



# NATIONAL TAIWAN NORMAL UNIVERSITY

## NEWSLETTER

ISSUE 05: SPRING / SUMMER 2024



|| COVER STORY: MANDARIN MADE MODERN  
|| FOCUS: WHERE EXPERIMENTS MEET EXCELLENCE

# President's message



## *Cheng-Chih Wu*

President, National Taiwan Normal University

National Taiwan Normal University (NTNU) takes the lead in advancing higher education with a deep commitment to research and educational excellence. This is manifested through a robust and diverse curriculum across our colleges and institutes. Our faculty, experts in their fields, also embody a passion for exceptional teaching. This dual focus is a defining feature of all NTNU disciplines, particularly evident in our globally recognized Chinese as a second language education.

Central to our success in this area is the Department of Chinese as a Second Language (CSL). The department prepares the next generation of Chinese language educators and conducts pioneering research on instructional methodologies. Collaborating with our acclaimed Mandarin Training Center (MTC), NTNU provides the best Mandarin education in the world. Additionally, teaching, learning, and assessment resources established in the COOL (Competence-Oriented Omniform Learning) Chinese suite of online products and applications have put NTNU at the forefront of developing educational technologies for CSL. They are invaluable resources for educators and potent learning tools for Chinese language learners.

NTNU's influence in Mandarin education extends globally. We strengthen intercollegiate relationships through initiatives like the Huayu BEST (Bilingual Exchange of Selected Talents) program. We also engage in USR (university social responsibility) projects such as the El Menahil School in Turkey, where our faculty and student teachers volunteer to teach Mandarin to Syrian teens in refugee camps.

Our pursuit of technological advancement is not just confined to language education. NTNU is home to over 20 cutting-edge laboratories which are equipped with science and high-tech instruments for various research fields and purposes, from sports science, art restoration, to chemical analysis. This array of resources, combined with our interdisciplinary curriculum, fosters a dynamic synergy across various areas of study. This environment propels academic and practical advancements and catalyzes interdepartmental, intercollegiate, and international collaborations.

NTNU remains true to its foundational commitment to excellence in education while embracing a leadership role in technological innovation. Our ongoing endeavors in these domains underscore our steadfast dedication to making a significant contribution to the global community.

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NTNU boasts more than 20 laboratories housing state-of-the-art scientific instruments on a campus with robust interdisciplinary resources for successful intersectoral collaborations.

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**ON THE COVER:**

*This academic year, NTNU has welcomed approximately 4000 students from over 80 countries to the Mandarin Training Center.*

# Tech-assisted Learning

NTNU faculty members have recently collaborated on groundbreaking research in education sciences.



## Reading Behavior in Science Comics and Its Relations with Comprehension Performance and Reading Attitudes: An Eye-tracker Study

Yu-Cin Jian, Faculty of Educational Psychology and Counseling

This research analyzes university students' perceptions of science comics and their learning effectiveness, using eye tracking and a reading comprehension test. A questionnaire on comic book reading habits was given to 65 undergraduates, who then read a science comic with monitored eye movements. This was followed by a comprehension test. Findings indicate a favorable view of comic reading for science education. Eye tracking showed that extended re-reading of crucial texts and graphics led to higher test scores, suggesting that effective learning from science comics requires focused processing of key scientific concepts.

*Jian, Y. C. (2023). Reading Behavior in Science Comics and Its Relations with Comprehension Performance and Reading Attitudes: An Eye-tracker Study. Research in Science Education, 53(4), 689-706.*

## Embedding dialog reading into AR picture books

Kuo-En Chang, Faculty of Information and Computer Education

Tzu-Chien Liu, Faculty of Educational Psychology and Counseling

Yao-Ting Sung, Faculty of Educational Psychology and Counseling

This study examines the effects of augmented reality (AR) on parent-child reading by incorporating it into a picture book. Using the prompt, evaluate, expand, repeat (PEER) dialogic reading strategy, children access AR content via mobile devices, enriching their reading. In a test with 56 preschoolers, divided into control (traditional reading) and experimental (AR-assisted) groups, the AR group demonstrated notably higher learning effectiveness. A behavioral pattern of scanning, reading augmented content, and answering questions showed that integrating a child, mobile device, and picture book significantly boosts learning.

*Chang, K. E., Tai, Y. W., Liu, T. C., & Sung, Y. T. (2023). Embedding dialog reading into AR picture books. Interactive Learning Environments.*

## Development and preliminary testing of a virtual reality measurement for assessing intake assessment skills

Ying-Fen Wang, Faculty of Educational Psychology and Counseling

This study explores using virtual standardized patients (VSPs) to improve the cost-effectiveness of Objective Structured Clinical Examinations (OSCEs) in professional psychology. It developed a VSP-Intake OSCE to assess psychologists' competencies, featuring a VSP interaction and a written station. Tested on 36 participants, including students and practicing psychologists, the VSP-Intake OSCE showed good inter-rater reliability and construct validity. This suggests VSPs could significantly enhance OSCEs in training and education in professional psychology.

*Lan YL, Chen WL, Wang YF, Chang Y. Development and preliminary testing of a virtual reality measurement for assessing intake assessment skills. Int J Psychol. 2023 Jun;58(3):237-246.*

## Modeling Rapid Guessing Behaviors in Computer-Based Testlet Items

Po Hsi Chen, Faculty of Educational Psychology and Counseling

This study presents a mixture testlet item response theory (IRT) model for computer-based testing, accounting for rapid guessing (RG) and dependent items in testlets. Traditional models overlook item dependence and RG, often due to test-taker motivation, knowledge, or time constraints, leading to biased results. The new model, validated through simulations and applied to a language test, demonstrated more accurate item and person parameter recovery. Results indicate that disregarding RG affects parameter estimates, like overestimating item difficulties and underestimating respondent abilities. Incorporating RG consideration significantly changes IRT model outcomes.

