TECHNICAL PROGRAM

WI-IAT 2026

The 25th IEEE/WIC International Conference
on Web Intelligence and
Intelligent Agent Technology

BI 2026

The 19th International Conference
on Brain Informatics



To celebrate the 70th Anniversary of AI



3–6 December 2026

Brisbane, Queensland, Australia

WI-IAT 2026 AI70

Brain Informatics AI70

Contents

WI-IAT 2026 Welcome Message **1**

WI-IAT 2026 Organising Committee **3**

BI 2026 Welcome Message **5**

BI 2026 Organising Committee **7**

AI 70Y Turing Award Laureate Keynote **9**
Professor Gilles Brassard 9

WI-IAT 2026 Keynote **11**
Professor Zhi (Helen) Huang 11

WI-IAT 2026 Keynote **13**
Professor Willy Susilo 13

BI 2026 Keynote **15**
Professor Minmin Luo 15

BI 2026 Keynote **17**
Professor Pankaj Sah 17

BI 2026 Industry Feature Talk **19**
Professor Soman Elangovan . . . 19

AI 70th Anniversary Panel **21**
AI at 70: Paradigm Shifts, Fundamental Challenges, and Future Frontiers . . . 21

Workshops and Special Sessions **23**

Program at a Glance **25**

Conference Sessions and Presentations
Thursday, the 3rd December **27**

Conference Sessions and Presentations
Friday, the 4th December **29**

Conference Sessions and Presentations
Saturday, the 5th December **32**

Conference Sessions and Presentations
Sunday, the 6th December **37**

BI 2026 Abstracts **43**

Conference Venue **60**
Podium Ballroom, Rydges Hotel, South Bank, Brisbane (Floor Map) . . . 60

DEI Reception Venue **62**
Azure Mediterranean Restaurant, South Bank (How to Get There) . . . 62

Banquet Venue **64**
Sky Room & Terrace, Brisbane Convention & Exhibition Centre (How to Get There) . . . 64

Acknowledgements and Sponsors **68**

Proud Platinum Sponsor of BI 2026 **70**
Belmont Private Hospital 70

WI-IAT 2026 Welcome Message

On behalf of the organising committee, it is our great pleasure to welcome you to the 25th IEEE/WIC International Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT 2026), held in Brisbane, Australia, from 3 to 6 December 2026. We warmly welcome researchers, practitioners, educators, students and industry partners from around the world, including those joining us online.

Under the theme of "**Celebrating the 70th Anniversary of AI**," WI-IAT 2026 brings our community together to reflect on the development of artificial intelligence, celebrate the people and ideas that have shaped the field, and consider the directions ahead. This anniversary offers an opportunity to connect the foundations of AI with a question that continues to inspire us: how can intelligent systems advance knowledge, support people and address complex challenges in an increasingly connected world?

Since its first gathering in 2001, WI-IAT has provided an international forum for research at the intersection of the Web and artificial intelligence. The conference has brought together researchers from diverse fields to explore how intelligence can be created, shared and applied across networks of people, data, devices and autonomous systems. As we mark the 25th edition of WI-IAT during AI's 70th anniversary year, we celebrate both the history of our conference community and its contribution to the continuing evolution of AI.

Recent advances in machine learning, large language models and agentic AI have expanded the ways in which information can be generated, discovered and used. They also invite us to revisit enduring questions about reasoning, learning and knowledge, while addressing challenges of reliability, privacy, security, fairness and responsible use. The anniversary gives us an occasion to learn from the field's history while pursuing new ideas for its future.

WI-IAT 2026 reflects the breadth of this endeavour through research on intelligent Web systems, autonomous agents and multi-agent systems, machine learning, knowledge graphs, language and multimodal technologies, human-centred AI, privacy and security, and applications across domains. Its research presentations, workshops and special sessions offer opportunities to exchange findings, discuss emerging directions and build collaborations across disciplines. We encourage participants to explore new perspectives and consider how different communities can contribute to the next chapter of AI.

The main conference received **198 submissions**. Following peer review, **55 papers were accepted as regular papers** and **58 as short papers** for inclusion in the program and proceedings. These figures represent acceptance rates of **27.8% for regular papers** and **29.3% for short papers**. The workshops and special sessions received **68 submissions**, of which **26 were accepted**, representing an acceptance rate of

38.2%. We congratulate the authors of the accepted papers and thank all authors who submitted their work. We are also grateful to the program committee members and reviewers for their careful assessments and constructive feedback.

As a highlight of our anniversary celebration, we are honoured to feature an **AI 70th Anniversary Turing Award Laureate Keynote** by Professor **Gilles Brassard** of the Université de Montréal. His talk, "Alan Turing and Me," will invite us to reflect on foundational questions in computing and the enduring influence of Alan Turing's ideas.

We are also delighted to welcome WI-IAT keynote speakers Professor **Zhi (Helen) Huang** of The University of Queensland and Professor **Willy Susilo** of the University of Wollongong. Professor Huang's keynote, "Learning at Test Time: Towards Adaptive AI in a Connected World," will explore adaptive AI in a connected world. Professor Susilo's keynote, "Securing the Web: From Real-World Vulnerabilities to Post-Quantum Cryptography," will explore challenges in protecting the Web today and into the future. We sincerely thank our distinguished speakers for sharing their knowledge and insights with the WI-IAT community.

The **AI 70th Anniversary panel discussion** will provide a further opportunity to reflect on the field's progress and future. We hope it will encourage an open exchange about AI's achievements, the challenges that remain, and the research and partnerships needed to shape its next decades.

We are pleased that WI-IAT 2026 is held alongside the 19th International Conference on Brain Informatics (BI 2026). Bringing these communities together is especially meaningful in an anniversary year that invites reflection on the many ways researchers have sought to understand and create intelligence. We hope that exchanges between the two conferences will inspire new questions and collaborations across AI, Web intelligence and brain research.

Alongside the technical program, the DEI reception, conference banquet and award ceremony will provide opportunities to meet colleagues, welcome new members of our community and celebrate researchers at different stages of their careers. These gatherings remind us that progress in AI depends on the people and communities that sustain it.

A conference of this scope depends on the dedication and support of many people. We extend our sincere thanks to the organising committee, program committee, reviewers, session chairs, workshop and special session organizers, and volunteers for their time, expertise and commitment. Their contributions have been essential to preparing the program and bringing together participants in Brisbane and online.

We are grateful to **The University of Southern Queensland** for hosting and sponsoring WI-IAT 2026. We also gratefully acknowledge the **IEEE Computer Society**, the **IEEE Computer Society Technical Committee on Intelligent Informatics (TCII)**, and the **Web Intelligence Consortium (WIC)** for their official sponsorship of the conference. Their support helps us bring our community together, recognize research excellence and encourage participation across the field.

Our sincere appreciation is also extended to **Daily Elite Events Pty Ltd**, our Professional Conference Organiser, for their outstanding professionalism, dedication and excellent service in coordinating the conference and ensuring its smooth organisation.

We thank all our sponsors and supporting organisations for their generosity and confidence in the conference.

Above all, we thank the authors and participants whose ideas, research and enthusiasm bring WI-IAT to life. As we celebrate the 70th anniversary of AI, we invite you to join us in honouring the field's achievements and imagining what we can accomplish together in the years ahead. We hope that WI-IAT 2026 will inspire stimulating discussions, new friendships and lasting collaborations. Whether you are joining us in Brisbane or online, we wish you a rewarding and enjoyable conference.

Yours sincerely.

