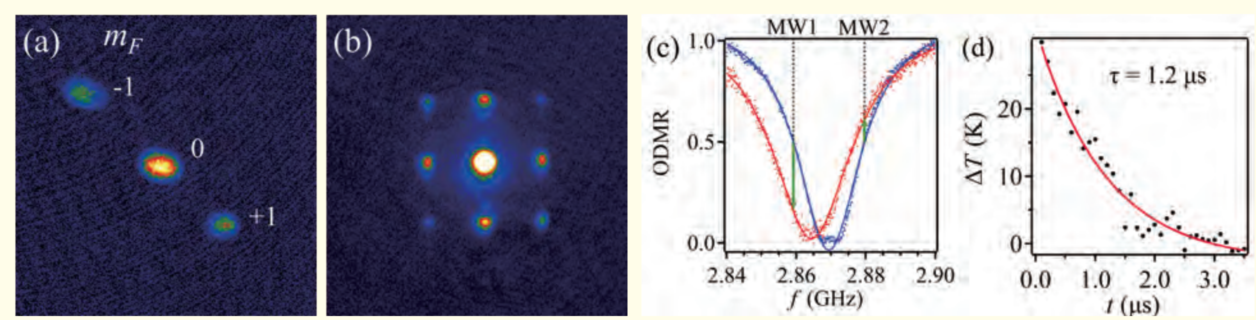


Associate Research Fellow

Ming-Shien Chang, Ph.D.



Dr. Chang's group specializes in the control and application of atomic and solid-state spins for quantum simulation, quantum sensing, and quantum computing. Using all-optical rubidium spinor Bose–Einstein condensates, the group investigates emergent phenomena in quantum magnetism. In parallel, the group employs nitrogen-vacancy (NV) centers in diamond nanocrystals for quantum sensing of environmental parameters such as temperature and vector magnetic fields, with nanometer-scale spatial resolution and high sensitivity. Beyond sensing, the group uses dense ensembles of NV centers, which are spin-1 artificial atoms, as a strongly interacting many-body system for the study of quantum magnetism.

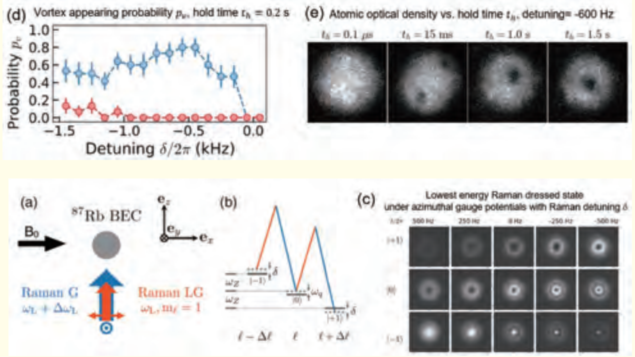


Research Overview

Associate Research Fellow

Yu-Ju Lin, Ph.D.

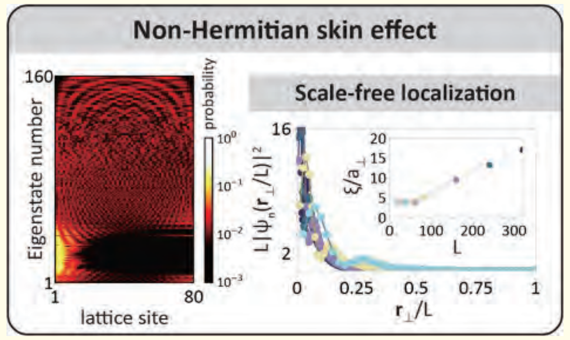
Dr. Yu-Ju Lin's laboratory studies spin–orbital-angular-momentum coupling in atomic Bose–Einstein condensates. Dr. Lin uses two co-propagating Raman dressing beams to couple atoms in the hyperfine electronic ground-state manifold, while simultaneously transferring orbital angular momentum (OAM) to the atomic center of mass. One Raman beam is a Gaussian (G) beam, and the other is a Laguerre–Gaussian (LG) beam with a winding number of one. This coupling between the atomic spin and the center-of-mass OAM is referred to as "spin–OAM coupling" (SOAMC). Dr. Lin observed correlations between spin and OAM in Raman-dressed quantum states and characterized their spin textures. Using atoms prepared in the lowest-energy dressed state, an azimuthal synthetic gauge potential acting as effective rotation was created, and the Hess–Fairbank effect was demonstrated, which is an analog of the Meissner effect in superconductors. The gauge field in the stationary Hamiltonian opens a path to investigating rotation properties of atomic superfluids under thermal equilibrium.
Using the synthetic azimuthal gauge potential, Dr. Lin further demonstrated the first experimental observation of vortex nucleation in a spinor Bose–Einstein condensate under a radially localized synthetic magnetic field. A large circulating azimuthal velocity field at the condensate center results in a dynamically unstable localized excitation that initiates vortex nucleations. The system shows both dynamical and Landau instabilities, and the observation has reasonable agreement with the time-dependent Gross-Pitaevskii simulations.

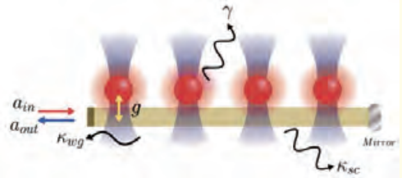


Associate Research Fellow

Hsiang-Hua Jen, Ph.D.

Dr. Hsiang-Hua Jen's research expertise lies in theoretical quantum optics and ultracold atoms, with a primary focus on atom–nanophotonic waveguide interfaces, non-Hermitian physics, and quantum correlations in dense atomic ensembles. These theoretical investigations aim to uncover the essential principles of quantum engineering through collective interactions between neutral atoms and light, with potential applications in quantum science and quantum technologies.

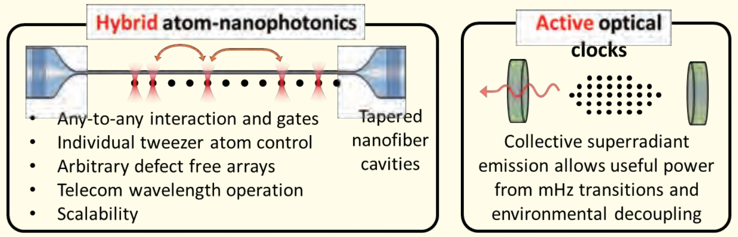




Assistant Research Fellow

Shayne Bennetts, Ph.D.

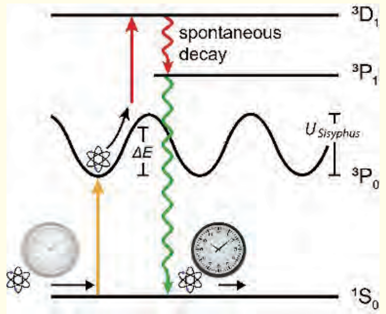
Beginning in January 2025, Dr. Shayne Bennetts joined the Institute of Atomic and Molecular Sciences. His research group focuses on two main directions. The first research direction is hybrid atom–nanophotonics, aiming to develop a globally unique experimental platform for quantum information processing and quantum metamaterials. This platform will combine arrays of quantum processors based on ultracold ytterbium atoms, where each processor features individual control and readout, interconnected by nanophotonic quantum information "buses." High single-atom cooperativity, rich atomic level structure, and clock-state qubits make ytterbium particularly attractive for nanophotonic quantum technologies. This platform will offer capabilities unmatched worldwide and will be compatible with the rapidly developing field of neutral-atom ytterbium quantum computing. The experimental efforts of Dr. Bennetts' group will benefit from close collaboration with the theoretical quantum optics group led by Dr. Hsiang-Hua Jen, as well as with related research groups in Taiwan. The long-term vision is to integrate neutral-atom quantum technologies with Taiwan's expertise in nanophotonic chip fabrication to develop advanced quantum information processors. The second research direction builds on Dr. Bennetts' previous partnership with Dr. Chun-Chia Chen, which demonstrated continuous Bose–Einstein condensation and his subsequent work on superradiant optical clocks. By combining the natural advantages of ytterbium with our earlier development of continuous high-phase-space-density atomic sources, this effort aims to demonstrate the world's first continuous active optical clock. Such a clock could fundamentally transform the portability and bandwidth of optical clocks and precision sensing and eliminate the need for an ultrastable reference cavity. This research continues the decade long partnership with Dr. Chen's quantum metrology group developing continuous cold atom technology for quantum sensing and quantum information applications.

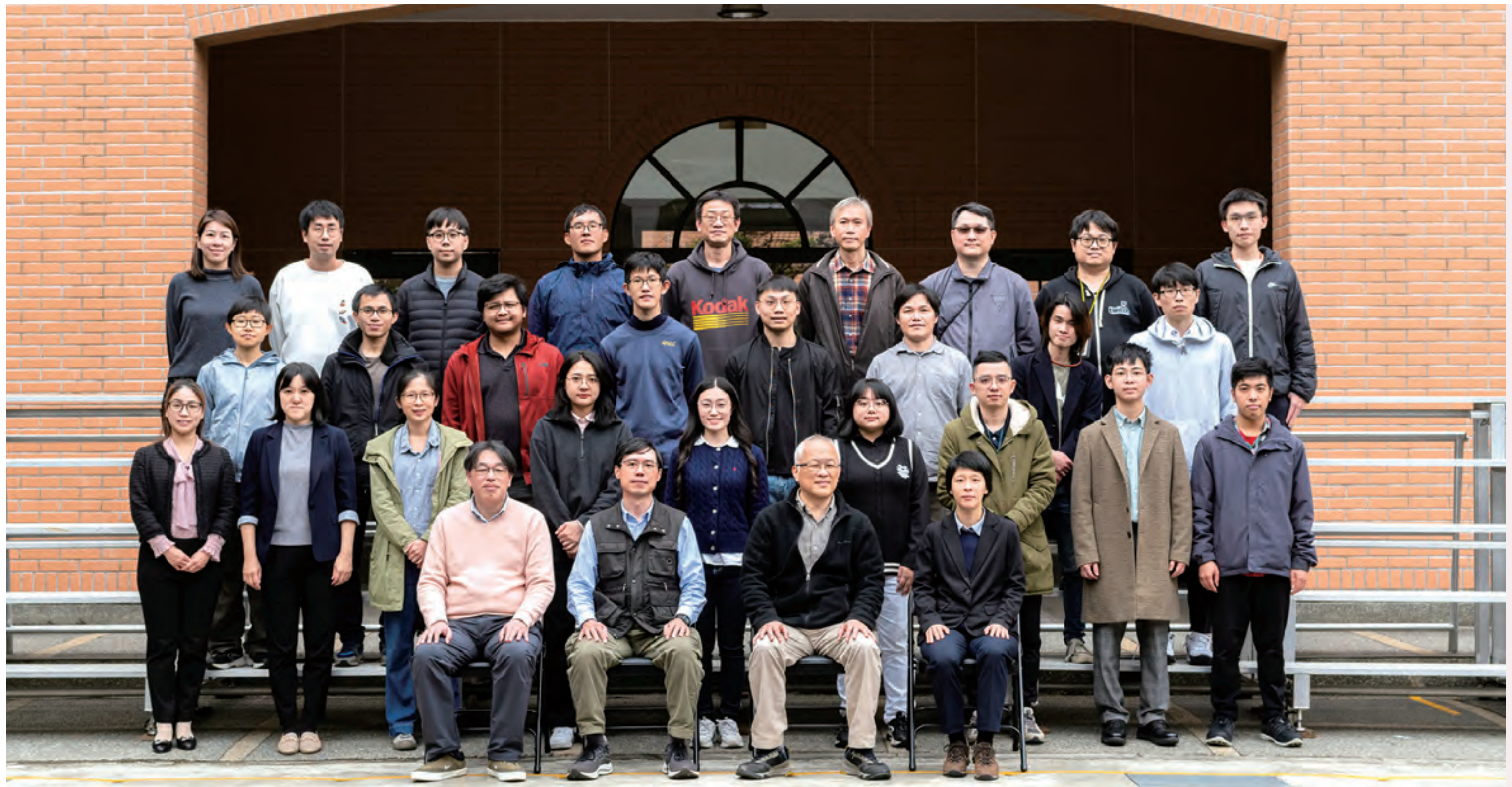


Assistant Research Fellow

Chun-Chia Chen, Ph.D.