*Jin, K.-Y., Hsu, C.-L., Chiu, M. M., & Chen, P.-H. (2023). Modeling Rapid Guessing Behaviors in Computer-Based Testlet Items. Applied Psychological Measurement, 47(1), 19-33.*

## Effective neural modeling leveraging readability features for automated essay scoring

Yao-Ting Sung, Faculty of Educational Psychology and Counseling

Berlin Chen, Faculty of Computer Science and Information Engineering

This study introduces a neural method for automated essay scoring (AES) leveraging Bidirectional Encoder Representations from Transformers (BERT) optimized with metric-based learning. We also explore the addition of handcrafted readability features to enhance the neural AES model. Our analysis shows the significant impact of each component, particularly the integration of readability features, in improving performance. Extensive evaluations on a benchmark dataset highlights the effectiveness of combining metric-based learning and readability features in AES development, setting the groundwork for future optimizations of these model elements.

*Wu, T.-I., Lo, T.-H., Chao, F.-A., Sung, Y.-T., & Chen, B. (2023). Effective neural modeling leveraging readability features for automated essay scoring. In Proc. 9th Workshop on Speech and Language Technology in Education (SLaTE) (pp. 81-85).*





# Mandarin Made Modern:

NTNU Redefines Chinese Language Education Worldwide

According to a 2021 report by Language magazine, some 4,000 colleges across the globe have added Chinese language courses to their curriculums and an estimated 25 million people are currently learning Chinese as a foreign language (CFL). Within this context, NTNU has distinguished itself in the domain of Chinese language education. With a rich history in CFL teaching spanning over six decades, NTNU has not only upheld traditional pedagogical approaches in language acquisition, but has also been at the vanguard of integrating digital technologies into language teaching, learning, and assessment. NTNU's leadership in this area has effectively redefined the benchmarks for Chinese language education on a global scale as a crucial contributor to the field of modern language education and digital pedagogy.



*German international student Marie Polen explores Chinese Characters Fun®, an innovative, interactive vocabulary building platform developed at NTNU.*

## Historical Excellence and Evolution

NTNU has long been recognized as a premier institution for Chinese language education, boasting over six decades of academic excellence in teaching Chinese as a foreign language. Originally established as a teacher training college, NTNU has evolved into a leading comprehensive university with over 130 academic disciplines across its colleges and institutes. This breadth of expertise at NTNU enriches the pioneering research in teaching pedagogy and educational sciences at the Graduate Institute of Teaching Chinese as a Second Language.

Interdisciplinary cross-fertilization to further teaching practice has come to fruition in the establishment of the Chinese Language and Technology Center, where language teaching expertise works in synergy with digital and web-based technologies to create innovative tools and resources for language educators and learners of Chinese as a second language.

## Global Leadership in CFL Education

Founded in 1956, the Mandarin Training Center (MTC) at NTNU is the oldest and largest facility of its kind in the world. Each quarter, over 1,700 students arrive from more than 80 countries to enroll at MTC. Diplomats, journalists, translators, and corporate and government leaders have studied here. Notable alumni include Hungarian sinologist Ákos Bertalan Apatóczy, former Enron CEO Andrew Fastow, American literary translator Howard Goldblatt, former Japanese Prime Minister Ryutaro Hashimoto, and former Australian Prime Minister Kevin Rudd.

Each year, in addition to creating tailored Chinese language learning programs for dozens of universities,



Each quarter, over 1,700 students arrive from more than 80 countries to enroll at the Mandarin Training Center (MTC) at NTNU, the oldest and largest facility of its kind in the world.



Mandarin teachers from NTNU's Huayu Best program lead U.C. Santa Barbara students in a mooncake making workshop.

governments, and corporate bodies around the world, the MTC also offers a flagship Mandarin Summer Program that is consistently oversubscribed. "We have run out of space on the NTNU campus to expand the program," said Ya-Hsun Tsai, Executive Director at MTC.

With its history of leadership in Chinese-language teaching, NTNU was chosen among universities in Taiwan to be selected to launch the Huayu BEST (Bilingual Exchanges of Selected Talent) initiative in 2021. This initiative intends to help meet the global demand to learn Chinese and to promote Taiwan's quality Chinese language education by establishing language education partnerships between outstanding universities in Taiwan and overseas.

## Huayu BEST Program: Bridging Cultures

The Huayu BEST program supports language teacher exchanges, scholarships for international students, and resources for Chinese language proficiency assessment and online learning. It has catalyzed numerous university partnerships, cultural events, and innovative projects, such as language training for local police. These initiatives enrich the educational and cultural landscape in partner universities and their surrounding communities, promoting person-to-person cross-cultural connections.

At NTNU, the initiative encompasses seven strategic areas: collaboration with partner universities, provision of Chinese as a Foreign Language (CFL) teachers, student scholarships for study in Taiwan, development of online CFL resources, language proficiency testing abroad, training workshops for CFL teachers overseas, and the establishment of CFL teaching centers in the U.S.

"Our program is now in its second phase," said NTNU Vice President Frank Yung-Hsiang Ying, who oversees the strategy and implementation of the Huayu BEST program at NTNU. "The first phase of our program focused on collaboration with our U.S. partner universities. We have formalized agreements with seven universities, including UCLA, Purdue University, UPenn, University of Guam, and University of Maryland."





Among the first universities in Taiwan to launch the bilateral Huayu BEST initiative in 2021, NTNU has since formalized agreements with seven universities, including UCLA, Purdue University, Penn State (pictured), University of Guam, and University of Maryland.

Ying noted that selecting a partner school for the Huayu BEST program involves multiple considerations. "While the MOE financially backs the program, partner schools contribute administrative support and classroom facilities," he explained.

"Our faculty often serve in visiting roles, working alongside permanent staff at partner institutions to enhance their Chinese language curricula," added MTC's Executive Director Tsai, who recruits teachers for the program.