Xiaohui Tao and Haoran Xie, General Chairs
Xujuan Zhou and Yang Liu, Program Committee Chairs
On behalf of WI-IAT 2026 Organising Committee
Brisbane, December 2026

WI-IAT 2026 Organising Committee

Honorary Chairs

John Bell
The University of Southern Queensland, Australia

Xunming Ji
Peking Union Medical College, Chinese Academy of Medical Sciences, China

General Chairs

Xiaohui Tao
The University of Southern Queensland, Australia

Haoran Xie
Lingnan University, Hong Kong

Program Committee Chairs

Xujuan Zhou
The University of Southern Queensland, Australia

Yang Liu
Wilfrid Laurier University, Canada

Organising Chair

Jianming Yong
The University of Southern Queensland, Australia

Industry Chair

Daqian Shi
Queen Mary University of London, United Kingdom

Workshop and Special Session Chairs

George Georgopoulos
York University, Canada

Zehua Chen
Taiyuan University of Technology, China

Min Pan
Hubei Normal University, China

Publicity/Publication Chairs

Hongzhi Kuai
Chongqing University of Posts and Telecommunications, China

Thanveer Shaik
The University of Southern Queensland, Australia

BI 2026 Welcome Message

How does the brain give rise to thought, emotion and behaviour? How can computational methods help us answer these questions? And what might our growing understanding of the brain teach us about intelligence itself? These questions bring us together at the 19th International Conference on Brain Informatics (BI 2026).

On behalf of the organising committee, we are delighted to welcome you to Brisbane, Australia, from 3 to 6 December 2026. We extend a warm welcome to all our speakers, authors, delegates and guests, both in Brisbane and online. Your participation brings together the knowledge and perspectives that make brain informatics a vibrant and collaborative field.

This year's theme, "**Celebrating the 70th Anniversary of AI**," gives our meeting a special significance. The histories of AI and brain research have long been connected through a shared interest in learning, reasoning and intelligence. Today, that relationship continues to develop as computational tools help researchers examine increasingly rich brain data, while knowledge of the brain inspires new ways of thinking about intelligent systems. BI 2026 provides an opportunity to reflect on these connections and explore where they might lead.

Brain informatics draws on neuroscience, cognitive science, computer science, medicine and many other disciplines. Its progress depends on the ability to bring different forms of evidence and expertise together: from neural signals and brain images to computational models and clinical observations. It also depends on careful attention to how findings are interpreted and how technologies are used in practice. We hope the conference will encourage conversations across these boundaries and help turn promising ideas into productive collaborations.

The BI 2026 program presents work on brain–computer interfaces, neural signal analysis, brain imaging, cognitive and affective neuroscience, and AI applications in brain and mental health. Through research presentations, workshops and special sessions, delegates will have opportunities to discuss both methodological advances and the questions that motivate them.

The main conference received **70 submissions**. Following peer review, **26 were accepted as regular papers, 11 as short papers and five as abstracts**. These figures represent an acceptance rate of **37.1% for regular papers** and 1**5.7% for short papers**. The workshops received **29 submissions**, of which **22 were accepted** including abstracts. We congratulate the authors whose work appears in the program and thank everyone who submitted. We are equally grateful to our reviewers and program committee members for the care and expertise they brought to the review process.

We are pleased to welcome Professor **Minmin Luo** of the Chinese Institute for Brain Research and Professor **Pankaj Sah** of The University

of Queensland as BI 2026 keynote speakers. Professor Luo's talk, "Development and Clinical Application of Fully Implantable High-Throughput Brain Machine Interfaces," will introduce advances connecting neuroscience, engineering and clinical application. Professor Sah's keynote, "Formation Storage and Consolidation of Fear Memory," will address the formation and consolidation of fear memory. The program also features an industry talk by Professor **Soman Elangovan** of the Cannan Institute and Belmont Private Hospital, titled "Advancing Mental Health Research and Innovation Through Hospital–University–Industry Collaboration." We thank our speakers for contributing their experience and insights to the conference.

The shared program offers further opportunities to engage with the wider AI community. We are honoured to feature the **AI 70th Anniversary Turing Award Laureate Keynote** by Professor **Gilles Brassard** of the Université de Montréal, whose talk, "Alan Turing and Me," will consider foundational questions in computing. The **AI 70th Anniversary panel discussion** will also invite participants to reflect on the field's achievements and future directions.

BI 2026 is held alongside the 25th IEEE/WIC International Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT 2026). We welcome this opportunity for the two communities to meet, exchange ideas and discover common interests. The conference banquet and award ceremony will provide further occasions to make connections, recognize achievements and welcome colleagues at all stages of their careers.

We extend our heartfelt thanks to every member of the BI 2026 organising committee for their dedication, time and collaborative effort in planning and delivering the conference. Their work across the many academic, organizational and practical aspects of the meeting has been invaluable. We also sincerely thank the program committee, reviewers, session chairs, workshop and special session organizers, and volunteers for their contributions to BI 2026.

We are grateful to **The University of Southern Queensland** for hosting and sponsoring BI 2026, and to the **Web Intelligence Consortium (WIC)** for its official sponsorship. We also thank the **Cannan Institute and Belmont Private Hospital, Chongqing Mydataservice, Linkintelli Technology**, and **Psytech** for their sponsorship. Their support has helped bring the BI 2026 community together and made a valuable contribution to the conference.

Our heartfelt thanks also go to **Daily Elite Events Pty Ltd**, the Professional Conference Organiser, whose exceptional service, meticulous planning and tireless efforts have been instrumental in bringing BI 2026 to life and delivering a memorable conference experience.

We thank all authors and delegates for contributing to the exchange of ideas at the heart of the meeting.

We hope you leave the conference with fresh perspectives, valuable connections and new questions to pursue. Whether this is your first BI conference or a return visit, we wish you an engaging and enjoyable experience.

Yours sincerely.

Xiaohui Tao and Soman Elangovan, General Chairs
Yan Li, Maryam Doborjeh, and Jungong Han, PC Chairs
On behalf of BI 2026 Organising Committee
Brisbane, December 2026

BI 2026 Organising Committee

Honorary Chairs

Robert Sang
The University of Southern Queensland, Australia

Xunming Ji
Peking Union Medical College Chinese Academy of Medical Sciences, China

General Chairs

Xiaohui Tao
The University of Southern Queensland, Australia

Soman Elangovan
Belmont Private Hospital, Australia

Program Committee Chairs

Yan Li
The University of Southern Queensland, Australia

Maryam Doborjeh
Auckland University of Technology, New Zealand

Jungong Han
Tsinghua University, China

Organising Chair

Jianming Yong
The University of Southern Queensland, Australia

Workshop and Special Session Chairs

Juan D. Velasquez
University of Chile, Chile

Tong Zhang
South China University of Technology, China

Publicity/Publication Chairs

Hongzhi Kuai
Chongqing University of Posts and Telecommunications, China

Thanveer Shaik
The University of Southern Queensland, Australia

AI 70Y Turing Award Laureate Keynote

Professor Gilles Brassard

2025 ACM A.M. Turing Award Laureate, Université de Montréal, Canada

Alan Turing and Me



Abstract: Alan Turing is one of the greatest mathematicians of the 20th century, as well as being the founding father of computer science. I am therefore very proud to have received the ACM award that bears his name. However, rather than talk about the work that earned me this accolade, I'm going to tell you a surprising story: in his foundational 1936 paper, in which Turing introduced what is known today as the Turing machine, he gave a completely inappropriate definition for computable real numbers. Indeed, according to his definition, addition and multiplication by three would not be computable! But alas, even with the best definition known today (which is probably the best possible definition), the question of whether a real number is equal to zero remains undecidable. All of this is related to the fascinating intuitionistic mathematics of Brouwer, about which I shall not presume any prior knowledge. This is joint work with Sophie Berthelette and Xavier Coiteux-Roy and published as https://doi.org/10.1016/j.tcs.2024.114573.

Short Bio: Professor Gilles Brassard is a Professor of Computer Science at the Université de Montréal, Canada, and one of the world's most influential pioneers in quantum information science, quantum cryptography, and quantum computing. He is the recipient of the 2025 ACM A.M. Turing Award, the highest distinction in computer science, jointly with Charles H. Bennett, in recognition of their groundbreaking contributions to the foundations of quantum information science and secure communication.