Dr. Chun-Chia Chen's laboratory had demonstrated a Sisyphus laser cooling scheme based on ultra-narrow linewidth (mHz-level) clock transitions. This approach constitutes a universal laser cooling technique applicable to all alkaline-earth(-like) atoms. These advances push the frontier of next-generation neutral-atom optical clocks, significantly improving their precision and stability. Dr. Chen plans to further extend these methods toward all-optical laser cooling of quantum-degenerate gases, including atomic Bose–Einstein condensates (BECs) and degenerate Fermi gases.
The first continuous Bose–Einstein condensate was realized by producing an ultracold atomic ensemble via narrow-linewidth laser cooling of ground-state atoms, while simultaneously suppressing near-resonant interactions between the condensate and the cooling light through controlled ac-Stark shifts. This mechanism enables the maintenance of a continuous BEC. Dr. Chen's laboratory is currently exploring an alternative pathway, in which laser cooling and atomic confinement are implemented in long-lived metastable states. This approach represents a key step toward the realization of a continuous atom laser. In addition, Dr. Chen's laboratory is developing a novel Sisyphus laser cooling technique that stores ultracold ytterbium (Yb) atoms in metastable states for applications in Rydberg atom spectroscopy. The long-term goal is to prepare ultracold ytterbium atoms in long-lived circular Rydberg states, opening new possibilities for quantum information processing and quantum sensing.





Chemical Dynamics and Spectroscopy

Research Group Profile

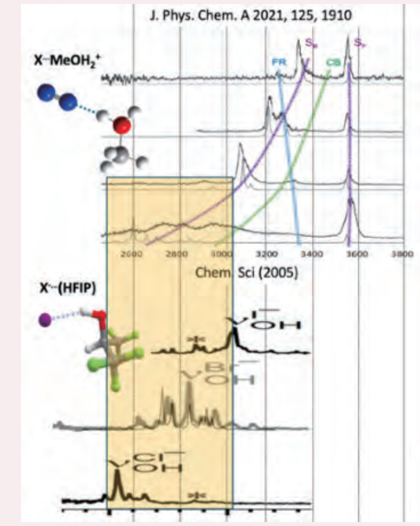
More than thirty years ago, when scientific research in Taiwan was only beginning to modernize, the Chemical Dynamics and Spectroscopy (CDS) group began introducing advanced research methodologies and technologies such as laser spectroscopy, reaction dynamics, and molecular beam scattering, opening up new directions for related research in Taiwan. The Group dedicated itself to the study of the photodissociation and chemical reactions of small molecules, with particular emphasis on the generation and characterization of transient species (e.g., free radicals and reaction intermediates). Particularly in the field of crossed molecular beam research, the group constructed world-leading crossed molecular beam scattering apparatus equipped with a high-resolution three-dimensional ion velocity-map imaging detector and an ultra-low-background universal mass-spectrometric detector, enabling studies that would otherwise be difficult to perform. At present, the CDS Group consists of four Research Fellows and one cross-group Research Staff Scientist. Its primary research areas encompass molecular spectroscopy, atmospheric chemistry, and glycan mass spectrometry.

Research Overview

Research Fellow

Jer-Lai Kuo, Ph.D.

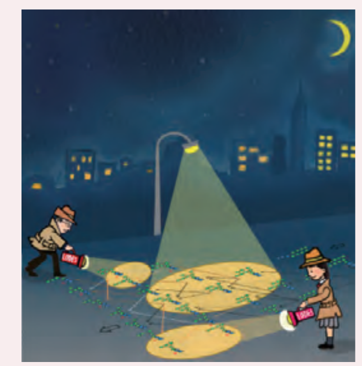
Dr. Jer-Lai Kuo's laboratory team has developed "ab initio structure-search" and "ab initio anharmonic" algorithms that can directly compute the molecular structures of chemical systems and the physical picture underlying their vibrational spectra. As shown in the figure on the right, two alcohol molecules—despite being in very different bonding environments—both display highly complex spectra between 2600 and 3200 cm^{-1}, with a bandwidth of nearly 500 cm^{-1}, arising from coupling between the O-H stretching vibration and other intramolecular vibrational quantum states. The lab's computed results agree with spectra measured by experimental groups in Japan and Germany. Because Dr. Kuo's first-principles calculations do not rely on empirical or fitted parameters, they can identify resonance conditions rapidly and accurately, and the group is actively expanding collaborations with multiple leading international experimental teams. In addition, Dr. Kuo has collaborated with the team of Dr. Chi-Kung Ni to use neural-network potentials (NNPs) to accelerate structure searches for complex saccharides and peptides by thousands of times, without sacrificing accuracy and without requiring experimental input, opening a new path for applying AI methods in this area.



Research Fellow

Chi-Kung Ni, Ph.D.

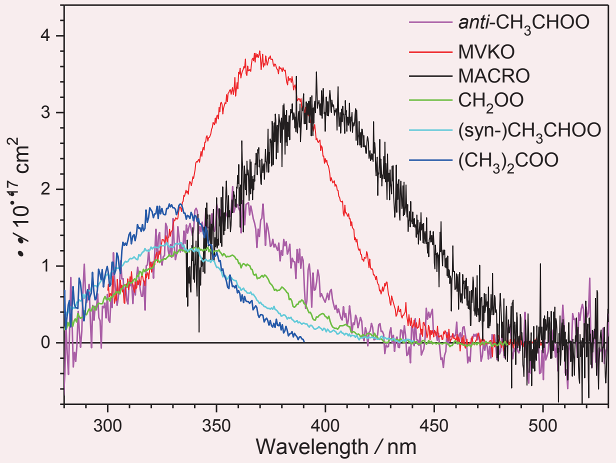
Dr. Ni's research overview is as follows. The four basic categories of molecules involved in creating life are nucleic acids, proteins, carbohydrates, and lipids. Among these four categories, nucleic acids, proteins, and carbohydrates are macromolecules with complicated structures. The methods to determine the sequences of nucleic acid bases in nucleic acids and amino acids in proteins are well developed. However, there is no robust method that can fully determine the primary structures of carbohydrates. Structures of carbohydrates are traditionally determined using enzyme digestion or nuclear magnetic resonance (NMR) spectroscopy. However, enzyme digestion and NMR require large amounts of samples, therefore these two methods are not suitable for small amounts of samples, such as the carbohydrates extracted from antibodies or cancer cells. Mass spectrometry has sensitivity four orders of magnitudes higher than that of enzyme digestion and NMR. However, conventional mass spectrometry methods only determine the linkage positions, information regarding anomeric configurations and stereoisomers in oligosaccharides is not available. We have recently developed a new mass spectrometry method, namely logically derived sequence tandem mass spectrometry (LODES/MSn) for carbohydrate structural determination. This new method is based on the dissociation mechanism of carbohydrate in the gas phase which we have investigated using chemical kinetics and quantum chemistry calculations. This new method determines the linkage positions, anomeric configuration, and stereoisomers of oligosaccharides, and it has high sensitivity for real time online structural determination of small oligosaccharides eluted from high performance liquid chromatography. We applied this method to determine the free oligosaccharides extracted from human, bovine, and caprine milk and the N-glycans extracted from plants, animals, cancer cells, and fungi. Many isomers which are beyond the prediction of current biosynthetic pathways were found.



Research Overview

Research Fellow

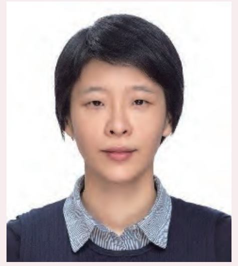
Jim Jr-Min Lin, Ph.D.



Dr. Jim Jr-Min Lin's laboratory team investigates the spectroscopy and reaction kinetics of Criegee intermediates. (1) They have measured the UV–visible spectra of six Criegee intermediates and determined their photodissociation cross sections; because Criegee intermediates are known to dissociate with 100% yield upon absorbing a UV–visible photon, the photodissociation cross section is therefore equivalent to the photoabsorption cross section. (2) To determine the fates of Criegee intermediates under real atmospheric conditions, the lab has measured kinetic parameters for these six species, including unimolecular (thermal) decomposition rate coefficients and rate coefficients for reactions with water molecules, among others. (3) They discovered that some Criegee intermediates undergo cooperative reactions with two molecules capable of hydrogen bonding, indicating a mechanism in which water molecules catalyze such reactions. (4) In collaboration with Dr. Kaito Takahashi, they used **quantum** chemical calculations to interpret and rationalize the experimental results. Together, these studies not only clarify the roles of Criegee intermediates in atmospheric chemistry but also provide important insights into intermolecular interactions.

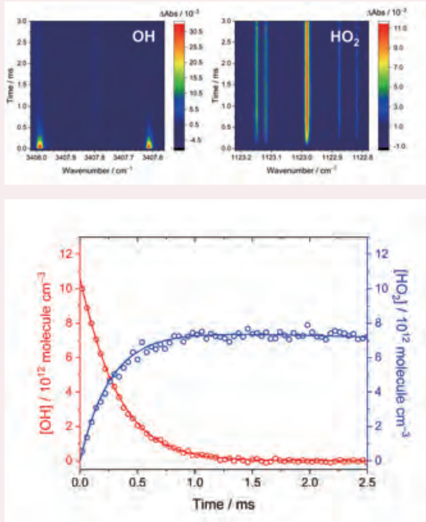
Associate Research Fellow

Pei-Ling Luo, Ph.D.



Dr. Pei-Ling Luo's laboratory team is developing mid-infrared, time-resolved dual-comb spectroscopy to investigate the infrared spectra of key atmospheric free radicals and their associated reaction kinetics. Recently, Dr. Luo's group successfully established a new spectrometer based on synchronized two-color, time-resolved dual-comb spectroscopy, which enables simultaneous measurements in two distinct molecular fingerprint regions (3–5 μm and 7–10 μm) with microsecond-level time resolution. Using this new approach, the team can synchronously monitor multiple reactive species, including precursor molecules, reaction intermediates, and reaction products.

Dr. Luo's laboratory primarily applies this unique spectroscopic technique to perform high-resolution spectral measurements and quantitative concentration determination of important radical species such as OH, HO_2, and CH_2OO. Building on these capabilities, the group further investigates key atmospheric reaction mechanisms and kinetics involving these radicals. In addition to providing accurate reaction rate constants, this research can also yield critical experimental data such as product branching ratios and mechanistic pathways, supporting more robust assessments of the impacts and significance of these reactions within atmospheric chemistry.



Assistant Research Staff Scientist

Yen-Chang Lin, Ph.D.

Dr. Yen-Chang Lin is a specialist in software and system development, with expertise spanning FPGA design, Python and LabVIEW programming, graphical user interface development, and instrument control and signal integration. His work focuses on enhancing the stability, precision, and reliability of experimental equipment, bridging the gap between complex hardware systems and practical research needs.

Actively engaged in instrument integration and laboratory automation, Dr. Lin has contributed to numerous research projects by helping build robust, high-efficiency experimental platforms. He provides support for remote monitoring, data logging, and automated alert systems, enabling real-time supervision and timely responses during long-duration experiments—capabilities that are increasingly essential in modern, data-intensive research environments.

In parallel with experimental system development, Dr. Lin has supported laboratories in establishing protein structure prediction platforms based on a range of modern computational approaches, including AlphaFold and related methods, to facilitate structural modeling and design in biomedical research. His contributions include deep learning model deployment, automated analysis pipeline development, and high-performance computing resource management, helping laboratories accelerate scientific discovery and streamline structure validation workflows.

Looking ahead, he plans to develop personal- and laboratory-scale Retrieval-Augmented Generation (RAG) systems that integrate local knowledge bases with language model inference, strengthening knowledge management and experimental decision-making. He also envisions the gradual introduction of automated data analysis, trend detection, and anomaly alert mechanisms, empowering researchers to monitor experimental conditions in real time while improving efficiency, traceability, and operational safety across the research process.