The Huayu BEST program was launched just prior to the global pandemic. "Adapting to a new teaching environment has its challenges. Not being able to engage in person with students and colleagues was an added hurdle," Ying recounted. "However, our visiting faculty effectively utilized a suite of online teaching resources developed by NTNU during those challenging months."

Despite these initial hurdles, the program has been successful and is now progressing into its second phase, with each phase spanning two years. "Several of the teachers have recommitted to the next phase of the initiative which will expand to more schools in North America," Tsai revealed.

### Humanitarian Outreach and Challenges

NTNU has also extended our expertise in Chinese language education globally through humanitarian efforts. In 2021, the university began a collaboration with the Tzu Chi Foundation in a program to teach Mandarin to Syrian teens in Turkish refugee camps through the Tzu Chi Foundation's El Menahil International School. "Fifteen student volunteers from various disciplines participated in the inaugural program," said NTNU Vice President Yao-Ting Sung. "The commitment involves three-weeks of training, followed by three months of online teaching, a two-week visit to the camps, and a subsequent six-month online teaching period."

Sung highlighted the positive feedback from the first cohort of volunteers and students, noting the increased volunteer interest for the following year. "Plans are underway to expand this program to disadvantaged areas in Northern Thailand," he added.

One significant challenge has been the reliance on online learning. Students often access one-on-one sessions using the family's only mobile phone, contending with unstable Wi-Fi signals. "Despite these obstacles, their eagerness to learn is evident. They are eager for access to education, and recognize that Chinese proficiency can open future opportunities," Sung observed.

### Digital Innovation and Advancements in CFL Learning

NTNU's development of web-based materials and apps has proven invaluable in both of these international outreach Mandarin programs. "The availability of digital learning resources is more efficient than shipping textbooks and workbooks internationally," Tsai said.

With over a decade of research into CFL technologies, NTNU's Chinese Language and Technology Center has developed a comprehensive suite of interactive software products through the COOL Chinese (Competence-Oriented Omniform Learning for Chinese as a Foreign Language) platform at [www.coolchinese.net](http://www.coolchinese.net), including eMPower, Smart Pinyin, Smart Reading-Mandarin, Smart Writing-Mandarin, and the Chinese Character Series. These resources allow instructors to customize speaking, writing, and reading exercises based on their own curriculum and lesson plans, that are then delivered to students for self-study and assessment.



Syrian students at the Tzu Chi Foundation's El Menahil International School in Turkey learn to write calligraphy from NTNU's student volunteers.



*The COOL Chinese® suite of customizable language teaching and learning tools developed at NTNU is used by over 69,000 users in 39 countries.*

Professor Jia-Fei Hong, Chair of the Department of Chinese as a Second Language, said technologies such as the SmartWriting platform have been continually refined and calibrated over the past ten years. This particular technology (AES-HAN) was initially developed to correct student essays written by native Chinese speakers. “The technology is able to look at character composition, phrasal vocabulary usage, and essay structure. We obtained training data samples from thousands of essays, each hand corrected by two or more teachers, making sure that the scores marked by hand were within a +/- 1 point margin of error,” she said. “Using this data, we have trained the software to be able to mark within the same level as a human instructor within a 97 percent accuracy.”

Hong said that the system applies criteria outlined by the rigorous US-based ACTFL (American Council on the Teaching of Foreign Languages) grading system, which assesses up to 11 levels of foreign language fluency.

In teaching CSL to students from different origin languages, there are similar linguistic proclivities that the software needs to be able to understand in order to assess the student’s error. Chinese-language also has a large number of homophones that can still make sense within a sentence, but may be incorrect in the context of a larger essay. These were all variables that had to be considered, Hong explained.

The software can provide immediate assessment and feedback, showing the student-user the corrected answer so they can deduce where they have made the mistake. “Self-assessment and self-correction is an effective method of learning,” Hong said.

The immediate feedback also alerts instructors as to whether an individual student may be making repeated mistakes in one area, or if an entire class is struggling with a specific part of the lesson. They can then adapt their

syllabus and exercises accordingly.

There are now versions of SmartWriting, which can create, administer, and assess Chinese writing for both native speakers and CFL students, with both complex and simplified Chinese character formats. The COOL Chinese suite is available to all Chinese language educators around the world, with an online certification training workshop to familiarize them with its capabilities and applications. In figures tabulated since August 2021, the platform has registered 69,000 unique users in 39 countries across six continents.

### **NTNU's Role and Future in Chinese Language Education**

NTNU's significant contributions to Chinese language education has cemented its leadership in the field. The university's blending of traditional methods with modern digital

innovations has set new standards, reflecting a broader trend in language education. For instance, a study by the Modern Language Association revealed a 6.7% increase in enrollments in Chinese language courses in U.S. higher education between 2016 and 2019, underscoring the growing global interest in Chinese language proficiency. This surge aligns with NTNU's efforts and success in addressing the increasing demand for quality CFL education.

Furthermore, NTNU's commitment to international humanitarian causes such as the volunteer teaching program for Syrian refugees, highlights the university's broader mission of using language education as a tool for social change and empowerment. The university's initiatives serve as a model for other institutions, demonstrating how academic excellence can be harmoniously combined with social responsibility. As language education continues to evolve in a digitally interconnected world, NTNU will continue to pioneer and inspire future advancements in the field. The university's achievements are a testament to the transformative power of education and its ability to bridge cultural divides and foster global understanding.