Professor Brassard is widely recognised as a founding father of quantum cryptography. Together with Charles Bennett, he developed the revolutionary BB84 quantum key distribution protocol in 1984, establishing the foundations of quantum-secure communication by demonstrating how the principles of quantum mechanics could be used to achieve unprecedented levels of information security. He also played a pioneering role in the discovery of quantum teleportation in 1993, one of the most remarkable breakthroughs in quantum information science. His research has fundamentally transformed our understanding of information, computation, and security, helping establish quantum information science as a major scientific discipline.

Over his distinguished career, Professor Brassard has made numerous seminal contributions to theoretical computer science, cryptography, and quantum information processing. His visionary work has not only shaped the theoretical foundations of quantum technologies but also inspired practical advances in quantum communication networks, quantum computing, and next-generation cybersecurity. His research continues to influence scientists and engineers worldwide and has played a central role in the emergence of today's rapidly developing quantum technology industry.

His extraordinary scientific achievements have been recognised through many of the world's most prestigious honours, including the Wolf Prize in Physics (2018), the Breakthrough Prize in Fundamental Physics (2023), and the Gerhard Herzberg Canada Gold Medal for Science and Engineering (2009). He is a Fellow of the Royal Society of London and the Royal Society of Canada, and an International Member of the US National Academy of Sciences.

Professor Brassard earned his PhD in Computer Science from Cornell University in 1979 and has spent his academic career at the Université de Montréal, where he has mentored generations of researchers and helped establish Canada as a leading centre for quantum information research. His pioneering discoveries have reshaped the boundaries between computer science and physics, leaving an enduring legacy in modern science and technology.

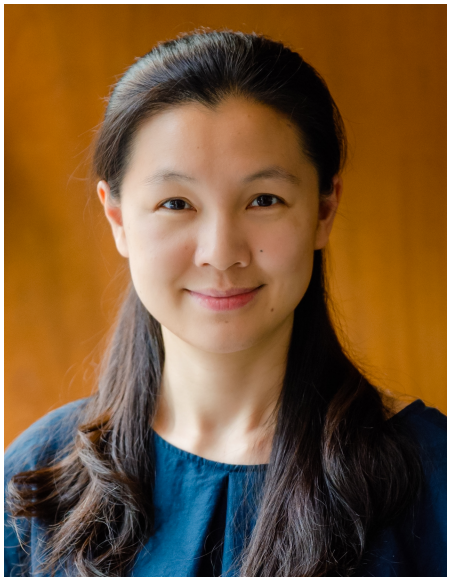
Venue and Time: Podium Ballroom, 09:00-10:00, Friday, 4 December 2026

WI-IAT 2026 Keynote

Professor Zhi (Helen) Huang

Fellow of the Institute of Electrical and Electronic Engineers (IEEE), Fellow of the Association for Computing Machinery (ACM), The University of Queensland, Australia

Learning at Test Time: Towards Adaptive AI in a Connected World



AI systems are increasingly deployed in connected environments where data streams, sensors, operating conditions and task requirements change after training. How can these systems remain useful when retraining is costly and computing resources are limited?

This keynote explores learning and adaptation at test time as a way to make better use of existing models. Four research examples illustrate different strategies: retaining complementary model knowledge as conditions shift; condensing visual tokens to focus computation on informative evidence; building and updating flexible 3D scene representations from live sensor data; and designing vision-language-action models so multiple skills can be combined with less interference.

Together, these projects suggest a broader view of intelligence at deployment: systems must manage what they remember, what they attend to, how they represent their environment and how they coordinate learned skills.

Short Bio: Helen Huang is a Professor and the Discipline Leader for Data Science in the School of EECS at The University of Queensland. Her research interests mainly include multimedia indexing and search, computer vision, recommender systems, and knowledge discovery. Helen has served as an Associate Editor for The VLDB Journal, ACM Computing Surveys, ACM Transactions on Information Systems (TOIS), IEEE Transactions on Multimedia (TMM), Pattern Recognition Journal, etc and also a member of the VLDB Endowment Board of Trustees. Helen

has been elevated to IEEE Fellow and ACM Fellow for contributions to large-scale multimedia content understanding, indexing and retrieval.

Venue and Time: Podium Ballroom, 10:00-11:00, Friday, 4 December 2026

WI-IAT 2026 Keynote

Professor Willy Susilo

Fellow of the Institute of Electrical and Electronic Engineers (IEEE), Fellow of the Institution of Engineering and Technology (IET), Australian Laureate Fellow, The University of Wollongong, Australia

Securing the Web: From Real-World Vulnerabilities to Post-Quantum Cryptography



Abstract: The modern Web has evolved into a deeply interconnected ecosystem supporting critical services, intelligent applications, and everyday communication. Yet securing this ecosystem remains a fundamental challenge. Web security depends not only on sound cryptographic foundations, but also on how security mechanisms are implemented and used in practice. A weakness at either level can undermine the security of the entire system.

In this keynote, we explore Web security from these two complementary perspectives. We first examine security challenges arising in real-world Web applications, focusing on API key leakage in browser extensions. Drawing on our recent work, KeyChaser, we show how insecure credential management in browser extensions can expose sensitive information and enable unauthorized access to online services beyond the extensions' intended functionality. These findings highlight an important lesson: API key authentication alone cannot prevent unauthorized access when privileged keys are exposed in client-side code, underscoring the need for secure credential management and fine-grained access control. We then turn to the cryptographic foundations of secure Web communication, particularly HTTPS and Transport Layer Security (TLS). While modern cryptography provides powerful mechanisms for protecting information in transit, advances in quantum computing pose a fundamental challenge to widely deployed public-key cryptography. We discuss how post-quantum cryptography changes the security landscape and how the

transition to quantum-resistant mechanisms can help protect the future Web. By connecting vulnerabilities that affect the Web today with cryptographic challenges that may shape its future, this keynote presents a broader view of Web security, from securing applications in practice to building cryptographic foundations capable of protecting the next generation of the Web.

Short Bio: Distinguished Professor Willy Susilo is an Australian Laureate Fellow and Director of the Institute of Cybersecurity and Cryptology (iC2) at the University of Wollongong, Australia. He is a Fellow of IEEE, IET, ACS, AAIA, and AIIA, and an internationally recognised researcher in cryptography and cybersecurity. Professor Susilo received the prestigious ARC Australian Laureate Fellowship in 2023 and the NSW Premier's Prize for Engineering and Communications Technology in 2024. He previously held an ARC Future Fellowship (2009) and served as Head of the School of Computing and Information Technology at the University of Wollongong from 2015 to 2025. He has published over 500 research papers in cryptography and network security, with influential contributions to short digital signature schemes. He serves as Editor-in-Chief of Computer Standards & Interfaces (Elsevier) and Information (MDPI), and as an Associate Editor of IEEE Transactions on Dependable and Secure Computing. His achievements have been recognised through several university awards, including Researcher of the Year (2016), Supervisor of the Year (2019), and the Vice-Chancellor's Award for Global Strategy (2020). He received his PhD from the University of Wollongong in 2001.

Venue and Time: Podium Ballroom, 08:30-09:30, Saturday, 5 December 2026

BI 2026 Keynote

Professor Minmin Luo

Director and Distinguished Investigator, Chinese Institute for Brain Research, Beijing, China
New Cornerstone Investigator, China

Development and Clinical Application of Fully Implantable High-Throughput Brain Machine Interfaces



Abstract: Brain machine interfaces (BMIs) enable direct interaction between the brain and external devices. Invasive and semi invasive BMIs offer high signal quality and broad clinical potential, yet developing wireless, high throughput, and fully implantable systems remains highly challenging. Our team focuses on this frontier and has successfully developed two fully implantable, wireless, high-throughput BMI systems: "The NeuCyber Matrix BMI System (Beinao-1)" and "The NeuCyber Array BMI System (Beinao 2)". "Beinao 1" is the world's first semi invasive BMI that achieves high throughput (>100 channels), wireless implantation, and practical usability. In collaboration with Xuanwu Hospital, Beijing Tiantan Hospital, and other clinical partners, it has been implanted in 44 patients, including those with spinal cord injury, ALS, and stroke. The system has now entered the GCP clinical validation stage. With the longest implantation exceeding 1.5 years and cumulative operation over 100K hours, it has demonstrated stable performance on direct brain control of cursor movement and facilitated rehabilitation of tetraplegia patients. Beinao 2 has achieved, for the first time internationally, brain controlled interception of two dimensional moving targets. Its high throughput flexible microwire electrodes and thousand channel neural acquisition system achieved cutting-edge performance, with the wireless, fully im-

plantable version expected to enter clinical validation in 2026.