Biophysics and Bioanalytical Technology

Research Group Profile

IAMS initially comprised six research groups: Theoretical Research and Computation, Gas-Phase Dynamics, Photochemistry and Spectroscopy, Surface Science, Condensed-Phase Dynamics, and Laser Optoelectronic Technology Development. To better align with evolving research directions and emerging topics, the Institute was reorganized in late October 2003, consolidating the original six groups into four: (1) Chemical Dynamics and Spectroscopy, (2) Advanced Materials and Surface Science, (3) Biophysics and Bioanalytical Technology (BBT), and (4) Atomic Physics and Optical Science. The establishment of the BBT Group has further strengthened IAMS's capabilities in biophysics and related fields.

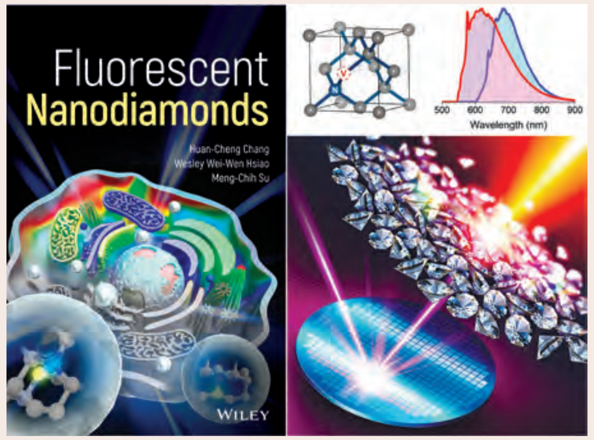
The Group currently consists of five Principal Investigators: Dr. Huan-Cheng Chang, Dr. Chia-Lung Hsieh, Dr. Tsyr-Yan Yu, Dr. Pin-Kuang Lai, and Dr. Ching-Wei Lin. Additionally, there are two Adjunct Principal Investigators: Dr. Yi-Chun Wu and Dr. Hsueh-Fen Juan (National Taiwan University). The Group also operates a Biophysics Core Laboratory that provides research support and technical assistance.

The BBT Group aims to advance development through interdisciplinary expertise spanning physics, chemistry, and biology, and is committed to developing innovative tools and methodologies. Specific goals include: (1) Investigating the fundamental nature of biological phenomena by integrating theory and experiment, grounded in physics and chemistry; and (2) Utilizing optics, microscopy, and nanoscience to develop next-generation tools for the in-depth study of biological systems at the molecular, cellular, and tissue levels.

Research Overview

Distinguished Research Fellow

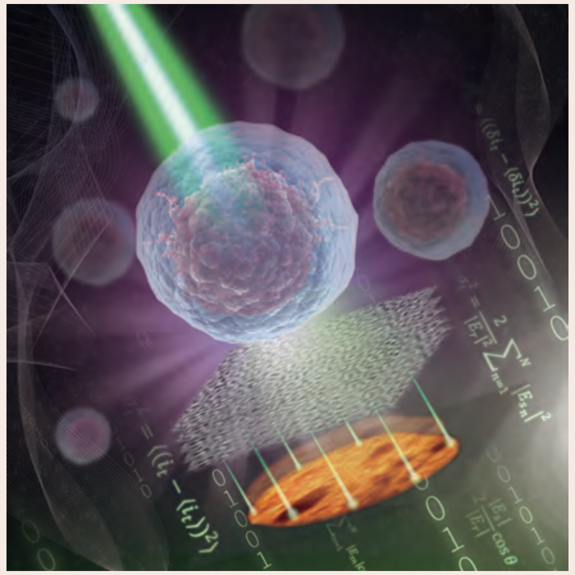
Huan-Cheng Chang, Ph.D.



Dr. Huan-Cheng Chang coined the term "fluorescent nanodiamond (FND)" and pioneered the application of this quantum biomaterial in biomedical research, opening up new fields of clinical applications for nanodiamonds in cell tracking, disease diagnosis, and drug delivery. His developed FND material possesses excellent biocompatibility, stable fluorescence properties, and quantum sensing capabilities, making it an important platform for advanced biomedical imaging technologies. Additionally, Dr. Chang and his team have obtained multiple patents related to fluorescent nanodiamonds in various countries and are actively promoting technology transfer and commercialization. Furthermore, Dr. Chang has authored the book "Fluorescent Nanodiamonds," which systematically organizes the physical properties, preparation methods, and applications of FND materials in the biomedical field, and has been widely cited and praised by the international academic community. He has also published more than 100 high-impact journal articles, covering topics such as nanodiamond synthesis, photophysical properties, quantum sensing, and clinical applications, and has received high attention and recognition in important international journals and academic conferences.

Research Fellow

Chia-Lung Hsieh, Ph.D.



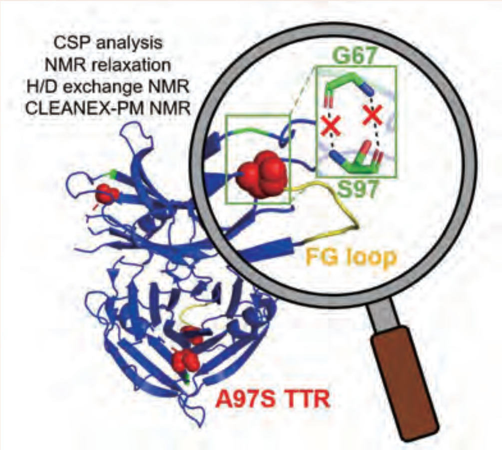
Dr. Chia-Lung Hsieh works at the intersection of advanced optical microscopy and nanoscale biophysics, specializing in the development of ultrafast, high-resolution imaging systems that reveal rapid and subtle dynamics inside living cells. The ultrafast microscopy platforms he has developed enable real-time visualization of nanoscale structural changes and dynamic behaviors in the cell membrane and chromatin, providing new insights into mechanisms underlying cellular signaling, gene regulation, and disease progression. His research advances the quantitative measurement of intracellular dynamics and deepens our understanding of the molecular pathology of major biomedical diseases, including cancer, neurodegeneration, and viral infections.

Research Overview

Research Fellow

Tsyr-Yan Yu, Ph.D.

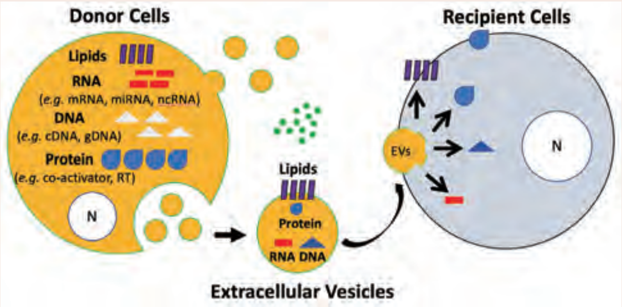
Dr. Tsyr-Yan Yu has long been dedicated to the fields of biophysics and structure biology, with a primary research focus on the interactions between membrane proteins and lipid membranes across various time scales to explore their functional implications in both physiological and pathological processes. He has also conducted in-depth investigations into how mutations in transthyretin (TTR) lead to protein misfolding and aggregation, which in turn triggers familial amyloid polyneuropathy (FAP). His work provides critical insights into disease mechanisms and essential clues for potential therapeutic strategies. Furthermore, Dr. Yu has developed innovative solid-state nuclear magnetic resonance (NMR) techniques for detecting molecular reorientational motion in organic-inorganic hybrid perovskite materials. This research has laid a vital foundation for understanding the relationship between the structure and function of next-generation optoelectronic materials.



Research Fellow

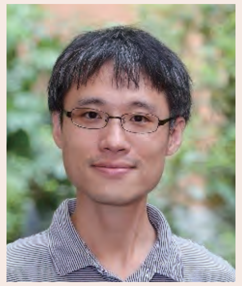
Charles Pin-Kuang Lai, Ph.D.

Dr. Charles Pin-Kuang Lai focuses on elucidating the roles and in vivo behaviors of extracellular vesicles (EVs) in tumor biology, with a dedicated focus on developing bioimaging technologies with high spatiotemporal resolution. He leads the team that pioneered the PalmGRET platform, the world's first multi-resolution EV tracking system to integrate bioluminescence resonance energy transfer (BRET) technology. This platform enables the precise mapping of the distribution and dynamics of diverse EV populations within living organisms. Utilizing this technology, his team discovered that highly malignant breast cancer cells release significant quantities of large EVs (bEVs; >200 nm), which exhibit biodistribution patterns and oncogenic potentials distinct from those of small EVs (sEVs; <200 nm). This work moves the field beyond its long-standing emphasis on sEVs by systematically revealing the unique roles of bEVs in tumor progression, opening new avenues for EV-based cancer diagnostics and therapeutics. Additionally, Dr. Lai has made sustained contributions to the study of DNA damage and repair mechanisms. He developed a multi-scale DNA repair tracking system to investigate how interactive gene-repair dynamics drive carcinogenesis and treatment resistance, providing vital insights for maintaining genomic stability and designing more effective cancer therapies.

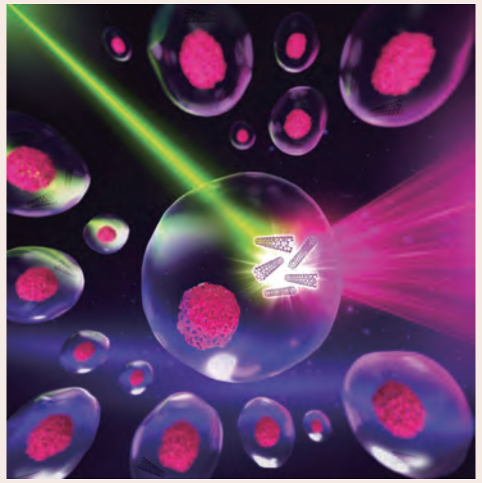


Assistant Research Fellow

Ching-Wei Lin, Ph.D.



Dr. Ching-Wei Lin focuses on frontier research in nano-optics and biophotonics, and is dedicated to developing innovative spectroscopic technologies to elucidate the interactions between nanomaterials and biological systems. He pioneered short-wave infrared (short-wave infrared, SWIR)-based fluorescence flow cytometry, overcoming the limitations of conventional visible and near-infrared imaging to enable high-contrast, deep-penetration cellular analysis, thereby expanding its potential applications in biomedical imaging and immune monitoring. In parallel, Dr. Lin has conducted in-depth investigations of the dynamic interactions between single-walled carbon nanotubes (SWCNTs) and biological systems, including cellular uptake, distribution, and biocompatibility, laying a foundation for the safety and functionality of carbon nanotubes as drug carriers or biosensors. In addition, he has developed SWIR chiroptical spectroscopy to study structural recognition and selective interactions between chiral nanomaterials and biomolecules, further advancing the application of chiroptical technologies in nanomedicine and molecular diagnostics.



Advanced Materials and Surface Science

Research Group Profile

The Advanced Materials and Surface Science (AMSS) Research Group evolved from the former Surface Science Group, one of the Institute's six research groups when IAMS was formally established in 1995. Its early members included Dr. Tung J. Chuang, Dr. Yuh-Lin Wang, Dr. Jiing-Chyuan Lin, Dr. Ker-Jar Song, and Dr. Kuei-Hsien Chen, and its main research areas spanned surface chemistry, reaction dynamics, spectroscopy, surface-structure analysis, nonlinear optics, and thin-film processing.

With the rise of nanoscience and theoretical materials computations, along with the addition of new members, the group was renamed the "Advanced Materials and Surface Science Group" during the tenure of Director Kopin Liu. During this period, a key shared research objective among members was the development of novel materials for energy-related applications, as well as the exploration of microscopic mechanisms and novel physical phenomena through fundamental research. In view of the rapid development of computing technology and theoretical material calculation methods, the current Director, Dr. Ching-Ming Wei, joined IAMS in 2004 and established the Institute's first high-performance computing cluster, laying a solid foundation for theoretical scientific computing. Subsequently, research in theoretical computation at IAMS continued to expand as members from this and other research groups joined, including Dr. Jer-Lai Kuo (2009), Dr. Kaito Takahashi (2009), Dr. Mei-Yin Chou (2011), Dr. Liang-Yan Hsu (2017), and Dr. Yang-Hao Chan (2021). They conduct in-depth studies on topics such as molecular and material structures, electronic properties of novel materials, spectroscopy, light-matter interaction, quantum electrodynamics, and computational methods. They also collaborate closely with experimental teams, providing theoretical insights that facilitate the analysis and interpretation of experimental data.