*Professor Jia-Fei Hong (left), Chair of Department of Chinese as a Second Language, and COOL Chinese® Project Manager teacher Kao Yu (right) guide Vietnamese international student Cao Nguyễn Trần Tuyền (center) in navigating the SmartReading Mandarin® interactive platform.*

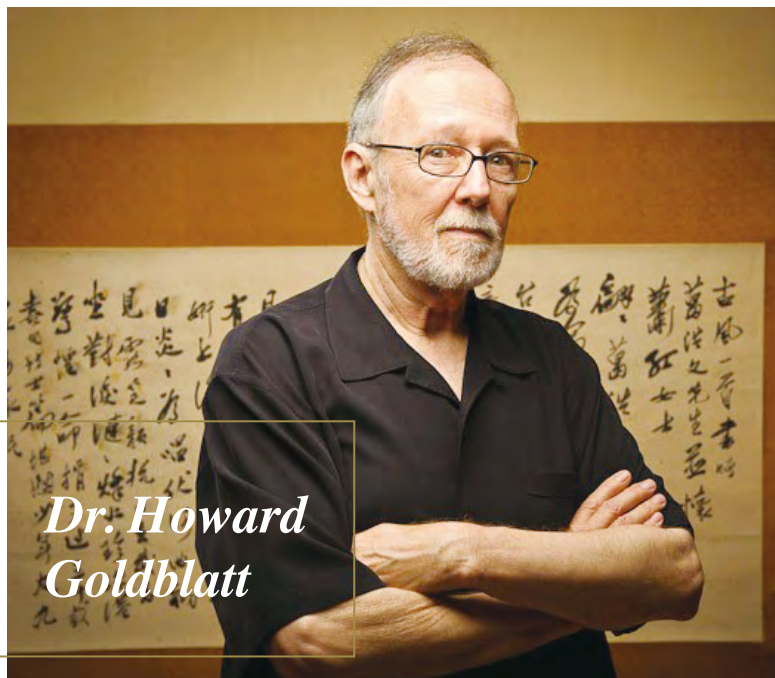
# Words Across Waters

Insights on translating the language and culture of Chinese literature

## Q&A

### *Profile in Brief*

*Dr. Goldblatt, renowned translator of Chinese literature, has devoted over 40 years to translating modern and contemporary Chinese works, notably Nobel laureate Mo Yan's novels, for English readers. His work has significantly impacted global understanding of Chinese narrative art. A Guggenheim Fellow, he has taught at the University of Colorado and Notre Dame University, and edited major journals on Chinese literature and translation.*



**You've made significant contributions to the world of literary translation, particularly for Chinese literature. What motivated you to start this journey?**

My fascination with the Chinese language and literature began unexpectedly. Initially, I had no connection to literature, but my military posting in Taiwan sparked a curiosity that turned into a lifelong passion. The unfamiliar sounds of the Chinese language around me intrigued me, and I started learning, using every opportunity as a learning moment.

**How did your early experiences in Taiwan shape your career?**

The people, the language, and the literature I encountered in Taiwan deeply influenced my trajectory. The teachers at the Mandarin Training Center (MTC) at NTNU not only taught me the language, but also inspired my profound appreciation for the nuances and depth of Chinese culture. My early association with Nancy Lanhsi Yin, founder and editor of *The Chinese Pen*, opened the door to Taiwanese literature, leading to my studies of literature from Republican China under Professors Kai-yu Hsu and Wu-chi Liu.

**What do you find most challenging and rewarding about the translation process?**

Translation is more than a linguistic exercise; it's a cultural and creative endeavor. The challenge lies in preserving the author's voice and the text's soul while making it accessible and resonant for foreign audiences, which is also what makes it rewarding. It is fulfilling when readers across the world connect with a story, feel its emotions, and understand its cultural context, despite the linguistic barriers.

**How have your interactions with the authors you've translated influenced your work?**

My relationship with some authors has been integral to working on their literary creations. Understanding their thoughts, their values, and the contexts in which they write helps me translate not just the words but the essence of their work. For instance, living in Harbin for an extended period gave me rare insights into Xiao Hong's work, while communicating with Mo Yan during the translation process improved my understanding and, I hope, elevated the quality of expression. Interactions with writers such as Huang Chunming often evolved into lifelong friendships..

**Your dedication to translation has earned accolades, including the Guggenheim Fellowship. What does such recognition mean to you?**

Such honors are incredibly humbling and affirming, signifying personal achievement and the growing global recognition of Chinese literature. These accolades motivate my work and hopefully inspire others to explore and appreciate the rich tapestry of Chinese literature.

**What advice would you give to aspiring translators or current students at the MTC who might be interested in a similar path?**

Be passionately curious. Learn not just the language, but immerse yourself in the culture and the myriad forms of its literature. In addition, work to become intimately familiar with the literature and expressive qualities of the receptor language—your language—and, if possible, other languages. That is the foundation of your work. Translation is not just about fluency; it's about understanding and conveying the spirit of the text. Embrace the challenges, enjoy the literary journeys, and always remember that each word you translate is a bridge connecting worlds.

**“Translation is more than a linguistic exercise; it's a cultural and creative endeavor.”**

# Where Experiments Meet Excellence

Inside NTNU's Precision  
Research Facilities

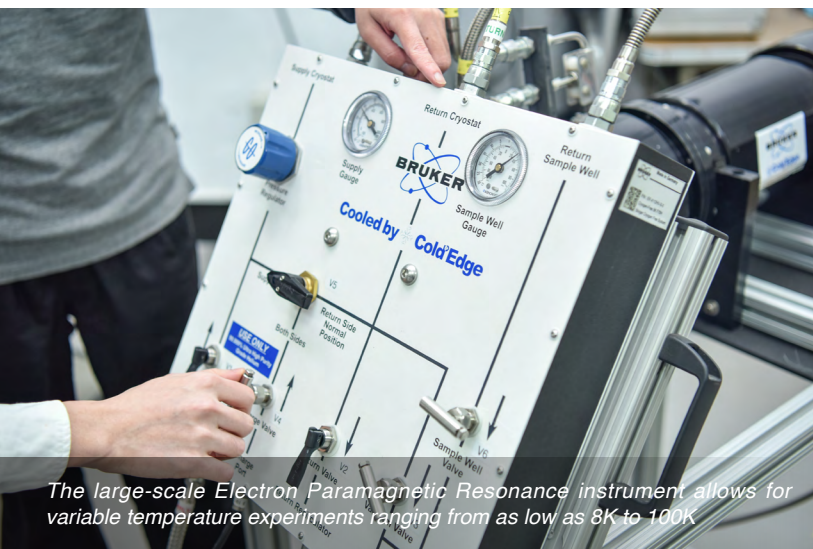
## **Harnessing Advanced Technology for Groundbreaking Research**

NTNU has enhanced its research capabilities with the acquisition of a Laser Ablation Inductively Coupled Plasma Mass Spectrometer (LA-ICP-MS/MS). Operational since May 2019, this powerful instrument positions NTNU among a select few universities with such technology. The LA-ICP-MS/MS, pivotal in precise chemical analyses, is utilized in geology, geochemistry, environmental science, biology, and materials science.