Keywords: BMI, high-throughput, wireless, neuroprosthesis, paralysis

Short Bio: Minmin Luo is Director of the Chinese Institute for Brain Research, Beijing, and a New Cornerstone Investigator. His longstanding research focuses on the neural mechanisms of reward and punishment and translational research on related brain disorders. He has published more than 100 high-impact research papers, been granted over 20 invention patents, and led 19 clinical trials. These include trials of groundbreaking gene therapies for vision restoration and drug-resistant epilepsy authorized by China's National Medical Products Administration or the U.S. Food and Drug Administration, as well as a world-leading wireless, high-throughput invasive brain–computer interface system.

Venue and Time: Podium Ballroom, 13:30-14:30, Friday, 4 December 2026

BI 2026 Keynote

Professor Pankaj Sah

Fellow of the Australian Academy of Science
Director, the Queensland Brain Institute (QBI), The University of Queensland, Australia

Formation Storage and Consolidation of Fear Memory



Abstract: Fear memories are essential for adaptive behaviour, but when they persist beyond the original threat or are expressed in inappropriate contexts, they can contribute to anxiety-related disorders. The amygdala and medial prefrontal cortex are key components of the distributed neural circuitry that supports the acquisition, consolidation, expression and extinction of learned fear. This lecture will examine how fear-related information is represented and transformed within amygdala microcircuits, and how reciprocal interactions with prefrontal cortical networks stabilize fear memories and shape their later expression. Particular attention will be paid to connections between the basolateral amygdala and prelimbic and infralimbic divisions of the prefrontal cortex. Integrating evidence from anatomical reconstruction, electrophysiology, behavioural analysis and circuit-manipulation approaches, this lecture will illustrate how synaptic plasticity and coordinated activity across these regions remodel fear-related memory ensembles after learning. The lecture will further consider how context and extinction recruit partially distinct pathways, and how disruption of amygdala-prefrontal communication may lead to maladaptive fear and anxiety.

Short Bio: Professor Pankaj Sah is Director of the Queensland Brain Institute (QBI) at The University of Queensland (UQ). He is renowned for his work in understanding the neural circuitry of the amygdala, an

area of the brain that plays a central role in learning and memory formation. Dysfunction of the amygdala leads to a host of anxiety-related disorders. His laboratory uses a combination of molecular tools, electrophysiology, anatomical reconstruction, calcium imaging and behavioural studies to examine the electrophysiological signatures of different brain regions and their impact on disease. Recently, his laboratory has been working with patients undergoing electrode implantation for deep brain stimulation, which is used to treat a variety of disorders such as Parkinson's disease, Tourette's syndrome and essential tremor. Professor Sah trained in medicine at The University of New South Wales and, after completing his internship, gained a PhD from the Australian National University. Following postdoctoral work at the University of California, San Francisco, and UQ, he established his own laboratory at the University of Newcastle in 1994. He then joined the John Curtin School of Medical Research at the Australian National University as a group leader in 1997. He was recruited to QBI as a founding member in 2003, and has been Director since July 2015. Professor Sah has published over 110 papers in international peer-reviewed journals. He is also the Editor-in-Chief of the Nature Partner Journal npj Science of Learning, the first journal to bring together the findings of neuroscientists, psychologists, and education researchers to understand how the brain learns.

Venue and Time: Podium Ballroom, 09:30-10:30, Saturday, 5 December 2026

BI 2026 Industry Feature Talk

Professor Soman Elangovan

MBBS, FRANZCP, MD(Psych), NIMHANS, FIPS, FIAP, IFAPA(USA), DFAPA(USA), INT ASSC RCPsych(UK), GCHE(Monash), Senior Consultant Psychiatrist, Cannan Institute, Belmont Private Hospital, Brisbane, Australia

Advancing Mental Health Research and Innovation Through Hospital–University–Industry Collaboration



Abstract: Belmont Private Hospital, officially opened in 1973, is Queensland's largest private acute mental health service and a recognised centre for the treatment of complex psychiatric conditions. As an Authorised Mental Health Service under the Queensland Mental Health Act, Belmont provides specialist inpatient care across a broad spectrum of mental health presentations, including mood, anxiety, trauma-related, neurodevelopmental and life-stage disorders. The hospital is also home to nationally recognised specialty programs, including the Brisbane Centre for Postnatal Disorders and Australia's only dedicated inpatient service for dissociative disorders, delivering evidence-based, multidisciplinary care.

The rapidly evolving healthcare environment presents significant challenges for hospitals, including increasing patient demand, workforce pressures, rising operational costs and the need to integrate emerging technologies. Addressing these challenges requires innovative approaches that extend beyond traditional clinical practice and embrace collaboration across healthcare, academia and industry.

This presentation will explore the opportunities for establishing strategic partnerships between Belmont Private Hospital, universities and industry to advance mental health research, education and innovation. Potential collaborative initiatives include joint research projects, clinical re-

search placements, PhD and postgraduate supervision, joint grant applications, and the development, translation and commercialisation of innovative healthcare solutions.

Key areas of research opportunity include clinical and translational research, health services research, patient experience and outcomes, healthcare efficiency and sustainability, and the implementation of evidence-based practices. By leveraging the complementary expertise, resources and capabilities of hospital clinicians, academic researchers and industry partners, these collaborations have the potential to strengthen research capacity, improve clinical practice and enhance patient outcomes.

Ultimately, the presentation will highlight how meaningful hospital–university–industry partnerships can create a sustainable platform for mental health research, knowledge exchange and innovation, positioning Belmont Private Hospital as an active contributor to the advancement of mental healthcare in Queensland and nationally.

Short Bio: Dr Soman Elangovan is a Senior Consultant Psychiatrist specialising in General Adult Psychiatry. Dr Elangovan has special interests in mood disorders, anxiety disorders, ADHD, neuropsychiatry and dual disability.

He also provides neurostimulation in his practice which includes Electroconvulsive Therapy and Repetitive Transcranial Magnetic Stimulation (rTMS) which is a proven and alternative treatment for depression.

Dr Elangovan has more than 25 years' experience in General Adult Psychiatry and has worked for Queensland Health since 2003 as a Senior Consultant Psychiatrist.

He completed his MBBS in 1991, India and 1997 completed his specialist training Doctor of Medicine in Psychiatry at the National Institute of Mental Health and Neurosciences (NIMHANS) in Bangalore, India.

He has been awarded International Fellowship and Distinguished Fellowship from the American Psychiatric Association (APA) for his clinical service and academic excellence. He currently holds the position of Australian Ambassador for the American Psychiatry Association International Membership division.

Dr Elangovan is a College Examiner and Supervisor at the Royal Australian and New Zealand College of Psychiatrists (RANZCP), and has previously been a Committee Member of the College. He is also a faculty member of Intellectual Disability and Neuropsychiatry, of the Royal College of Psychiatry, London. He is also a member of national and international ADHD associations.