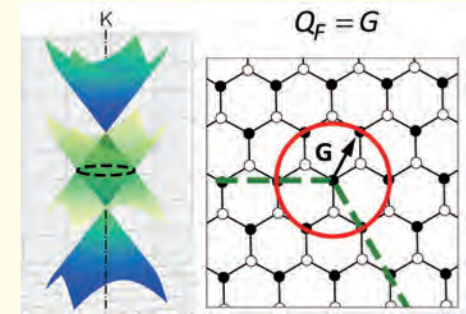
In recent years, following the quick development of emerging materials such as two-dimensional (2D) materials, the group has also actively recruited experimental talent in related fields. Dr. Wei-Hua Wang and Dr. Ya-Ping Hsieh joined IAMS in 2008 and 2017, respectively, with expertise spanning the growth of 2D materials, device fabrication, and measurement techniques for electrical and optical properties. Regarding materials analysis, high spatial resolution and time-resolved techniques are crucial for advanced materials research. In 2021, IAMS assisted Academia Sinica in establishing a double aberration-corrected transmission electron microscopy laboratory, led by Dr. Jessie Shiue to provide expert research support for materials characterization. Additionally, Dr. Cheng-Tien Chiang joined in 2019, focusing on the design, setup, and related research work of femtosecond laser and photoelectron spectroscopy.

At present, the AMSS Group consists of 10 Research Fellows and one Research Staff Scientist (including four theoretical researchers and seven experimental researchers), as well as seven join-appoint Research Fellows (all of whom are experimental researchers). Group members collaborate and interact closely, and IAMS maintains a free and open research culture with strong interactions across research groups; some researchers also conduct cross-group projects, without rigid boundaries between research areas.

Research Overview

Distinguished Research Fellow

Mei-Yin Chou, Ph.D.

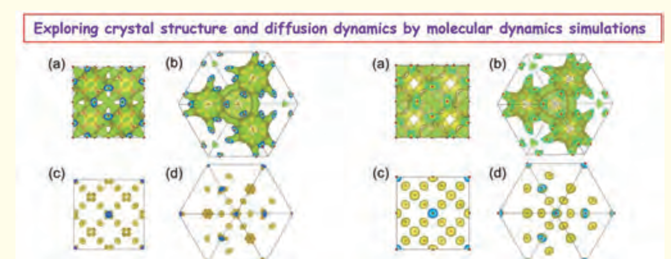


Dr. Mei-Yin Chou's research focuses on the electronic structure of condensed matter, as it plays a decisive role in the properties and dynamics of quantum materials. For most systems we employ first-principles calculations that do not rely on any adjustable parameters. This has been made possible by advances in computational methods developed in recent decades. The purpose of these studies is to provide unambiguous explanations for various interesting phenomena observed experimentally in nanostructures, solids, and surfaces, and to make reliable predictions of new material properties from microscopic quantum theories. Our theoretical efforts can be classified into two categories: (1) investigating the electronic and dynamical properties of technologically important quantum materials, and (2) developing new algorithms and calculational methods to study the properties of materials using quantum mechanics.

One of the recent investigations was on the origin of flat bands at the magic angles in twisted bilayer graphene, where the unexpected discovery of superconductivity and strong electron correlation is one of the most intriguing developments in two-dimensional materials. We identified the most critical role of the Fermi ring in the AA-stacked region and showed that the magic angles can be predicted by the moiré periodicity determined by the size of this Fermi ring. The resonant criterion in momentum space makes it possible to coherently combine states on the Fermi ring through scattering by the moiré potential, leading to flat bands near the Fermi level.

Distinguished Research Fellow

Ching-Ming Wei, Ph.D.



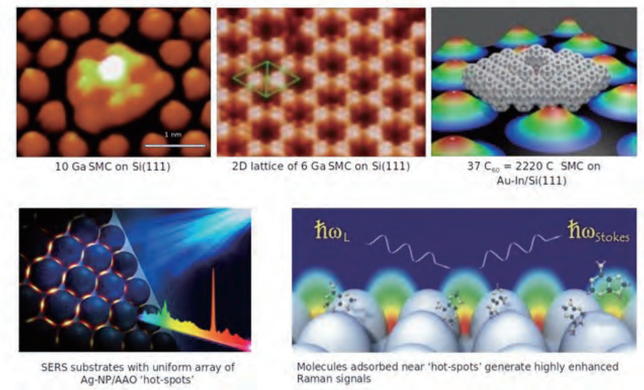
Dr. Ching-Ming Wei has developed stochastic structure-search methods to identify stable structures of previously unknown materials. In recent years, he has applied machine-learning approaches that emulate density functional theory (DFT) calculations to improve the efficiency of molecular dynamics simulations, calculate thermal-transport properties, and simulate X-ray diffraction patterns, with applications to superionic conductors, lithium-battery materials, and metal–organic frameworks. His recent work includes (i) using molecular dynamics to accumulate and average the positions of identical atoms across multiple unit cells and time steps to generate three-dimensional atomic-density maps that reveal site occupancies and diffusion pathways, addressing limitations of conventional X-ray refinement with partial-occupancy models; (ii) clarifying liquid-like thermal transport and Ag-ion dynamics in argyrodite materials by simulating Ag_8SiTe_6 with machine-learning interatomic potentials, showing symmetry breaking at low temperatures and large-scale Ag diffusion at high temperatures; and (iii) developing machine-learning potentials for superionic systems such as Ag_2S, Ag_8SiTe_6, Cu_2S, and $Zn_{3.6+x}Sb_3$ to reach experimentally relevant scales and quantify diffusion barriers of 0.09–0.22 eV, helping explain the origin of their liquid-like behavior.

Research Overview

Distinguished Research Fellow

Yuh-Lin Wang, Ph.D.

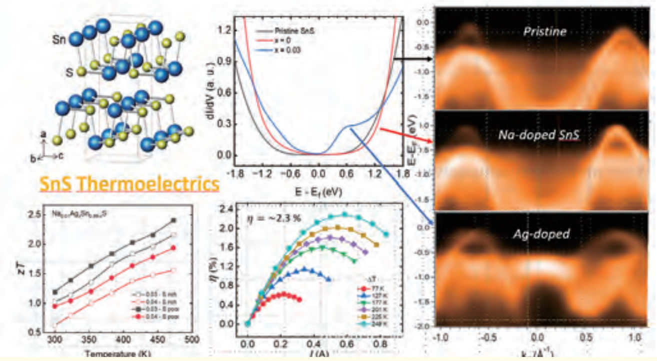
Dr. Yuh-Lin Wang's research focuses on the investigation of novel nanostructures and their applications. In collaboration with Dr. Ching-Ming Wei's group, Dr. Wang has achieved important breakthroughs in the study of self-organized surface magic-number clusters (SMCs) composed of atoms and molecules. Precise construction of nanostructures on surfaces is essential for the advancement of nanoscience and nanotechnology. SMCs are stable atomic or molecular structures that form at specific sizes on particular crystalline surfaces, enabling nanostructure arrays with atomic-scale precision. Dr. Wang's team discovered the first SMC consisting of ten gallium atoms on the Si(111) surface, constructed the first two-dimensional SMC lattice on Si(111), and, in collaboration with Russian experimentalists, observed the first molecular SMC of C_{60} on the Au–In(111) surface. These discoveries elucidate fundamental self-organization mechanisms and open new pathways for nanoscale design with atomic precision. Beyond atomic-scale self-organization, Dr. Wang and Dr. Juen-Kai Wang have jointly created and studied uniform arrays of plasmonic "hot spots" formed by silver nanoparticles confined within anodic aluminum oxide (AAO) nanochannels for surface-enhanced Raman spectroscopy (SERS). Self-organized AAO templates provide a versatile platform for the growth of nanoparticles and nanowires, enabling adjacent silver nanoparticles to be positioned at extremely small and uniform separations, thereby generating homogeneous plasmonic hot spots. This architecture significantly enhances the sensitivity, uniformity, and stability of SERS. Collectively, these studies contribute to establishing SERS as a reliable analytical tool for practical applications, including antibiotic susceptibility testing for patients with sepsis.



Distinguished Research Fellow

Kuei-Hsien Chen, Ph.D.

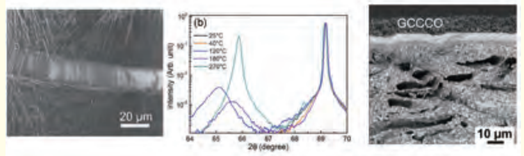
Dr. Kuei-Hsien Chen's research focuses on the synthesis of compound semiconductors and their composites for energy applications such as thermoelectric conversion, photo- and electro-catalytic CO_2 reduction. Current research targets include: (1) CO_2 reduction utilizing low-cost chalcogenides such as 2D SnS_2 photocatalysis. Doping of SnS_2 to enhance visible light absorption and selection of high-value products is desirable; (2) Electrochemical CO_2 reduction utilizing designed catalysts such as single-atom catalysts (SAC) and alloys of Cu, Sn, and Sb to produce CO or HCOOH as syngas for industry; (3) Developing low-cost and high efficiency thermoelectric materials through electronic and phononic band structure engineering. Recent progress in Na and Ag co-doped SnS renders highly desirable near room temperature thermoelectric devices.



Research Fellow

Szu-Yuan Chen, Ph.D.

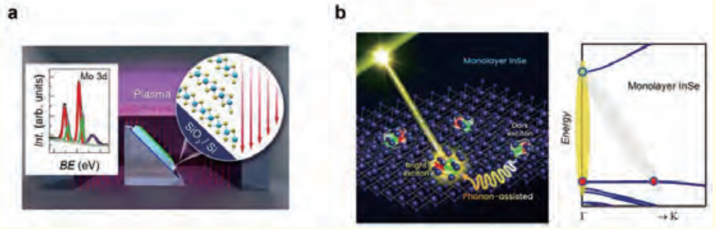
The Light-Controlled Materials Fabrication and Application Laboratory led by Dr. Szu-yuan Chen is currently conducting research in four areas. The first area is in collaboration with Prof. Chung-Jen Tseng of the Department of Mechanical Engineering and the Institute of Energy at National Central University to develop polymer electrolyte membrane fuel cells. Past research focused on improving catalyst layers composed of stacked Pt nanoparticles deposited using pulsed laser deposition. Current research aims to improve solution-phase deposited Pt nanoparticle catalyst layers with catalyst support structures using lasers and to apply these to both low-temperature and high-temperature polymer electrolyte membrane fuel cells. The second area is in collaboration with Prof. Sheng-Wei Lee of the Institute of Materials Science and Engineering at National Central University to develop solid oxide fuel cells. Previous research has focused on using pulsed laser deposition and spontaneous phase separation to significantly improve the cathode/electrolyte interface area and quality, thereby significantly increasing current density. They have also developed a method using paper fibers as pore-forming agents for the anode substrate and using electrophoresis to fill surface pores to significantly improve gas transport rate and supporting pulsed laser deposition, thus significantly increasing cell current density. Currently, research is underway to use pulsed laser deposition and pulsed laser annealing to manufacture cathode catalyst layers with further improved performance. The third area involves collaboration with Prof. Ming-Wei Lin of the Department of Engineering and Systems Science and the Institute of Nuclear Engineering at National Tsing Hua University to develop germanium-tin-based mid-infrared optoelectronic devices and silicon photonics on silicon substrates. Previously, using a plasma-enhanced chemical vapor deposition platform of their own design, they developed a technique for depositing high-quality germanium and germanium-tin thin films on silicon substrates using chloride precursors and successfully fabricated high-performance germanium detectors using this technique. Currently, they are developing mid-infrared photodetectors, light-emitting diodes, and diode lasers based on germanium-tin thin films to extend to longer wavelengths. The fourth area involves collaboration with Prof. Meng-Jiy Wang of the Department of Chemical Engineering at National Taiwan University of Science and Technology to develop tissue engineering techniques. Previously, they developed a method using extrinsic photobiological modulation combined with collagen microislands to achieve a universally applicable way for inducing mesenchymal stem cell differentiation without the need for any specialized chemical factors. Currently, they are developing laser control methods to improve the structure, function, and reliability of induced pluripotent stem cells generated from somatic cells, organoids generated from pluripotent stem cells, and 3D bio-printed organs.