Professor J. Gregory Shellnutt of the Earth Sciences Department highlights the instrument's efficiency: "What used to take years can now be done in days with high accuracy." Professor Shellnutt, alongside post-doctoral researcher Sam Uthup, manages the facility.

*The Motion Capture System at the College of Sports Science enabled professor Tzyy-Yuan Shiang to develop his award winning "Dynamic Tire Pressure Sensor System" for bicycles.*





The large-scale Electron Paramagnetic Resonance instrument allows for variable temperature experiments ranging from as low as 8K to 100K

### Fostering Collaboration Across Disciplines

NTNU promotes scientific progress by facilitating interdisciplinary collaboration. The university's array of sophisticated equipment includes the BD FACSMelody, Bruker Tracer III SD, BRUKER FT-IR ALPHA, ProTT-EZRaman (2022), a state-of-the-art Motion Capture System, Matrix-Assisted Laser Desorption/Ionization Time of Flight Mass Spectrometry (MALDI-TOF MS), and Electron Paramagnetic Resonance instruments, among others. These resources are accessible to NTNU community and external researchers via a reservation system.

As a top Taiwanese university supported by the National Science and Technology Council (NSTC), NTNU houses eight NSTC-funded instruments. The Advanced Instruments Center oversees these, providing maintenance, staff training, and supporting diverse research activities.

Prominent instruments include the Electron Ionization Double-Focusing Magnetic Sector Mass Spectrometer, Electrospray Ionization Quadrupole Time-of-Flight Mass Spectrometer, and MALDI-TOF MS. "These instruments offer extensive molecular analysis," says Chemistry Professor Sung-Fang Chen. He and post-doctoral researcher Chia-Chen Wang jointly manage the MALDI, primarily used for biomolecular analysis.

In proteomics, MALDI-TOF MS is crucial for protein identification and characterization. It's instrumental in clinical microbiology for pathogen identification, in pharmacology for drug-protein interaction analysis, and in synthetic chemistry for compound verification. Its imaging mass spectrometry application is valuable in histological studies.

*Professor Chen's research* uses Liquid Chromatography coupled with MS to study microplastics' toxicological effects. NTNU also collaborates with the Ministry of Agriculture on rapid-testing methods for toxin detection in pesticides, aiding in food quality control and GMO identification.

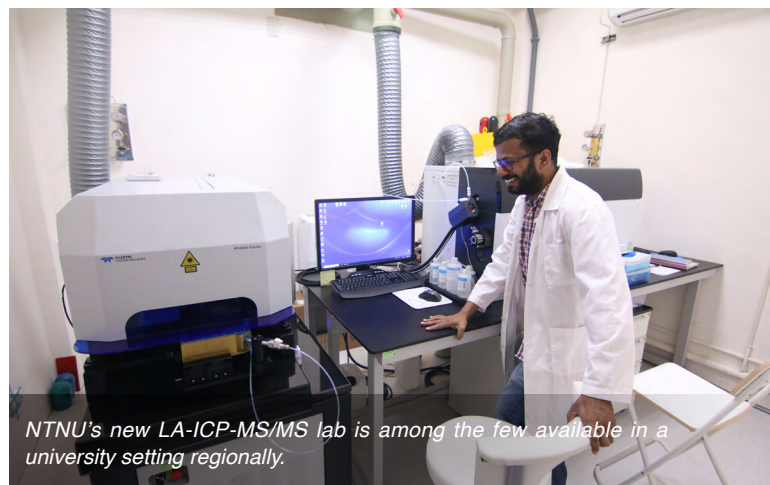
MALDI-TOF MS's high throughput, sensitivity, and minimal fragmentation make it a preferred technique in biological research, clinical diagnostics, molecular analysis, and forensic investigations.

### Blending Art with Science: NTNU's Approach to Conservation

The NTNU Research Center for Conservation of Cultural Relics (RCCCR) features a selection of advanced instruments that are invaluable in the conservation of both Eastern and Western paintings, including nihonga (Eastern gouache), as well as sculptures. The center's equipment comprises the Bruker Tracer III SD XRF spectrometer, Bruker FT-IR Alpha FT-IR spectroscopy, and ProTT-EZRaman spectroscopy. These tools perform non-destructive analyses, essential for identifying compositions and organic compounds in artworks, and their use extends to broader scientific and investigative domains.

The XRF Spectrometer was instrumental in a significant conservation project undertaken by Taiwan's National Museum of History. This project involved restoring five oil paintings by Chi-Chun Liao and fourteen ink paintings by Dai-Chien Chang. These valuable works, exhibiting signs of deterioration such as smudging, foxing, cracks, and mold, presented challenges due to their unique artistic techniques, layered structures, and the impact of prior conservations.

According to Yi-Ling Pan, a senior conservator at RCCCR who oversees the instruments, "Artistic expertise is fundamental in conservation, but the scientific knowledge gleaned from specialized instruments is equally critical. These tools help us understand and address the frailties of historically significant works, aiding in the development of effective conservation strategies while avoiding irreversible damage." Pan highlights the need to comprehend material interactions, such as solvent effects on cinnabar in East Asian paintings, which is crucial for both art conservation and material science.



NTNU's new LA-ICP-MS/MS lab is among the few available in a university setting regionally.