Venue and Time: Podium Ballroom, 14:30-15:10, Friday, 4 December 2026

AI 70th Anniversary Panel

AI at 70: Paradigm Shifts, Fundamental Challenges, and Future Frontiers

Panel Chairs

Prof. Ning Zhong
WIC Chair, Maebashi Institute of Technology,
Japan

Prof. Jimmy Xiangji Huang
IEEE-CS TCII Chair, York University,
Canada

Panellists

Prof. Gilles Brassard
2025 ACM A.M. Turing Award Laureate,
Université de Montréal,
Canada

Prof. Minmin Luo
Director and Distinguished Investigator,
Chinese Institute for Brain Research,
China

Prof. Andreas Reinhardt
Vice President, IEEE Computer Society,
Clausthal University of Technology,
Germany

Prof. Pankaj Sah
Director of the Queensland Brain Institute, University of Queensland, Australia

Prof. Soman Elangovan
Senior Consultant Psychiatrist,
Cannan Institute and Belmont Private Hospital, Australia

Prof. Juan D. Velásquez
WIC-Chile Chair,
Universidad de Chile,
Santiago, Chile

Prof. Xiaohui Tao
WI-IAT'26 General Chair,
University of Southern Queensland,
Australia

Background and Introduction: The year 2026 marks the 70th anniversary of the Dartmouth Summer Research Project on Artificial Intelligence, widely regarded as a landmark in the establishment of AI as a research field. Over the past seven decades, AI has evolved from symbolic reasoning and knowledge-based systems to machine learning, deep learning, large-scale foundation models, generative AI, and agentic AI. These developments have profoundly transformed scientific discovery, industrial innovation, and human society.

Despite remarkable progress, fundamental challenges remain in reasoning, learning, cognition, generalization, continual adaptation, and understanding the physical world. Meanwhile, emerging technologies and interdisciplinary approaches, including quantum information technology, brain-inspired intelligence, embodied intelligence, Web Intelligence, and connected intelligence, may open new pathways toward the next generation of AI.

To commemorate this important milestone, WI-IAT 2026 and BI 2026 will jointly organize this anniversary panel to reflect on the historical evolution of AI, examine its fundamental limitations, and explore potential paradigm shifts and future research directions.

Venue and Time: Podium Ballroom, 15:45-17:00, Saturday, 5 December 2026

Workshops and Special Sessions

The 15th International Workshop on Intelligent Data Processing (IDP 2026)

Paolo Mengoni[1], Kristen (Yuanxi) Li[1], and Haolan, Zhang[2]
[1]*Hong Kong Baptist University, Hong Kong, China*
[2]*SCDM Centre NIT, Zhejiang University, China*

Special Session on Cognitive Web Intelligence in the Wild: Unifying Image Restoration, Change Detection, and Agentic Systems (CWIW 2026)

Zehua Chen
Taiyuan University of Technology, China

Special Session on Generative, Trustworthy, and Connected AI: From Web Intelligence to Autonomous Agents (WIAA 2026)

Jianming Yong[1], Di Wu[2], and Thanveer Shaik[1]
[1]*University of Southern Queensland, Australia*
[2]*La Trobe University, Australia*

The 2026 International Workshop on AI and Computer Science (AI&CS 2026)

Min Pan, Shan Liu, and Hexi Liang
Hubei Normal University, Huangshi, China

The 2nd International Workshop on AI and Big Data on the Web: Insights, Challenges, and Applications (AIBD 2026)

Lantian Guo[1] and Mark Chai[2]
[1]*Qingdao University of Science and Technology, China*
[2]*Northwest Missouri State University, USA*

The 2026 International Workshop on AI and Spatio-Temporal Intelligence (AI-STI 2026)

Yanlin Ruan[1], Xiaoyan Liu[3], and Zhaoliang Liu[3]
[1]*Hubei Normal University, Huangshi, China*
[2]*National Time Service Center, Chinese Academy of Sciences, Xi'an, China*
[3]*Harbin Engineering University, Harbin, China*

Special Session on AI Applications to Firm Productivity and Firm Organization (AIA2FPFO 2026)

George J. Georgopoulos
York University, Canada

Artificial Intelligence and Machine Learning in Brain Research (AIMLBR 2026)

Sanjay Ghosh[1] and Swati Banerjee[2]
[1]*Indian Institute of Technology Kharagpur, India*
[2]*Université Paris-Saclay, France*

The 2026 Workshop on Web Intelligence meets Brain Informatics (WImeetsBI 2026)

Jiajin Huang[1], Jianhui Chen[1], and Hongzhi Kuai[2]
[1]*Beijing University of Technology, China*
[2]*Chongqing University of Posts and Telecommunications, China*

Program at a Glance

Thursday, 3rd December

	Virtual Zoom 1	Virtual Zoom 2	Virtual Zoom 3	Podium Lobby
13:00-15:45	WI-IAT'26 WS Session 1	WI-IAT'26 WS Session 2	BI'26 WS Session 1	Registration
14:45-15:00	Break			
15:00-16:30	WI-IAT'26 WS Session 3	WI-IAT'26 WS Session 4	BI'26 WS Session 3	
18:30-20:30	DEI Reception (Azure Mediterranean Restaurant, Southbank)			

Friday, 4th December

	Podium 1	Podium 2	Podium 3	Podium 4	Podium 5
08:30-09:00	Opening Ceremony				Registration
09:00-10:00	AI 70th Turing Keynote: Gilles Brassard, 2025 ACM A.M. Turing Award Laureate				
10:00-11:00	WI-IAT Keynote: Zhi (Helen) Huang, University of Queensland, Australia				
11:00-11:15	Morning Tea				
11:15-12:35	WI-IAT'26 Session 1	WI-IAT'26 Session 2	WI-IAT'26 Session 3	BI'26 Session 1	
12:35-13:30	Lunch				
13:30-14:30	BI Keynote: Minmin Luo, Chinese Institute for Brain Research, China				
14:30-15:10	Industry Feature Talk: Soman Elangovan,Cannan Institute and Belmont Private Hospital, Australia				
15:10-15:25	Afternoon Tea				
15:25-17:00	WI-IAT'26 Session 4	WI-IAT'26 Session 5	WI-IAT'26 Session 6	BI'26 Session 2	

Saturday, 5th December

	Podium 1	Podium 2	Podium 3	Podium 4	Podium 5
08:30-09:30	WI-IAT Keynote: Willy Susilo, University of Wollongong, Australia				Poster + 3-mins Pitches
09:30-10:30	BI Keynote: Pankaj Sah, University of Queensland, Australia				
10:30-10:45	Morning Tea				
10:45-12:30	WI-IAT'26 Session 7	WI-IAT'26 Session 8	WI-IAT'26 Session 9	BI'26 Session 3	
12:30-13:30	Lunch				
13:30-15:30	WI-IAT'26 Session 10	WI-IAT'26 Session 11	WI-IAT'26 Session 12	BI'26 Session 4	
15:30-15:45	Afternoon Tea				
15:45-17:00	AI 70th Anniversary Panel Discussion				
18:30-21:00	Banquet & Award Ceremony (Sky Room & Terrace, Brisbane Convention & Exhibition Centre)				

Sunday, 6th December

	Podium 1	Podium 2	Podium 3	Podium 4	Podium 5
09:00-10:45	WI-IAT'26 Session 13	WI-IAT'26 Session 14	WI-IAT'26 Session 15	BI'26 Session 5	Executive meetings
10:45-11:00	Morning Tea				
11:00-12:30	WI-IAT'26 Session 16	WI-IAT'26 Session 17	WI-IAT'26 Session 18	BI'26 Session 6	
12:30-13:30	Lunch				
13:30-15:30	WI-IAT'26 Session 19	WI-IAT'26 Session 20	BI'26 WS SS	BI'26 Session 7	
15:30-15:45	Afternoon Tea				
15:45-16:50	WI-IAT'26 WS Session 5	WI-IAT'26 WS Session 6	WI-IAT'26 WS Session 7	BI'26 WS Session 2	
16:50-17:00	Closing Ceremony				