Associate Research Fellow

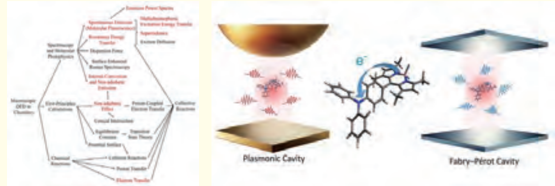
Wei-Hua Wang, Ph.D.

Dr. Wei-Hua Wang leads a research team investigating the electron transport and optoelectronic properties of nanoscale devices based on two-dimensional (2D) materials. Exploiting the diverse physical characteristics of 2D semiconductors and the unique opportunities provided by Van der Waals heterostructures, the group explores novel physics and potential applications unattainable with conventional materials. A primary objective is developing advanced device fabrication techniques that leverage the atomic-scale thickness and lateral bonding of these materials for next-generation nanoelectronics. Specifically, the team has demonstrated enhanced performance in 2D semiconductor field-effect transistors through edge metal contacts, which facilitate complete channel encapsulation. To address the challenges of interface analysis, they innovated a directional angular etching technique that effectively characterizes the chemical states at the metal-semiconductor interface, a critical advancement for optimizing device contacts. Beyond transport, the research delves into novel optoelectronic properties, identifying strong exciton-phonon coupling in monolayer semiconductors to manipulate dark excitons. By precisely controlling material composition and structural architecture, the team aims to bridge the gap between fundamental physical studies and practical applications in high-performance electronic and optoelectronic devices.



Research Fellow

Liang-Yan Hsu, Ph.D.



Dr. Hsu's research focuses on exploring quantum electrodynamical phenomena in chemical systems. Light is a fundamental element in many physical phenomena and chemical reactions. In most cases, weak light-matter coupling can trigger chemical molecules to change their quantum states after absorbing or releasing photons, forming the basis of spectroscopy and photochemistry. Recently, strong light-matter coupling between excited molecules and vacuum electromagnetic fields has received extensive attention due to the intriguing properties of the hybrid states formed by excited molecules and photons (analogous to how two hydrogen atoms form a hydrogen molecule). This emerging field is known as "Polaritonic Chemistry." To properly describe the effects of vacuum electromagnetic fields on chemical molecules, a fully quantum electrodynamic approach is essential. Within the framework of macroscopic quantum electrodynamics, our group has not only generalized several traditional chemical theories to the strong coupling regime but has also incorporated the effects of dielectric environments into light-matter interactions. Building upon quantum electrodynamics, we have successfully extended several representative theories in chemical physics, including:

(i) a unified theory of molecular fluorescence spanning weak to strong light-matter coupling (a generalization of the Chance-Prock-Silbey fluorescence theory),

(ii) a unified theory of radiative and non-radiative energy transfer (a generalization of Förster resonance energy transfer theory),

(iii) the multichromophoric excitation energy transfer theory,

(iv) a unified theory of radiative and non-radiative electron transfer (a generalization of Marcus theory),

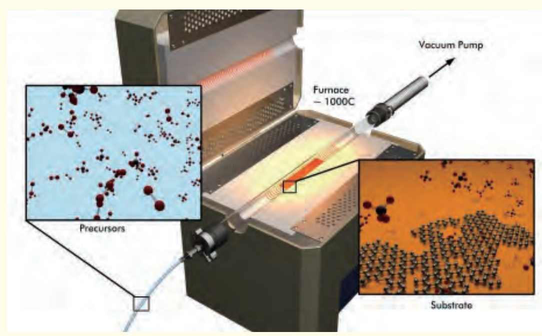
(v) the generalized Born-Huang expansion for photon-electron-nucleus systems (a generalization of the Born-Huang expansion),

(vi) the molecular superradiance theory (a generalization of Spano-Mukamel theory).

Furthermore, our theories enable the description of light-molecule interactions in inhomogeneous, dispersive, and absorbing media, corresponding to materials with space-dependent, frequency-dependent, and complex dielectric functions. In other words, our approach incorporates the effects of plasmon polaritons and cavity photons, as well as material dissipation, without relying on free parameters. Our research perspective extends beyond "Polaritonic Chemistry." More broadly, we explore entirely new phenomena within the domain of "Quantum Electrodynamical (QED) Chemistry."

Research Fellow

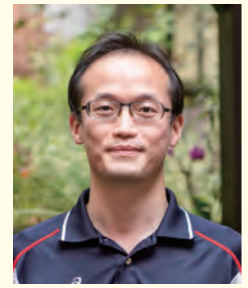
Ya-Ping Hsieh, Ph.D.



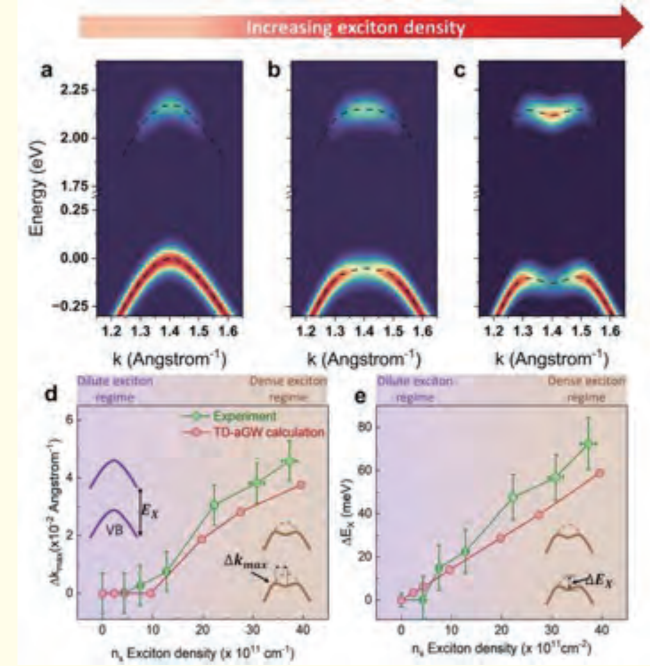
Dr. Ya-Ping Hsieh's laboratory develops novel two-dimensional (2D) materials by exploiting spatial confinement effects to advance chemical vapor deposition (CVD). By engineering confined reaction environments, the lab regulates gas transport, reaction kinetics, and interfacial interactions, enabling improved structural quality while opening access to new 2D phases and functionalities. The lab has established a confined CVD platform for reliable, wafer-scale growth of high-quality 2D materials, including transition metal dichalcogenides (TMDCs), transition metal monochalcogenides (TMMCs), transition metal nitrides (TMNs), and graphene. This mechanistic, confinement-assisted approach enables uniform monolayer films with low defect density and high crystallinity. At the nanoscale, confinement is further extended to nanoscale-precision patterning, providing alternative strategies for high-resolution multi-patterning relevant to advanced semiconductor manufacturing. Beyond synthesis, the lab leverages confinement-enabled structural and chemical control to tune the electrochemical and spin-dependent properties of 2D materials. Edge-localized electric fields and defect engineering enhance catalytic activity in hydrogen evolution (HER) and carbon dioxide reduction (CO_2RR), while controlled confinement and selective doping induce spin polarization, magnetic ordering, and magneto-optical responses. The laboratory continues to explore the synthesis of novel 2D materials via topotactic conversion and confinement-guided reaction pathways to create compositionally and structurally diverse systems, targeting applications in sustainable energy, spintronics, and nano-optoelectronic devices.

Associate Research Fellow

Yang-Hao Chan, Ph.D.



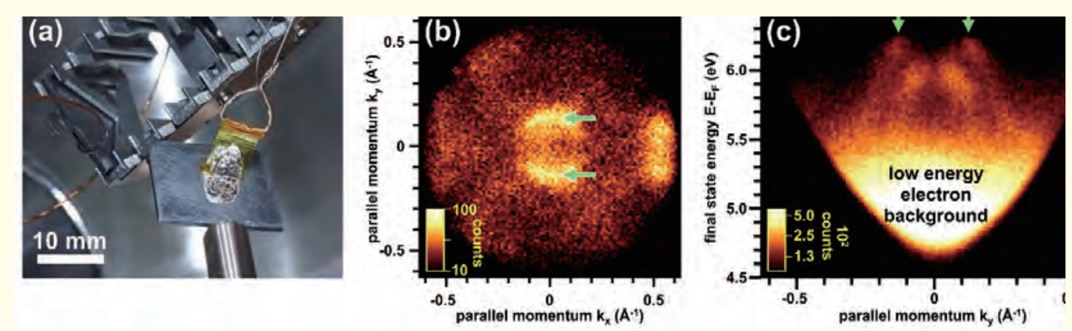
Dr. Chan's research group applies theoretical and computational methods to study nonequilibrium quantum dynamics from first-principles. The group developed a method to compute nonlinear optical responses in the exciton basis and established a diagrammatic approach. They applied this method to study the shift current and second harmonic generation and the associated selection rules. The group is also interested in ultrafast exciton dynamics due to exciton-phonon couplings. In their recent work, they revealed the ultrafast charge transfer path in monolayer MoS_2 and MoS_2/WS_2 heterostructure by analyzing the exciton-phonon coupling matrix elements.



Assistant Research Fellow

Cheng-Tien Chiang,

In November 2019, Dr. Chiang initiated the Ultrafast Surface Science Laboratory focusing on the development of experimental methods to observe and control the ultrafast dynamics of electrons in solids. His primary tools are femtosecond laser pulses and their combinations with photoelectron spectroscopy at solid surfaces. The main research goals of this laboratory are: (1) direct measurements of electronic band structure of solid surfaces with momentum-resolved photoelectron spectroscopy; (2) observation of non-equilibrium distributions of excited electronic states in their momentum and energy phase space; (3) control of ultrafast electronic processes in solids. So far this laboratory has established a pair of home-built non-collinear optical parametric amplifiers and compressed their output pulse duration down to 100 femtoseconds. With this experimental development, momentum-resolved two-photon photoemission spectra have been successfully observed with their characteristic spectroscopic details on single crystals Ag(001) and $NiTe_2$. In the near future, this laboratory is going to develop further ultrafast light sources, including high-order harmonic generation and terahertz pulses, and these advanced light sources will allow efficient control of the excited states of electrons and phonons in solids. Moreover, advanced coincidence detection of photoelectron pairs will be envisioned in the future for the direct analysis of the energy and momentum-dependent interaction between correlated electrons in solids.

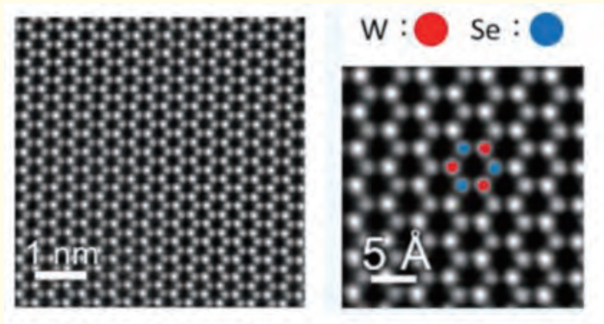


Research Overview

Senior Research Staff Scientist

Jessie Yunn-Shin Shiue, Ph.D.

Dr. Jessie Shiue's research focuses on the development and application of advanced electron microscopy techniques. She has extensive experience in related research and development, and has previously led a team in developing a TEM phase-plate system. By employing analytical electron microscopy techniques for materials characterization and manipulation, her research enables the correlation of novel phenomena in emerging materials and devices with their unique structures, thereby enabling further studies of advanced material properties and device development. Her recent collaborative research work include the development and characterization of novel methods for the large-area growth of two-dimensional materials (Nature Communications, 16, 2777, 2025).