The Bruker Tracer III SD (XRF spectrometer) and Bruker FT-IR Alpha (FT-IR spectroscopy) exceed their functions in artwork composition identification. They are pivotal in analyzing molecular structures, functional groups, and chemical bonds in a variety of materials, proving invaluable in areas like pharmaceuticals, polymers, and forensics. FT-IR spectroscopy, sensitive to polar bonds, and Raman spectroscopy, responsive to nonpolar bonds, facilitate comprehensive molecular characterization.



The Matrix-Assisted Laser Desorption Ionization Time of Flight Mass Spectrometer is instrumental in analyzing interactions between drug candidates and target proteins, and understanding pharmaceutical metabolism.

ProTT-EZRaman spectroscopy, vital for pigment identification and degradation studies in art conservation, also contributes to understanding the structural and phase information of materials. This insight is essential for developing new materials or examining historical artifacts.

Collectively, these instruments enable a detailed and careful approach to art conservation and preservation. They also find applications in cell analysis, material identification, and quality control across various industries. Their use ensures well-informed, precise, and respectful interventions, preserving the originality and historical integrity of artworks.

Beyond painting conservation, RCCCR's expertise extends to diverse projects, such as analyzing metals in race car alloy wheels, analyzing a century-old dragon sculpture at Taipei's Grand Hotel, and contributing to sustainable material development. These varied

***“With the addition of the LA-ICP-MS instrument, NTNU highlights our commitment to advancing science through collaborative efforts and invites regional researchers to utilize our array of advanced scientific instruments and laboratories.”***

applications highlight the versatility and significance of RCCCR's laboratory equipment in fields ranging from forensic science and conservation biology to pharmaceutical research. This multifaceted approach, blending art conservation with scientific analysis, positions RCCCR as a leader in both cultural heritage preservation and scientific research.

### **The Science of Movement: Exploring Athletic Excellence**

As a leader in Taiwan's higher education, NTNU emphasizes our collaborative ethos in interdisciplinary, intercollegiate, and international research partnerships. A notable feature is the College of Sports Science's Motion Capture System, which uses an infrared camera to track reflective markers on athletes, aided by Simi Scout and Motion Monitor software for comprehensive movement analysis. This setup includes a high-speed sports camera with exceptional frame rate capabilities.

This system's applications extend beyond sports science. It's used in medical fields for gait analysis, aiding orthopedics, rehabilitation, and sports medicine. In ergonomics, it helps improve tool and workspace design to enhance performance and reduce workplace injuries. For athletes, it provides feedback to refine techniques. The system is also employed in filmmaking and game development for character animation, blending live-action and computer-generated imagery.

Additionally, the system assists in diagnosing, monitoring, and treating various conditions by analyzing and tracking patients' movements, and informing prosthetics and orthotics design. It contributes to robotics, human-computer interaction, including virtual and augmented reality, and studies in human cognition, motor skills, and sports equipment design. Its versatility benefits the performing arts and interactive installations, responding to participants' movements in real-time.



At the NTNU Research Center for Conservation of Cultural Relics, researchers use the ProTT-EZRaman instrument to identify pigments in artworks before undertaking the conservation process.

NTNU's system has been instrumental in diverse fields such as biology, for studying bat flight, and the bicycle industry, for speed and ergonomics analysis. Professor Chia-Hou Chang notes the lab's capability for post-analysis data. An upcoming upgrade to an AI-assisted markerless motion capture system will enable outdoor motion analysis and overcome the limitations of reflective markers. Professor Chang, who manages the system, highlights this as a testament to NTNU's commitment to advancing research and technology, showcasing the intersection of creativity, technology, and science in motion-related studies.

### Unraveling Nature's Secrets: Environmental and Material Research

Chemistry Professor Way-Zen Lee, overseeing the Electron Paramagnetic Resonance (EPR) instrument, highlights that NTNU is currently the only academic institution in Northern Taiwan with a large-scale EPR. This sophisticated instrument, essential for detecting free radical signals in various chemical compounds, operates in both normal and parallel modes and supports variable temperature experiments, ranging from as low as 8K to 100K.

Under Professor Lee's guidance, the EPR facility plays a crucial role in studying substances with unpaired electrons. He underscores its importance in examining the structure, reactivity, and dynamics of molecular systems, particularly those involving radicals or transition metal complexes. The instrument's capability to conduct variable temperature experiments is vital for researching biomolecules, such as proteins and enzymes, often involving metal ions or radical sites.

*Professor Lee's collaboration* with scientists in Germany and China showcases the EPR's significance in exploring complex biochemical processes. In materials science, the EPR aids in characterizing defects in various materials, including crystals, glasses, and semiconductors. Its applications extend to photoelectronic research, biotechnology, and medical research, making significant contributions to understanding magnetic properties, quantum effects, and the impact of ionizing radiation on living organisms.

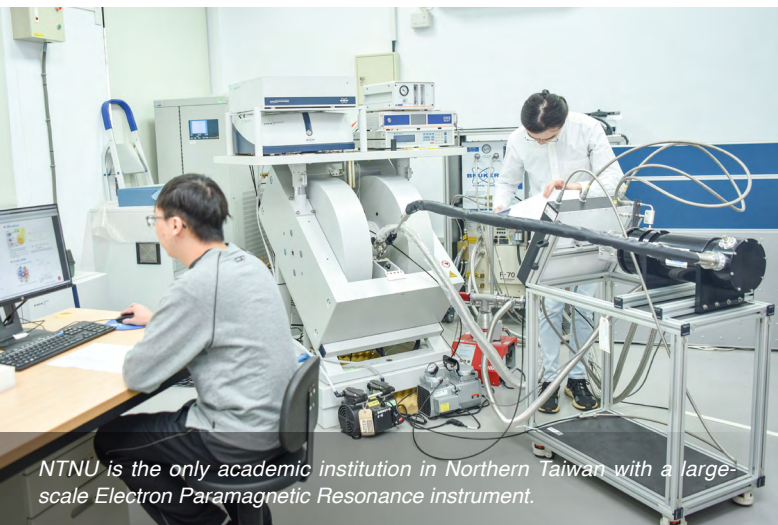


*This summer, NTNU plans to upgrading the current infrared Motion Capture System that relies on reflective markers, with an AI-assisted markerless motion capture system that will allow motion analysis in outdoor environments.*

At NTNU, the synergy of advanced technology and expert personnel fosters a unique collaborative environment. Professor Sung-Fang Chen underscores the role of specialized technicians in accurate data collection, analysis, and certification training. Dr. Wang, lead technician on the MALDI, highlights the necessity of efficient time management and meticulous sample preparation for data accuracy.