Conference Sessions and Presentations
Thursday, the 3rd December

Time	Virtual Zoom 1	Virtual Zoom 2	Virtual Zoom 3	Podium Lobby
	WI-IAT'26 WS Session 1 **Chair: *Paolo Mengoni* (@)**	**WI-IAT'26 WS Session 2** **Chair: *Mark Chai* (@)**	**BI'26 WS Session 1** **Chair: *Jianhui Chen* (@)**	
13:00-15:00	[S03201-IDP-L(@)] Post-Training Quantization of Convolutional Neural Networks: A Comparative Evaluation of Affine, Symmetric, and Power-of-Two Schemes with Layer-Wise Fidelity Analysis *Dominic Jean-Luc Tarnowski and Tatiana Ermakova*	[Invited Talk-AIBD((@))] From Big Data Pipelines to Autonomous Intelligence: Architecting Agentic AI Systems for Data-Driven Decision Making. *Ajay Bandi, Northwest Missouri State University, United States*	[S02201-WImBI-L(@)] A Knowledge Distillation Approach for Interpretable pRCC Nuclear Grading Prediction *Zitong Zhang, Houming Zhao, jianhui Chen, Qingbo Huang, and Hairong Yan*	Registration
	[S03202-IDP-L(@)] On Yuan Kejia's Chinese Translations of Yeats's Poetry from the Perspective of Translator Behavior Criticism *Yitian Zhang and Chen Ou*	[WI346-WIAA-L(@)] SmartPQ-Shield for Policy-Bounded Safe-Action Bandits in Adaptive Post-Quantum TLS *Insaf Imene Lasledj, Yulliwas AMEUR, and Samia Bouzefrane*	[S02203-WImBI-L(@)] How Learning Shapes Communication under Conflicting Interests: A Computational Model *Vyacheslav Kalchenko and Eduard Korkotian*	
	[S03203-IDP-L(@)] On the Construction of China's National Image from the Perspective of Multimodal Discourse Analysis—Taking the Documentary China Bouquet as an Example *Nan Song and Chen Ou*	[WI211-WIAA-L(@)] Web Intelligence for Smart Health and Living *Kireet Joshi, Jianming Yong, and Yahua Zhang*	[S02204-WImBI-L(@)] LearnTune: An Exploratory Pilot Study of Multimodal Closed-Loop Music Biofeedback During Word Learning *Zimo Fan and Ting Jiang*	
	[S03204-IDP-L(@)] Interpreting Curiosity-Driven Reinforcement Learning Through Behavioral Coverage and Policy-Loss Diagnostics *Paolo Mengoni, Zixin Li, Yuanxi Li, Pui Yun Paulina Wong, Daniel Jandong Shen, and Aru Nurgissayeva*	[S05203-AIBD-L(@)] Evolution-Guided Adaptive Learning for Non-Stationary Web Data Streams *Mohamed Ayari, Atef Gharbi, and Nasser Albalawi*	[B219-WImBI-L(@)] Hierarchical Representation is Not a Passive Compromise: Evidence from the Bayesian RNN model *Ma Mingxuan, Peng Guanqiao, and Li Chen*	

	[S03205-IDP-L(@)] Using Machine Learning to Explore the Impact of ESG Practices on Corporate Financial Performance *Zining Qu and Kristen Yuanxi Li*	[S05204-AIBD(-L@)] Design of Millimeter Wave Train-ground Communication System in Heavy haul Railway Scenarios *Feng-wei Kang, Yang Cheng, Wei-fan Zheng, Yu-xin Li, Jin-hua Hu, and Jing Song*	[S10203-GAI4Neuro-L(@)] Brain-Aligned Multimodal LLMs for Social and Emotional Understanding of Cartoon Movies *Yiran Huang, Zeyong Zhang, Bharat Biswal, Xin Di, and Mengjia Xu*
		[S15201-AI-STI-L(@)] Ar-Net : a Ratio-Based Learning Network for Multivariate Time Series Forecasting *Arwansyah -, Bijay Prasad Jaysawal, and Jen-Wei Huang*	[S08201-IBI-BIBC(@)) Joint Spatio-Temporal and Frequency-Gated Representation Learning for Inner Speech EEG Decoding *Zhiyuan Zhu, Jiawei Xue, Qing Li, Yang Bai, Kailun Tan, and Ziyu Li*
15:00-15:15	**Break**		
15:15-16:45	**WI-IAT'26 WS Session 3** **Chair: *Yuanxi Li* (@)**	**WI-IAT'26 WS Session 4** **Chair: *Zehua Chen* (@)**	**BI'26 WS Session 3** **Chair: *Feng Zhao* (@)**
	[S03206-IDP-L(@)] Evaluating the Incremental Predictive Value of Title and Thumbnail Features under Temporal Shift in YouTube Trending Videos *Xiaoqi Meng, Yupeng Li, and Liang Lan*	[S13202-CWIW-L(@)] FS-Mamba: Frequency-Structure Decoupling with Mamba for Low-Light Image Restoration *Chengzhi Ma, Hao Wu, Hongqi Zong, and Zehua Chen*	[Invited (@)] Mapping Somatosensory Networks from the Periphery to the Brain. *Yan Chen, Guangdong Institute of Intelligence Science and Technology*
	[S03209-IDP-L(@)] Predictive Algorithm Selection for Multiscale Electromagnetic Simulation from Sparse Runtime Data *Mohamed Ayari, Mohamed Hajji, and Taoufik Aguili*	[S13203-CWIW-L(@)] Agentic Query Reformulation for Dementia Caregiving Conversational AI *Becky Yu*	[Invited (@)] High-Accuracy, Low-Cost Connectome Reconstruction. *Jiazheng Liu, Laboratory of Brain Atlas and Brain-inspired Intelligence, Institute of Automation, Chinese Academy of Sciences*
	[S09203-AIA2FPFO-L(@)] MUDiffNet: A Multi-scale Differential Attention Hybrid Network for Robust Clinical Image Classification *Zeshan Hu*	[S13204-CWIW-L(@)] Future Directions in Retrieval-Augmented Generation: From Retrieval Optimization to GraphRAG and Agent-Oriented RAG *Haoyu Wang*	[Invited (@)] A mouse brain atlas based on dendritic microenvironments. *Yufeng Li, Fudan University, China*
	[S02220-AI&CS-L(@)] K-PGR: Knowledge-Anchored Personalized Graph Reranking for Inference-Time Query Rewriting in Dense Retrieval *ZuHua Chen*	[S07201-WImBI-L(@)] Deep Learning Classification and Comparative Evaluation of Frost States on Industrial Unit Coolers in an Indoor Ski Resort *Guoping He, Yuhua Zhang, Yilun Yin, and Pengfan Zhou*	
18:30-20:30	**DEI Reception (Azure Mediterranean Restaurant, Southbank)**		

Program Legend

- **L** — Long or regular presentation: 15 minutes for the presentation, followed by 5 minutes for questions and answers.
- **S** — Short presentation: 12 minutes for the presentation, followed by 3 minutes for questions and answers.
- **(@)** — Indicates that a presentation will be delivered online or that a session chair will participate online.