Jointly Appointed Principal Investigators

IAMS maintains active synergies and collaborations with leading research universities across Taiwan, including the joint appointment of numerous distinguished professors and scholars.

◯ Jointly Appointed Principal Investigators ◯

Dr. Juen-Kai Wang

(joint appointment with National Taiwan University) founded the Modern Optical Spectroscopy Laboratory in 1994 to address challenging problems in fundamental condensed-matter physics using innovative spectroscopic techniques with high temporal, spatial, and energy resolution. The laboratory develops and employs methods including spectrally resolved femtosecond pump–probe spectroscopy, sub-10-nm near-field optical microscopy, tip-enhanced Raman scattering (TERS) microscopy, and high-precision Raman spectroscopy. Current research focuses on (1) chemical pressure and photoluminescence studies of hybrid organic–inorganic perovskites, (2) fundamental studies toward rapid phenotypic antimicrobial susceptibility testing, (3) SERS-based detection of chromate in the presence of other ionic species, and (4) enhancing bacterial secretion to improve SERS detection.

Dr. Chia-Chun Chen

(joint appointment with National Taiwan Normal University) specializes in the synthesis and application of nanomaterials, including the preparation of various nanoparticles and the development of novel synthetic methods, characterization of their physical properties, and applications in the energy and biomedical fields. Recent work includes manipulating electronic polarization in two-dimensional layered $CuInP_2S_6$ via ferroelectric and magnetic approaches to enhance photocatalytic CO_2 reduction (*J. Am. Chem. Soc.* 146, 23278–23288, 2024).

Dr. Minn-Tsong Lin

(joint appointment with National Taiwan University) specializes in nanomagnetism and has long pursued research on low-dimensional magnetism, spin transport, and nanoscale devices. His group introduces emerging materials into conventional electronics and spintronics and develops advanced spintronic systems, demonstrating performance gains of two-dimensional crystals in electronic and spintronic devices. Beyond low-dimensional materials, he also studies novel crystals with strong orbital angular momentum, aiming to uncover new orbital physics and advance next-generation orbitronic devices; his recent international collaboration used momentum microscopy (circular-dichroism soft X-ray ARPES) on B20 CoSi to resolve chirality-driven orbital angular momentum textures (*Phys. Rev. Lett.* 132, 196402, 2024).

Dr. Ken-Tsung Wong

(joint appointment with National Taiwan University) specializes in the molecular design and synthesis of functional organic molecules, with particular emphasis on organic materials for optoelectronic applications. Recent work includes using entropy-driven charge-transfer complexation to generate thermally activated delayed fluorescence, enabling highly efficient organic light-emitting diodes (OLEDs) (*Nature Chemistry* 16, 98–106, 2024).

Dr. Po-Wen Chiu

(joint appointment with National Tsing Hua University) is devoted to the growth of two-dimensional layered materials, band-structure engineering, and their semiconductor applications. Recent topics and results from his laboratory include studies of emerging 2D layered semiconductors and devices, such as graphene, WS_2, WSe_2, and Bi_2O_2Se, as well as investigations into the mechanisms of alkali-metal intercalation in bilayer graphene (*Nature Communications* 15, 425, 2024).

Dr. Ya-Ping Chiu

(joint appointment with National Taiwan University) investigates the properties of materials and devices using scanning probe microscopy (SPM) and continues to develop key SPM techniques to probe the materials world at the atomic scale. Recent work combines low-temperature scanning tunneling microscopy/spectroscopy (LT-STM/S) with quasiparticle interference (QPI) analysis to reveal how atomic-scale defects in transition-metal dichalcogenides (TMDs) affect carrier transport, showing that different defect types can tune the scattering potential and that the energy-dependent QPI standing-wave phase helps clarify how substitutional defects influence electronic behavior *(ACS Nano* 18, 17622, 2024).

◯ Jointly Appointed Principal Investigators ◯

Dr. Hsin-Jay Wu

(joint appointment with National Taiwan University) specializes in electron and phonon engineering of thermoelectric materials, integrating metallurgical thermodynamics, materials synthesis, and carrier transport analysis to systematically develop novel energy materials with both high performance and thermal stability.

Dr. Yi-Chun Wu

(joint appointment with National Taiwan University) is a Distinguished Professor at the College of Life Science, specializing in molecular genetic developmental biology. Her research focuses on key biological processes including programmed cell death, apoptotic cell-corpse clearance, cell migration, and organ development. Using C. elegans as a model organism and combining genetic and molecular approaches, her team investigates how cells execute death and engulfment programs with precision and how cell migration is spatiotemporally regulated; they also extend genes identified in worms to human cells to explore their roles in disease mechanisms such as neurodegeneration and cancer.

Dr. Hsueh-Fen Juan

(joint appointment with National Taiwan University) is a Distinguished Professor in the Department of Life Science and specializes in systems biology, synthetic biology, and bioinformatics. Her research integrates genomics, transcriptomics, proteomics, and bioinformatics to elucidate cellular signaling networks, investigate cancer biology, enable drug-target discovery, and support bioenergy development.

Dr. Tai-Chi Hsiao

(joint appointment with National Taiwan University) and his laboratory have established comprehensive real-time air quality monitoring stations since 2014, with a research focus on fine particulate matter (PM2.5) and ultrafine particles (UFP). Through long-term observation of aerosol physical and chemical properties, the lab has successfully analyzed the spatial and temporal variations of particles, studied the causes of atmospheric visibility degradation, developed quantification methods for oxidative potential of aerosol particles, assessed the health risks of urban traffic emissions, and focused on using lung-deposited surface area (LDSA) as a health effect indicator.

Dr. Sungkit Yip

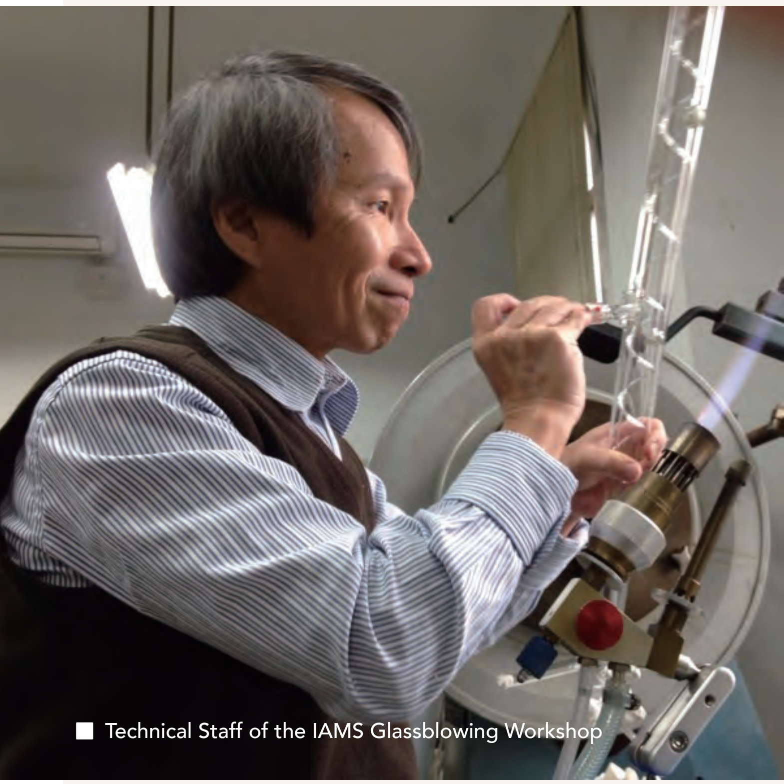
(joint appointment with the Institute of Physics, Academia Sinica) is devoted to theoretical investigations of superconductivity and ultra-cold atomic gases, especially multi-component bosonic and fermionic systems, superfluidity and pairing in fermionic atoms, quantum magnetism in optical lattices and other strongly correlated phenomena.

Dr. Shau-Yu Lan

(joint appointment with National Taiwan University) focuses on advancing applications of atomic interferometry in fundamental physics, quantum sensing, and inertial navigation, working to unlock new possibilities for these cutting-edge technologies. Additionally, Dr. Lan investigates the quantum control of atoms in optical lattices, aiming to explore core issues in continuous-variable quantum information processing and many-body physics.

Research Support

Since its inception, IAMS has maintained in-house mechanical, electronic, and glassblowing workshops, staffed by highly experienced master technicians capable of custom fabricating the instruments required for specialized experiments. This was exceptionally rare in Taiwan at the time and contributed significantly to elevating the quality of scientific research. Subsequently, the Institute established the Laser & Photonics Support Center to expand its research support. Over the past decade, IAMS has developed additional research support laboratories and academic exchange platforms to sustain cutting-edge research and strengthen its engagement with the international scientific community.


■ Technical Staff of the IAMS Glassblowing Workshop


■ Technical Staff of the IAMS Mechanical Workshop

Taiwan Node of the Centre Européen de Calcul Atomique et Moléculaire (CECAM-TW Node)

Since 2023, the Institute has been leading the establishment and operation of the CECAM Taiwan Node (CECAM-TW). In October 2023, the 6th International Conference on Molecular Simulation (ICMS 2023) was held in Taiwan, successfully attracting nearly 300 researchers from around the world. Invited speakers included distinguished scientists from the United States, Europe, and Japan, as well as Dr. Chin-Min Wei, Director of IAMS, and Dr. Tai-Wei Wu, Director of the Institute of Chemistry at Academia Sinica. Many international experts were deeply impressed by the research capabilities demonstrated by Taiwan's theoretical and computational science community, as well as the ability of Taiwanese research teams to bring together the broader Asian scientific community.

Shortly after the conclusion of the ICMS conference, the Director of the European Centre for Atomic and Molecular Computation (CECAM) proactively contacted researchers at IAMS to explore the possibility of establishing a CECAM Taiwan Node under the leadership of Academia Sinica. At that time, outside Europe, only Israel, Chicago, and Beijing hosted CECAM nodes. The proposal received strong support from the directors of four Academia Sinica institutes—IAMS, the Institute of Physics, the Institute of Chemistry, and the Institute of Biological Chemistry—who subsequently organized a coordinating team composed of core members from these institutes.

The application to establish CECAM-TW was approved at the CECAM Council meeting held in late 2024, and the initiative has since secured financial support from both the Institute and Academia Sinica. After its formal establishment, the Taiwan Node will focus on supporting local scientific activities, hosting visiting scientists, and facilitating participation by Taiwanese researchers in events organized by other CECAM nodes, thereby strengthening research interactions and collaborations. With broad institutional backing, the establishment of CECAM-TW—spearheaded by IAMS—is expected to further strengthen the research capabilities of Taiwan's theoretical and computational science community.

Biophysics Core Facility

The Biophysics Core Facility Laboratory at IAMS provides equipment and technical support for research related to the biological sciences. Its facilities include a Biosafety Level-2 (P2) cell culture room and a wide range of shared instruments, such as a circular dichroism spectrometer, MALDI-TOF mass spectrometer, PCR systems, flow cytometers, flow cell sorters, fluorescence and absorption spectrometers, and an ultracentrifuge. In addition, the laboratory is equipped with a Leica SP8 white-light confocal microscope to support research at the cellular and molecular levels.

The core laboratory also houses essential infrastructure, including low-temperature freezers, an ice maker, a bottle washer, a purified-water system, and a high-temperature high-pressure autoclave. All certified student researchers have 24-hour access to the facility. Through resource sharing, the laboratory enables researchers to conduct experiments more efficiently and enhances the overall quality of scientific output.

Advanced Materials Characterization Laboratory

IAMS hosts a materials research shared laboratory that provides access to a wide range of common experimental instruments, including spectroscopic measurement systems, optical and scanning electron microscopes. In addition, in 2021, IAMS assisted Academia Sinica in establishing Taiwan's first Double Aberration-Corrected Transmission Electron Microscope (Double AC-TEM) laboratory. The facility is operated by a dedicated team of professional research scientists employed by IAMS, offering state-of-the-art, atomic-scale materials characterization to support researchers at IAMS and across other research institutes within Academia Sinica.