"NTNU has a culture of innovation and academic freedom. This atmosphere encourages exploration and experimentation, facilitating new applications that enhance instrument capabilities," said Dr. Sam Uthup, who oversees the LA-ICP-MS/MS.

This innovative spirit, buoyed by Taiwan's high regard for intellectual freedom, enables NTNU researchers to push knowledge boundaries in various fields. Their expertise, coupled with a supportive community, transforms these tools into catalysts for groundbreaking discoveries. NTNU's focus on real-world applications is demonstrated through partnerships with the Ministry of Agriculture and cultural heritage conservation projects. This integration of human ingenuity and technological advancement establishes NTNU as a leader in addressing global challenges and a hub for collaborative, innovative research.



*NTNU is the only academic institution in Northern Taiwan with a large-scale Electron Paramagnetic Resonance instrument.*



# Laughter and Learning

**Dr. Hsueh-Chih Chen**

*Faculty of Educational Psychology and Counseling, NTNU*



Professor Hsueh-Chih Chen, a distinguished educator with over 30 years of experience, specializes in cognitive psychology, humor psychology, and the study of Chinese characters. His research has significantly contributed to understanding the roles of cognition, emotion, and creativity in education.

Born in 1962 in Sanchong City, Taipei County, Chen grew up in a poor family. His mother, though illiterate, was a pillar of support in his educational journey. Despite his childhood shyness and anxiety, Chen turned his personal struggles into a driving force for studying educational psychology.

Chen's academic journey is notable for its self-reliance and excellence. He attended the prestigious Jianguo Senior High School and later, the NTU Department of Psychology, financing his education through tutoring and scholarships. In 1991, he earned his Ph.D. with pioneering research in humor comprehension's cognitive processes. He joined NTNU in 2001, focusing on practical applications of humor, creativity, and social emotions within Positive Psychology.

Professor Chen's groundbreaking work includes the three-stage cranial neural model of humor comprehension, utilizing functional magnetic resonance imaging (fMRI) to explore brain activities related to humor. His studies have provided insights into humor understanding in Autism Spectrum Disorder (ASD), as well as humor preferences across different genders and cultures. "Those with Autism Spectrum Disorder (ASD) are able to understand the concept of humor, but are specifically unable to process the 'dissonance-solution' type of humor, preferring instead nonsensical jokes that require less logical reasoning, such

as jokes based on puns and double entendres," he observes.

In 2023, Chen was honored by the National Science and Technology Council (NSTC) for his extensive research, including the development of creativity assessment tools and innovative approaches to studying creative processes. He has authored nearly 40 books and over 200 academic papers, extending his influence beyond academia. Chen was instrumental in establishing the Social Emotional Education and Development Center (SEED Center) at NTNU in 2022, and has developed training programs for secondary school principals for the Taipei City Government's Education Bureau.

**"Creativity drives the advancement of civilization. Vital in an era of rapid changes, it cannot be supplanted by artificial intelligence."**

A proponent of balancing cognitive skills with emotional and social learning in Taiwan's education system, Chen underscores the importance of nurturing curiosity, passion, and social emotions to transform learning from a chore into a meaningful endeavor.

Chen's recent focus is on promoting a holistic approach to education, emphasizing mindfulness and creative thinking. He observes, "While Taiwan frequently excels in mathematics and science competitions globally, there is a gap in the interest, confidence, and enthusiasm of Taiwanese youth in learning compared to their global peers." He further notes the role non-cognitive skills like emotion, motivation,

and self-discipline play crucial roles in success.

Professor Chen emphasizes the significance of creativity, stating, "Creativity is not just the advancement of civilization's driving force; it's also vital in an era of rapid changes, where it cannot be supplanted by artificial intelligence."

To advance these educational principles, Professor Chen established the Taiwan Education Alliance (TEA) and the Asia-Pacific Association for Teacher Education (APATE). Serving as Dean of the National Taiwan Normal University (NTNU) School of Education from 2016 to 2022, he upheld high academic standards and integrated social and emotional learning into the educational process.

Professor Chen's career is marked by a dedication to enhancing educational practices and policies, informed by his vast experiences and understanding of the complex human mind. He recalls his two terms as Dean of the School of Education as a highlight in his distinguished career. "My tenure as Dean enabled me to collaborate with education experts across Taiwan and Asia, and to leverage my academic expertise to influence significant educational policies." Dr. Chen credits continual learning and interactions for shaping his invaluable contributions to the field of education.

"Creativity drives the advancement of civilization. Vital in an era of rapid changes; it cannot be supplanted by artificial intelligence."

**Pictured above:**

*The NTNU Social Emotional Education and Development (SEED) Center established by Dr. Chen conducts research on the impact of family, society, and smart technology on education, to enhance comprehensive educational models.*



The NTNU delegation met with Technical University of Darmstadt (TUD) on 11 July 2023.

# NTNU Enhancing European Academic Partnerships



In 2023, National Taiwan Normal University (NTNU) significantly strengthened its academic ties with European institutions under President Cheng-Chih Wu's leadership. This was accomplished through efforts such as a comprehensive tour of German universities, active involvement at the European Association of International Education (EAIE) Conference, and other endeavors aligned with NTNU's strategy to establish lasting educational cooperation with foreign institutions of higher learning.