Conference Sessions and Presentations
Friday, the 4th December

Time	Podium 1	Podium 2	Podium 3	Podium 4	Podium 5
08:30-09:00	**Opening Ceremony (Chair: *Xiaohui Tao*)**				
09:00-10:00	**[AI 70th Anniversary Turing Keynote] Alan Turing and me** **Professor Gilles Brassard, 2025 ACM A.M. Turing Award Laureate, Université de Montréal, Canada** **(Chair: *Ning Zhong*)**				
10:00-11:00	**[WI-IAT Keynote] Learning at Test Time: Towards Adaptive AI in a Connected World** **Professor Zhi (Helen) Huang, Fellow of IEEE, Fellow of ACM, The University of Queensland, Australia** **(Chair: *Jimmy Xiangji Huang*)**				
11:00-11:15	**Morning Tea**				**Registration**
11:15-12:35	**WI-IAT'26 Session 1** **Intelligent IoT and Data Systems** **Chair: *George Georgopoulos***	**WI-IAT'26 Session 2** **Reinforcement Learning and Multi-Agent Systems** **Chair: *Ji Zhang***	**WI-IAT'26 Session 3** **Language Analysis and Benchmarking** **Chair: *Juan D. Velásquez***	**BI'26 Session 1** **Emotion Recognition & Affective Neuroscience** **Chair: *Yan Li***	
	[WI384-L] IoT-Enabled Waste Segregation System: From Collection to Recycling *Abinaya Gopalakrsihnan, Yuting Zhu, and Xujuan Zhou*	[WI259-L] Efficient LLM-Assisted Reinforcement Learning via Entropy-Driven Invocation Scheduling and Performance-Based Termination *Ryotaro Murakami, Manabu Ohta, Donghui Lin, and Fumito Uwano*	[WI241-L] Supervision Helps, Filtering Hurts: A Multilingual Analysis of Two-Stage Persuasion Span Detection *Yutong Wang, Diana Nurbakova, and Sylvie Calabretto*	[B210-L] AI Policy & Interpretations of Human Emotions *Anunaya Sinha and Jianming Yong*	

	[WI223-S] SAGE-GraphRAG: Schema-Aware Multimodal GraphRAG for Water Affairs Question Answering Rui Han, Hongxia Xu, Zou Xiaotao, Yuebo Du, and Jianzhuo Yan	[WI298-L] Quantifying Re-identification Risk in LLM-Generated Mobility Summaries through Iterative Questioning *Ayumu Kai and Masanao Ochi*	[WI308-L] VERIDOC-QA: A Benchmark for Verifiable Multi-Document, Multi-Span Evidence Grounding *Jui-I Wang, Sheng-Lun Wei, Hen-Hsen Huang, and Hsin-Hsi Chen*	[B225-L] A Model-Agnostic Data-Driven Hierarchical Learning Approach for Fine-Grained EEG Emotion Recognition *Debadrita Roy, Neethu Robinson, and Smitha Kavallur Pisharath Gopi*
	[WI280-S] GenCS-Net: A Generative Conv-Swin Hybrid Network for Deepfake Video Detection *Min Dong, Pengyu Liu, Kebin Jia, Zhonghua Sun, Zhe Li, and Jinchao Feng*	[WI339-L] Deep Reinforcement Learning-Based Agents for Multilateral Negotiation *Kosuke Nakata and Katsuhide Fujita*	[WI299-L] gym-invmgmt: An Open Benchmarking Framework for Inventory Management Methods *Reza Barati and Qinmin (Vivian) Hu*	[B266-L] TopoEMO: Topography-Guided Adaptive Mixture-of-Experts for Cross-Dataset EEG Emotion Recognition *Jianlin Wang, Youxi Qu, Yanyi Zhu, Xicheng Lou, and Xinwei Li*
	[WI321-S] A Matching-Driven Framework for Distributing IoT Traffic across Edge Intrusion Detection Nodes *Waleed Almughalles, Jianming Yong, Xiaohui Tao, Yuefeng Li, and Jun Shen*	[WI381-L] State-Dependent Risk Adaptation via Distributional Reinforcement Learning for Decentralized Multi-ASV Navigation *Tenyu Matsumoto, Manabu Ohta, Donghui Lin, and Fumito Uwano*	[WI363-S] Aggregation Granularity Reverses Confusion Diagnostics: Persuasion Technique Confusion Is Cross-Lingually Shared *Yutong Wang, Diana Nurbakova, and Sylvie Calabretto*	[B212-S] Feedback-Related Fronto-Parietal Theta/Alpha Balance Differentiates Dark Triad Personality Profiles *Dor Mizrahi, Inon Zuckerman, and Ilan Laufer*
	[WI279-S] Visual Similarity and Structural Aggregation in Examiner-Citation Networks for GNN Evaluation *Soichi Onozuka, Yohei Kobashi, Takaaki Ohnishi, and Yutaka Matsuo*			
12:35-13:30	**Lunch**			
13:30-14:30	**[BI Keynote (@)] Development and Clinical Application of Fully Implantable High-Throughput Brain Machine Interfaces** **Professor Minmin Luo, Chinese Institute for Brain Research, China** **(Chair: *Xiaohui Tao*)**			
14:30-14:40	**[BI in Industry] Introduction to Cannan Institute and Belmont Private Hospital** **Rachel Stark, Cannan Institute and Belmont Private Hospital, Australia** **(Chair: *Maryam Doborjeh*)**			
14:40-15:10	**[BI Industry Feature Talk] Advancing Mental Health Research and Innovation Through Hospital–University–Industry Collaboration** **Professor Soman Elangovan, Cannan Institute and Belmont Private Hospital, Australia** **(Chair: *Maryam Doborjeh*)**			
15:10-15:25	**Afternoon Tea**			
15:25-17:00	**WI-IAT'26 Session 4** **Explainable AI and User Behaviour** **Chair: *Tong Zhang***	**WI-IAT'26 Session 5** **Knowledge Graphs and Graph Learning** **Chair: *Thanveer Shaik***	**WI-IAT'26 Session 6** **Social Media and Language Analysis** **Chair: *Jianzhuo Yan***	**BI'26 Session 2** **Brain States, Sleep and Consciousness** **Chair: *Neil Smalheiser***

[WI295-L] From Random Noise to Anatomy: Evaluating Saliency Explanations in MRI-Based Alzheimer's Disease Detection *Tamal Chakroborty and Yang Liu*	[WI234-L] Dual-Axis LLM-Based Evaluation of Knowledge Graph Extraction: A Water Management Case Study *Yupeng Wang, Hongxia Xu, Xiaojuan, and Jianzhuo Yan*	[WI267-L] Asymmetric Decline Rather Than Backfire: A Repost-Network Analysis of Japanese Vaccine-Shedding Misinformation on X *Akinobu Seki, Erina Murata, Masaki Chujyo, and Fujio Toriumi*	[B230-L] Distinct Neural Spectral Trajectories Define the Transitions Between Wakefulness and Sleep *Saumya Prachi, Karthick PA, John Thomas, Rajamanickam Yuvaraj, and Jac Fredo Agastinose Ronickom*
[WI370-L] Causally and Temporally Feasible Counterfactual Explanations for Dynamic Rankings *Rikuto Takano Takano, Ryusei Otani, Ryuta Shiraishi, Keiichi Namikoshi, Yuko Sakurai, and Satoshi Oyama*	[WI247-L] GraphAny++: On the Effectiveness of Linear GNNs *Leon Walcher and Ansgar Scherp*	[WI330-L] From Detection to Characterization: A Large-Scale Study of Ragebait on Japanese X *Zhiyang Qi, Kazuhiro Ito, Jinghui Chen, Hibiki Nakamura, Zhangxuan Chen, Erina Murata, Masaki Chujyo, and Fujio Toriumi*	[B243-L] A Lightweight Brain Informatics Framework for End-to-End Sleep Staging from Raw PSG Signals *Md Nahidul Islam, Siuly Siuly, Bo Song, Peng Wen, and Yan Li*
[WI378-L] When Product Stakes Matter: User Engagement with AI Summaries and Warnings in E-Commerce *Elaheh Jafari and Julita Vassileva*	[WI336-L] When Successful Knowledge Graph Edits Displace Correct Answers Rank-Level Locality beyond Parameter Support *Yi-Cheng Lai, Jerry Wang, Hsin-Ling Hsu, Li-Chu Chi, Ya-Wen Teng, and Hen-Hsen Huang*	[WI288-S] Operation Semantics for Exploring Hypermedia Environments *Jérémy Lemée, Simon Mayer, Danai Vachtsevanou, Alessandro Giugno, Kimberly Garcia, and Andrei Ciortea*	[B253-L] Patient-Wise EEG-Based Depth of Anaesthesia Estimation Using Nonlinear Complexity Features and Support Vector Regression *Rashini Sahabandu, Tianning Li, Yan Li, and Siuly Siuly*
[WI392-L] Does Adaptive Graph Structure Help Dynamic User Behaviour Modelling? A Controlled Study *F M Javed Mehedi Shamrat, Syed Muntasin Fayaz, Xujuan Zhou, Raj Gururajan, and Ji Zhang*	[WI380-L] Heterogeneous Knowledge Graphs for Territorial Transition *Landy Rajaonarivo, Mathieu Roche, and Maguelonne Teisseire*	[WI270-S] Context-Dependent Interpretation of Vague Temporal Expressions in Disaster-Related Behavioral Facilitation Information on Social Media *Ryota Dakie, Yu Suzuki, Tadahiko Kumamoto, and Akiyo Nadamoto*	[B263-L] A Multi-Dimensional Comparison Study of Feature Extraction and Transition Modelling in Automated Sleep Classification *Isuru Naotunna Andarage, Bo Song, Yan Li, and Peng Wen*
[WI301-S(@)] Collective Decision-Making with Intrinsic Explanations in Open Cyber-Physical Systems *Miriam ZAWADI MUCHIKA*	[WI269-S] REKGN: Relation-Enhanced Knowledge Graph Embedding Networks for Recommender Systems *Cheng Chu and Jenq-Haur Wang*	[WI274-L(@)] Semantic Evaluation of Text Clustering Without Ground Truth Using Large Language Models *Sami Guembour, Catherine Dominguès, and Sabine Ploux*	[B251-S] The Centromedian Thalamic Nucleus as Center of the Consciousness Vortex Model: A Hypothesis *Zhaole Sun*