■ Two former and current directors of IAMS visited the Double Aberration-Corrected Transmission Electron Microscope laboratory.

Major Research Achievements

Over the past three decades, the Institute of Atomic and Molecular Sciences has achieved numerous groundbreaking research milestones through the collective dedication and ingenuity of its members.

1996~2005

Direct Observation of Two Dimensional Magic Clusters

M. Y. Lai and Y. L. Wang (王玉麟)
Physical Review Letters, 81, 164 (1998)
DOI: https://doi.org/10.1103/PhysRevLett.81.164

Ab Initio Calculations of Vibronic Spectra and Dynamics for Small Polyatomic Molecules: Role of Duschinsky Effect

A. M. Mebel (梅亞歷), M. Hayashi, K. K. Liang, and S. H. Lin (林聖賢)
The Journal of Physical Chemistry A, 103, 10674 (1999)
DOI: https://doi.org/10.1021/jp992429m

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van der Waals Interactions in the Cl + HD Reaction

Dimitris Skouteris, David E. Manolopoulos, Wensheng Bian, Hans-Joachim Werner, Lih-Huey Lai, and Kopin Liu (劉國平)
Science, 286, 1713 (1999)
DOI: https://doi.org/10.1126/science.286.5445.1713

Resonance-Mediated Chemical Reaction: F + HD → HF + D

Rex T. Skodje, Dimitris Skouteris, David E. Manolopoulos, Shih-Huang Lee, Feng Dong, and Kopin Liu (劉國平)
Physical Review Letters, 85, 1206 (2000)
DOI: https://doi.org/10.1103/PhysRevLett.85.1206

Infrared Spectra of H+(H2O)5-8 Clusters: Evidence for Symmetric Proton Hydration

Jyh-Chiang Jiang, Yi-Sheng Wang, Hai-Chou Chang, Sheng H. Lin, Yuan T. Lee (李遠哲), Gereon Niedner-Schatteburg, and Huan-Cheng Chang (張煥正)
Journal of the American Chemical Society, 122, 1398 (2000)
DOI: https://doi.org/10.1021/ja990033i

Multimass Ion Imaging Detection: Application to Photodissociation

Shang-Ting Tsai, Chih-Kai Lin, Yuan T. Lee (李遠哲), and Chi-Kung Ni (倪其焜)
Review of Scientific Instruments, 72, 1963 (2001)
DOI: https://doi.org/10.1063/1.1359188

State-Specific Correlation of Coincident Product Pairs in the F + CD4 Reaction

Jim J. Lin (林志民), Jingang Zhou, Weicheng Shiu, and Kopin Liu (劉國平)
Science, 300, 966 (2003)
DOI: https://doi.org/10.1126/science.1083672

Structure Determination of Surface Magic Clusters

H. H. Chang, M. Y. Lai, J. H. Wei, C. M. Wei (魏金明), and Y. L. Wang (王玉麟)
Physical Review Letters, 92, 066103 (2004)
DOI: https://doi.org/10.1103/PhysRevLett.92.066103

Bright Fluorescent Nanodiamonds: No Photobleaching and Low Cytotoxicity

Shu-Jung Yu, Ming-Wei Kang, Huan-Cheng Chang (張煥正), Kuan-Ming Chen, and Yueh-Chung Yu
Journal of the American Chemical Society, 127, 17604 (2005)
DOI: https://doi.org/10.1021/ja0567081

2006~2015

Highly Raman-Enhancing Substrates Based on Silver Nanoparticle Arrays with Tunable Sub-10 nm Gaps

H. H. Wang, C. Y. Liu, S. B. Wu, N. W. Liu, C. Y. Peng, T. H. Chan, C. F. Hsu, J. K. Wang (王俊凱), and Y. L. Wang (王玉麟)
Advanced Materials, 18, 491 (2006)
DOI: https://doi.org/10.1002/adma.200501875

Enhancement of Relativistic Harmonic Generation by an Optically Preformed Periodic Plasma Waveguide

C. C. Kuo, C. H. Pai, M. W. Lin, K. H. Lee, J. Y. Lin, J. Wang (汪治平), and S. Y. Chen (陳賜原)
Physical Review Letters, 98, 033901 (2007)
DOI: https://doi.org/10.1103/PhysRevLett.98.033901

Tracking the Energy Flow along the Reaction Path

Shannon Yan, Yen-Tien Wu, and Kopin Liu (劉國平)
The Proceedings of the National Academy of Sciences of the USA, 105, 12667 (2008)
DOI: https://doi.org/10.1073/pnas.0800220105

Mass Production and Dynamic Imaging of Fluorescent Nanodiamonds

Yi-Ren Chang, Hsu-Yang Lee, Kowa Chen, Chun-Chieh Chang, Dung-Sheng Tsai, Chi-Cheng Fu, Tsong-Shin Lim, Yan-Kai Tzeng, Chia-Yi Fang, Chau-Chung Han (韓肇中), Huan-Cheng Chang (張煥正), and Wunshain Fann (范文祥)
Nature Nanotechnology, 31, 284 (2008)
DOI: https://doi.org/10.1038/nnano.2008.99

UV Absorption Cross Sections of ClOOCl are Consistent with Ozone Degradation Models

Hsueh-Ying Chen, Chien-Yu Lien, Wei-Yen Lin, Yuan T. Lee (李遠哲), and Jim J. Lin (林志民)
Science, 324, 781 (2009)
DOI: https://doi.org/10.1126/science.1171305

CH Stretching Excitation in the Early Barrier F + CHD_3 Reaction Inhibits CH Bond Cleavage

Weiqing Zhang, Hiroshi Kawamata, and Kopin Liu (劉國平)
Science, 325, 303 (2009)
DOI: https://doi.org/10.1126/science.1175018

Synthesis and Measurement of Ultrafast Waveforms from Five Discrete Optical Harmonics

Han-Sung Chan, Zhi-Ming Hsieh, Wei-Hong Liang, A. H. Kung (孔慶昌), Chao-Kuei Lee, Chien-Jen Lai, Ru-Pin Pan, and Lung-Han Peng
Science, 331, 1165 (2011)
DOI: https://doi.org/10.1126/science.1198397

Revealing the Stereospecific Chemistry of the Reaction of Cl with Aligned $CHD_3(v_1=1)$

Fengyan Wang, Kopin Liu (劉國平), and T. Peter Rakitzis
Nature Chemistry, 4, 636 (2012)
DOI: https://doi.org/10.1038/nchem.1383

Graphene Oxide as a Promising Photocatalyst for CO2 to Methanol Conversion

Hsin-Cheng Hsu, Indrajit Shown, Hsieh-Yu Wei, Yu-Chung Chang, He-Yun Du, Yan-Gu Lin, Chi-Ang Tseng, Chen-Hao Wang, Li-Chyong Chen, Yu-Chuan Lin, and Kuei-Hsien Chen (陳貴賢)
Nanoscale, 51, 262 (2013)
DOI: https://doi.org/10.1039/C2NR31718D

Ultrahigh-Gain Photodetectors Based on Atomically Thin Graphene-MoS_2 Heterostructures

Wenjing Zhang, Chih-Piao Chuu, Jing-Kai Huang, Chang-Hsiao Chen, Meng-Lin Tsai, Yung-Huang Chang, Chi-Te Liang, Yu-Ze Chen, Yu-Lun Chueh, Jr-Hau He, Mei-Yin Chou (周美吟) & Lain-Jong Li (李連忠)
Scientific Reports, 4, 3826 (2014)
DOI: https://doi.org/10.1038/srep03826

Determination of Band Alignment in the Single-Layer MoS_2/WSe_2 Heterojunction

Ming-Hui Chiu, Chendong Zhang, Hung-Wei Shiu, Chih-Piao Chuu, Chang-Hsiao Chen, Chih-Yuan S. Chang, Chia-Hao Chen, Mei-Yin Chou (周美吟), Chih-Kang Shih, and Lain-Jong Li (李連忠)
Nature Communications, 6, 7666 (2015)
DOI: https://doi.org/10.1038/ncomms8666

Direct Kinetic Measurement of the Reaction of the Simplest Criegee Intermediate with Water Vapor

Wen Chao, Jun-Ting Hsieh, Chun-Hung Chang, and Jim J. Lin (林志民)
Science, 347, 751-754, (2015)
DOI: https://doi.org/10.1126/science.1261549

Time-Resolved Luminescence Nanothermometry with Nitrogen-Vacancy Centers in Nanodiamonds

Yan-Kai Tzeng, Pei-Chang Tsa, Hsiou-Yuan Liu, Oliver Y. Chen, Hsiang Hsu, Fu-Goul Yee, Ming-Shien Chang (張銘顯), and Huan-Cheng Chang (張煥正)
Nano Letters, 15, 3945 (2015)
DOI: https://doi.org/10.1021/acs.nanolett.5b00836

2016~2025

Interlayer couplings, Moiré patterns, and 2D electronic superlattices in MoS_2/WSe_2 hetero-bilayers

Chendong Zhang, Chih-Piao Chuu, Xibiao Ren, Ming-Yang Li, Lain-Jong Li, Chuanhong Jin, Mei-Yin Chou (周美吟), Chih-Kang Shih
Science Advances, 3, e1601459 (2017)
DOI: https://doi.org/10.1126/sciadv.1601459

Coherent Brightfield Microscopy Provides the Spatiotemporal Resolution to Study Early Stage Viral Infection in Live Cells

Yi-Fan Huang, Guan-Yu Zhuo, Chun-Yu Chou, Cheng-Hao Lin, Wen Chang, and Chia-Lung Hsieh (謝佳龍)
ACS Nano, 11, 2575 (2017)
DOI: https://doi.org/10.1021/acsnano.6b05601

Spin-Orbital-Angular-Momentum Coupled Bose-Einstein Condensates

H. R. Chen, K. Y. Lin, P. K. Chen, N. C. Chiu, J. B. Wang, C. A. Chen, Panpan Huang, S. K. Yip (葉崇傑), Yuki Kawaguchi, and Y. J. Lin (林育如)
Physical Review Letters, 121, 113204 (2018)
DOI: https://doi.org/10.1103/PhysRevLett.121.113204

Carbon-Doped SnS_2 Nanostructure as a High-Efficiency Solar Fuel Catalyst under Visible Light

Indrajit Shown, Satyanarayana Samireddi, Yu-Chung Chang, Raghunath Putikam, Po-Han Chang, Amr Sabbah, Fang-Yu Fu, Wei-Fu Chen, Chih-I Wu, Tsyr-Yan Yu (余慈顏), Po-Wen Chung, M. C. Lin, Li-Chyong Chen, and Kuei-Hsien Chen (陳貴賢)
Nature Communications, 9, 169 (2018)
DOI: https://doi.org/10.1038/s41467-017-02547-4

Simple Method for De Novo Structural Determination of Underivatised Glucose Oligosaccharides

Hsu Chen Hsu, Chia Yen Liew, Shih-Pei Huang, Shang-Ting Tsai, and Chi-Kung Ni (倪其焜)
Scientific Reports, 8, 5562 (2018)
DOI: https://doi.org/10.1038/s41598-018-23903-4

Highly Efficient Coherent Optical Memory Based on Electromagnetically Induced Transparency

Ya-Fen Hsiao, Pin-Ju Tsai, Hung-Shiue Chen, Sheng-Xiang Lin, Chih-Chiao Hung, Chih-Hsi Lee, Yi-Hsin Chen, Yong-Fan Chen, Ite A. Yu, and Ying-Cheng Chen (陳應誠)
Physical Review Letters, 120, 183602 (2018)
DOI: https://doi.org/10.1103/PhysRevLett.120.183602

Multiresolution Imaging Using Bioluminescence Resonance Energy Transfer Identifies Distinct Biodistribution Profiles of Extracellular Vesicles and Exomeres with Redirected Tropism