## Strengthening Ties: NTNU's Comprehensive Tour of German Universities

In July, an NTNU delegation that included Vice President Frank Yung-Hsiang Ying, Vice President for Academic Affairs Dr. Mei-Hui Liu, and Vice President for International Affairs Yi-De Liu visited six German universities for academic and cultural exchanges. The universities they visited were Ruhr-University Bochum, Georg-August-University Göttingen, the University of Münster, Goethe University Frankfurt, Free University of Berlin, and Technical University of Darmstadt. The tour culminated a series of memorandums of understanding that expanded previous collaborations with NTNU

from departmental to university-wide levels.

The agreements broaden NTNU's scope in academic research and educational innovation, securing the university's position within the global academic community.

A highlight of the 11-day visit was the "3rd Taiwan-Germany Higher Education Forum" in Berlin, co-organized with the Berlin-Brandenburgische Akademie der Wissenschaften (BBAW) and the Higher Education Foundation. This forum, held on July 12-13, brought together 20 leaders from



*The NTNU delegation were honored to take part in the University of Münster's annual summer party of Schlossgartenfest, held at WWU's beautiful Botanical Garden.*

10 Taiwanese universities and representatives from 26 German institutions.

President Walter Rosenthal of the German Rectors' Conference recognized the growing educational partnership between Taiwan and Germany. "Taiwan and Germany have maintained a steady and close relationship in education and research," he said. "Universities are crucial in nurturing talent and social development."

Reflecting on collaborative achievements since the inaugural forum in 2016, President Wu said, "In addition to bilateral sharing of knowledge in higher education and scientific research, opportunities for further cooperation, such as the Huayu Best Chinese language program, are also being explored."

"Germany is a strategic long-term partner in higher education for Taiwan. Both sides share the values of democracy, peace, freedom, and human rights, in addition to the commitment to educational exchange that underpins the flourishing partnership," he added

## Expanding Horizons: Participation in the EAIE Conference

Furthering its European outreach, President Wu and Vice President Liu also made a special visit to two NTNU partner institutions, Leiden University in the Netherlands and Ghent University in Belgium, as part of the agenda for their September trip to the 2023 EAIE Conference held in Rotterdam.

As Chairman of the Foundation for International Cooperation in Higher Education of Taiwan, President Wu led a 50-member delegation representing 23 Taiwanese universities at this year's EAIE conference with the theme "Connecting Currents."

At the conference, the Taiwan Pavilion attracted attention with its unique branding, while the "Taiwan Night" dinner on September 28 provided an excellent venue for further exchanges between Taiwanese and European educational institutions.

"EAIE is the largest and most representative international education event in Europe, attracting over 6,000 representatives from more than 90 countries," President Wu said. "Taiwan's participation aims to showcase our high-quality, diverse educational environment and welcoming culture. We hope to expand international links and attract top European students to study and learn Mandarin in Taiwan – thus increasing the international impact of Taiwan's higher education."

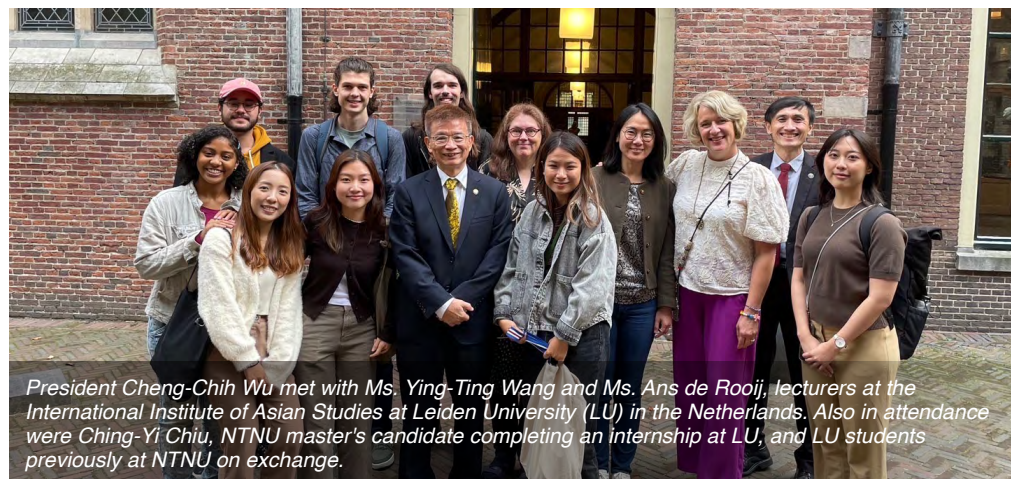
## NTNU in Europe: Reaching Out to the Netherlands, Belgium, and Beyond

Despite the challenges of the global pandemic, Taiwan has maintained a steady presence in promoting its educational strengths internationally at EAIE and other educational forums in the Netherlands, Spain, Germany, and Poland. The government has also collaborated with France and Lithuania regarding online education conferences. Scholarships such as the Ministry of Education (MOE) EU Scholarship, the "Erasmus Program," and "The Taiwan-EU Connection Scholarship" have also helped maintain high-quality academic exchanges.

### Key Achievements: Notable Outcomes in International Initiatives

According to MOE reports, over 25,000 students from the EU have studied in Taiwan over the past five years, and more than 30,000 Taiwanese students have pursued education in the EU. Nearly 3,000 academic agreements have been signed between Taiwanese universities and their European counterparts.

These recent initiatives at NTNU reflect the university's commitment to enhancing our global academic impact. Through strategic partnerships and engagement in international forums, NTNU is working to strengthen its position within the global higher education and research community.



*President Cheng-Chih Wu met with Ms. Ying-Ting Wang and Ms. Ans de Rooij, lecturers at the International Institute of Asian Studies at Leiden University (LU) in the Netherlands. Also in attendance were Ching-Yi Chiu, NTNU master's candidate completing an internship at LU, and LU students previously at NTNU on exchange.*



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