Anthony Yan-Tang Wu, Yun-Chieh Sung, Yen-Ju Chen, Steven Ting-Yu Chou, Vanessa Guo, Jasper Che-Yung Chien, John Jun-Sheng Ko, Alan Ling Yang, Hsi-Chien Huang, Ju-Chen Chuang, Syuan Wu, Meng-Ru Ho, Maria Ericsson, Wan-Wan Lin, Chantal Hoi Yin Cheung, Hsueh-Fen Juan, Koji Ueda, Yunching Chen, and Charles Pin-Kuang Lai (賴品光)
Advanced Science, 7, 2001467 (2020)
DOI: https://doi.org/10.1002/advs.202001467

Strong Fermi Resonance Associated with Proton Motions Revealed by Vibrational Spectra of Asymmetric Proton-Bound Dimers

Qian-Rui Huang, Ryunosuke Shishido, Chih-Kai Lin, Chen-Wei Tsai, Jake A. Tan, Asuka Fujii, Jer-Lai Kuo (郭哲來)
Angewandte Chemie-International Edition, 60, 1936 (2021)
DOI: https://doi.org/10.1002/anie.202012665

Direct Investigation of the Reorientational Dynamics of A-Site Cations in 2D Organic-Inorganic Hybrid Perovskite by Solid-State NMR

Cheng-Chieh Lin, Shing-Jong Huang, Pei-Hao Wu, Tzu-Pei Chen, Chih-Ying Huang, Ying-Chiao Wang, Po-Tuan Chen, Denitsa Radeva, Ognyan Petrov, Vladimir M. Gelev, Raman Sankar, Chia-Chun Chen (陳家俊), Chun-Wei Chen, and Tsyr-Yan Yu (余慈顏)
Nature Communications, 13, 1513 (2022)
DOI: https://doi.org/10.1038/s41467-022-29207-6

A Non-Hermitian Optical Atomic Mirror

Yi-Cheng Wang, Jhih-Shih You, and H. H. Jen (任祥華)
Nature Communications, 13, 4598 (2022)
DOI: https://doi.org/10.1038/s41467-022-32372-3

Fermi-Phase-Induced Interference in the Reaction between Cl and Vibrationally Excited CH_3D

Huilin Pan, and Kopin Liu (劉國平)
Nature Chemistry, 14, 545 (2022)
DOI: https://doi.org/10.1038/s41557-022-00914-3

Membrane Protein Modification Modulates Big and Small Extracellular Vesicle Biodistribution and Tumorigenic Potential in Breast Cancers In Vivo

Bryan John Abel Magoling, Anthony Yan-Tang Wu, Yen-Ju Chen, Wendy Wan-Ting Wong, Steven Ting-Yu Chuo, Hsi-Chien Huang, Yun-Chieh Sung, Hsin Tzu Hsieh, Poya Huang, Kang-Zhang Lee, Kuan-Wei Huang, Ruey-Hwa Chen, Yunching Chen, Charles Pin-Kuang Lai (賴品光)
Advanced Materials, 35, 2208966 (2023)
DOI: https://doi.org/10.1002/adma.202208966

Exciton Lifetime and Optical Line Width Profile via Exciton–Phonon Interactions: Theory and First-Principles Calculations for Monolayer MoS_2

Yang-hao Chan (詹楊皓), Jonah B. Haber, Mit H. Naik, Jeffrey B. Neaton, Diana Y. Qiu, Felipe H. da Jornada, and Steven G. Louie
Nano Letters, 23, 3971 (2023)
DOI: https://doi.org/10.1021/acs.nanolett.3c00732

Anomalous Giant Superradiance in Molecular Aggregates Coupled to Polaritons

Yi-Ting Chuang, and Liang-Yan Hsu (許良彥)
Physical Review Letters, 133, 128001 (2024)
DOI: https://doi.org/10.1103/PhysRevLett.133.128001

Accurate Kinetic Studies of OH + HO_2 Radical–Radical Reaction through Direct Measurement of Precursor and Radical Concentrations with High-Resolution Time-Resolved Dual-Comb Spectroscopy

I-Yun Chen, Che-Wei Chang, Christa Fittschen, and Pei-Ling Luo (羅佩凌)
The Journal of Physical Chemistry Letters, 15, 3733 (2024)
DOI: https://doi.org/10.1021/acs.jpclett.4c00494

Generalized Born-Huang Expansion under Macroscopic Quantum Electrodynamics Framework

Hung-Sheng Tsai, Chih-En Shen, Liang-Yan Hsu (許良彥)
The Journal of Chemical Physics, 160, 144112 (2024)
DOI: https://doi.org/10.1063/5.0195087

Academic Outreach

People are the most critical factor in scientific research. Naturally, IAMS cannot rely on a passive, "wait-and-see" recruitment strategy, like the legendary Grand Duke Jiang, waiting for a willing fish to take the bait. Over the years, the Institute has proactively promoted science outreach initiatives and taken the lead in nurturing promising young talents, aspiring to cultivate the next generation of scientists and engineers for the society. The Institute continues to organize a wide range of academic outreach programs and often hosts visiting groups, striving to bring science closer to the public and to deepen understanding of the value and significance of scientific research.
Key highlights of these activities include:

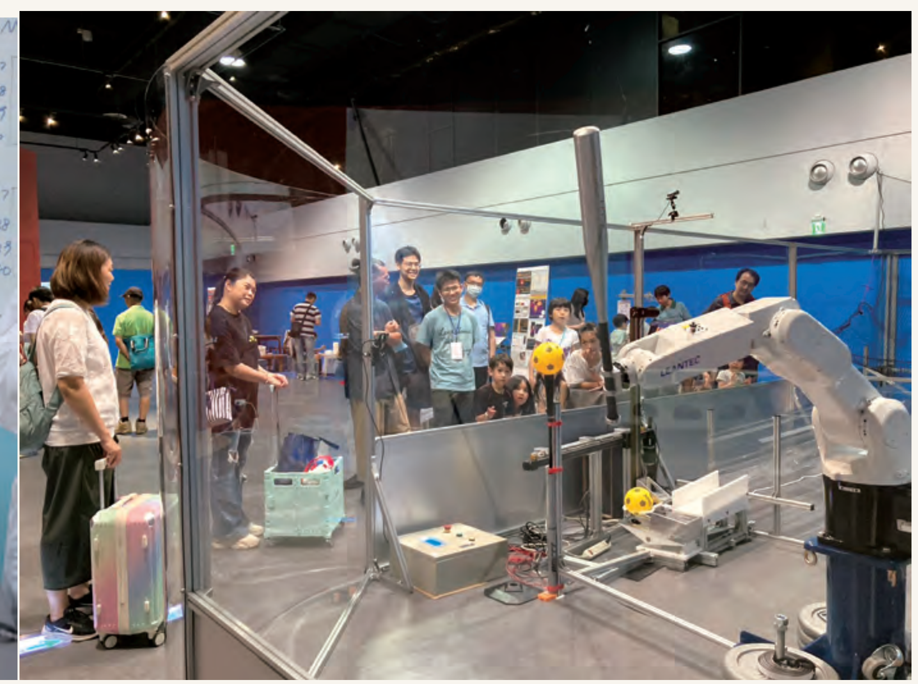
The Marie Curie Science Camp

Since 2020, IAMS and the Chang Chau-Ting Memorial Foundation have co-organized the "Marie Curie Science Camp". Each year, the camp brings together over 100 high school students and 30 teachers, supported by a multi-tiered instructional team. This team includes 20 undergraduate peer mentors, 10 graduate/undergraduate-level curriculum developers, and 20 student assistants from Taipei First Girls' High School who facilitate hands-on experiments. Rounding out the Program are approximately 10 invited expert speakers and panelists, in addition to several staff members. A defining feature of this camp is its emphasis on hands-on experimentation. Beyond traditional lectures and discussions, two full afternoons are dedicated to allowing participants to conduct their own scientific experiments.

"The Wonder of Molecular Encounters" Permanent Exhibition

Starting in 2025, IAMS and the Yuan T. Lee Foundation Science Education for All co-launched a permanent exhibition "The Wonder of Molecular Encounters" at the National Taiwan Science Education Center. The exhibition features the crossed molecular beam apparatus built by the Nobel Laureate, Academician Yuan T. Lee, detailing its underlying principles and historical narrative. A core component is the hands-on science exploration zone. Through carefully crafted interactive experiments, visitors of all ages can directly experience the joy of scientific discovery. Current interactive modules include:
"Robot Plays Baseball" for demonstrating collision mechanics;
"Seeing through (by Eye) Is Not Necessarily Transmitting (Thermal Radiation)" for exploring the thermal radiation transmittance of different materials;
"Super Greenhouse Gas" for illustrating how greenhouse gases absorb thermal radiation;
"Draw out the Heat on Teppanyaki" for demonstrating that metal has a much lower emissivity than liquid water;
"Thermal Kaleidoscope" using thermal images reflected from aluminum plates to create a kaleidoscope effect;
"Laser on Balloon" for a dramatic demonstration of absorption spectroscopy.

Marie Curie Science Camp



The Wonder of Molecular Encounters

Message from the Editors

Editors-in-Chief: Dr. Charles Pin-Kuang Lai, Dr. Jessie Yunn-Shin Shiue

Editorial Team: Dr. Yuh-Lin Wang, Dr. Huan-Cheng Chang, Dr. Jim Jr-Min Lin

The corridor outside the Chang Chau-Ting Memorial Hall at IAMS bears an inscription of Dr. Chau-Ting Chang's words of counsel, delivered in 1970.

Message from the Editors

The completion of this 30th Anniversary Issue represents the collective dedication and wisdom of many, chronicling the evolution and spirit of the Institute of Atomic and Molecular Sciences (IAMS) since its founding. Through the compilation process, we were reminded once again of how the Institute's unique legacy: from its early planning stages, IAMS established a culture of charting its own course rather than merely following academic trends. These foundations have sustained our research and development over the long term and reflected the shared perseverance and ideals of scientists across generations.

Particularly moving is a reflection from one of the co-founders, Dr. Chau-Ting Chang, dating back to 1970, which resonates as powerfully today as it did then: "Scientific and technological research must be conducted with absolute integrity and solidity; there is no room for showboating. If modern science and technology are to take root, bloom, and bear fruit in Taiwan, this generation must be prepared, in spirit, to serve as the fertilizer." The firm foundations and flourishing successes we see today were built upon the enduring and selfless service of those who preceded us.

We hereby extend our most sincere gratitude and respect to the generations past. At the same time, we look to our mid-career and younger scholars to take up the mantle. With an open mind and the courage to innovate, may you forge an even broader future for IAMS and for scientific research in Taiwan. May this spirit endure like an eternal flame, passed from hand to hand; as we continue to cultivate and break new ground, let us welcome an even more brilliant era ahead.

Building on the Past, Forging the Future
—Passing the Torch Onward

Dr. Charles Pin-Kuang Lai and
Dr. Jessie Yunn-Shin Shiue
September, 2025

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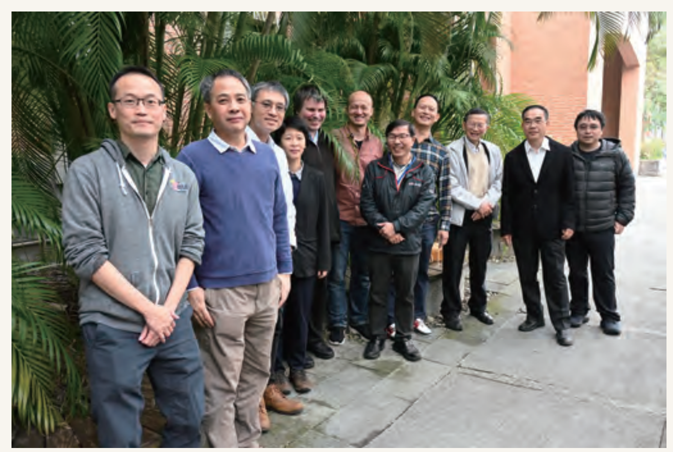

Photo Highlights:
30th Anniversary Celebration

Creating a Future of Continued Excellence
—Join Us on the Journey.

30th Anniversary Issue, Institute of Atomic and Molecular Sciences, Academia Sinica

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2025: 30th Anniversary of IAMS

1995: Inauguration of IAMS

1982: Establishment of the Preparatory Office

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