Program Legend

- **L** — Long or regular presentation: 15 minutes for the presentation, followed by 5 minutes for questions and answers.
- **S** — Short presentation: 12 minutes for the presentation, followed by 3 minutes for questions and answers.
- **(@)** — Indicates that a presentation will be delivered online or that a session chair will participate online.

Conference Sessions and Presentations
Saturday, the 5th December

Time	Podium 1	Podium 2	Podium 3	Podium 4	Podium 5
08:30-09:30	**[WI-IAT Keynote (@)] Securing the Web: From Real-World Vulnerabilities to Post-Quantum Cryptography** **Professor Willy Susilo, Fellow of IEEE, Fellow of IET, Australian Laureate Fellow, The University of Wollongong, Australia** **(Chair: *Xujuan Zhou*)**				
09:30-10:30	**[BI Keynote] Formation Storage and Consolidation of Fear Memory** **Professor Pankaj Sah, Fellow of the Australian Academy of Science, The University of Queensland, Australia** **(Chair: *Yan Li*)**				
10:30-10:45	**Morning Tea**				
10:45-12:30	**WI-IAT'26 Session 7** **Intelligent Web Services and Language Models** **Chair: *Jianming Yong***	**WI-IAT'26 Session 8** **AI Agents and Intelligent Recommendations** **Chair: *Yu Suzuki***	**WI-IAT'26 Session 9** **Data Analysis and Human Behaviour** **Chair: *Xujuan Zhou***	**BI'26 Session 3** **Machine Learning for Brain and Health Analysis** **Chair: *Maryam Doborjeh***	**BI'26 Abstract Session I** **Posters & 3-mins Pitches** **Chair: *Jing Meng***
	[WI297-L] Hierarchical API Selection for Requirements-Driven Service Composition *Shinichi Nakagawa and Yohei Murakami*	[WI237-L] Hierarchical ReAct: Mitigating LLM Agent Degradation in Long-Horizon Tasks and Building a Dataset with Reduced Test Contamination *Hidenori Itaya and Masaki Hamamoto*	[WI277-L] Structural Asymmetry in Embedding-Space Neighborhoods for Diagnosing Task Structure *Tatsuya Yamamoto*	[B249-L] A Generative–Discriminative Fusion Framework for Explainable Image Classification with Application to Brain MRI *Juan D Velasquez, Junwei He-Mai, Yong Zhang, Ingeborg Lopez-Liberona, and Ram Sarkar*	• [S03202] High-Precision Whole-Brain Spatial Localization by Quantitative Feature Selection: From Visibility Census to Influence Tensor *Xin Lu, Jie Luo, Yuegang Wang, and Zhao Feng*

[WI303-L] CNP-Based LLM Multi-Agent Systems for Composite Service Recommendation
Yuki Tobisawa and Yohei Murakami

[WI227-S(@)] Behavior-Aware Aggregation and Graph Attention Fusion Network for Multi-Behavior Recommendation
Chuang Shi, Yong Xu, Cheng Li, Shenglan Liao, Jianfeng Sun, and Qun Fang

[WI286-L] Can We Trust Gaze? A Reliability and Fairness Study of Webcam Gaze Estimation in Online Learning
Jumana Alqudah, Towhidul Islam, Nuren Nafisa, Nuha Abadi, David J. Brown, and Mufti Mahmud

[B229-L] Correlation-Based Structural MRI Analysis and Machine Learning for Characterizing Autism Spectrum Disorder
Hrithika Usha, Sandeep Singh Sengar, and Jac Fredo Agastinose Ronickom

• [S03203] Multimodal Image-Guided Stereotactic Localization of the Mouse Brain Based on STAM
Hongqin Liu, Anan Li
• [S03204] A stereotaxic brain knowledge graph for integrating heterogeneous neural-circuit evidence
Xiaonan Ge, Zhao Feng, and Jie Luo

[WI376-L] Lightweight Ban Prediction in YouTube Live-Stream Chat: Per-Genre Feature Selection and Automatic Genre Assignment
Ryotaro Hamada, Yohei Kobashi, Hiroto Sudo, and Yutaka Matsuo

[WI263-S] Towards Constraint-Aware Opportunity Architecture: A Modular Framework for Compliant and Explainable Nascent Research Grant Recommendation
Naif N. Alotaibi, Madhushi Bandara, Morteza Saberi, and Farookh Hussain

[WI356-L] DiTo-HSS: Long-Context Diartization via Token-Grounded Hybrid State Spaces
Fengchi Wang, Jiashu Zhao, and Yang Liu

[B264-L] Decision Voting Based Multiscale Convolutional Learning of Brain Networks
Deep Sekhar Ghosh, Kinnar Halder, and Sanjay Ghosh

• [S03205] Multimodal Self-Supervised Learning of Brain Spatial Representations
Rou Li
• [S03206] PGRMamba: Geometry-Guided State Space Models for 3D Soma Detection in Large-Scale Whole-Brain Images
Zibin Cai, Rou Li, Yan Jiang, Jiamin Lin, Qingming Luo, Anan Li, and Chi Xiao

---

[WI292-S] Account Level Community Notes History for Autonomous Judgment: A Source History Nudge
Yuki Horikawa, Fujio Toriumi, Kazuhiro Ito, and Atom Sonoda

[WI264-S] Constraint-Aware Decoupled Reasoning for Safe LLM-based IoT Control
Nanami Takita and Donghui Lin

[WI278-S] Similarity Measurement for Event Tree
Daisuke Machizawa and Yasunobu Sumikawa

[B245-S] Joint Phase-Amplitude Connectivity Modeling of EEG Signals for MDD Classification
Soujanya Hazra, Sohini Gupta, Kinnar Halder, and Sanjay Ghosh

• [S03207] A mouse brain atlas based on dendritic microenvironments
Yufeng Liu and Yukai Yang
• [S06202] Attentional Bias Toward Emotional Faces in Gelotophobe and the Effects of Social Exclusion: The Biopsychosocial Model
Shuo Wang, Junwen Mo, Yang Yang, Xiangjun Xu, and Junjia Shi

[WI300-S(@)] Benchmarking Small Language Models on Answer Selection Tasks
Chang Nian Chuy, Chen Ding, and Vivian Hu

[WI307-S(@)] An End-to-End Agentic Framework with Graph Attention Networks for Detecting and Explaining Behavioral Polarization in Online Communities
Bahareh Rahmatikargar and Aijun An

[WI304-S] Simulating Strategies for Defense Against Brand-Targeted Online Disinformation
Bryan Boots

[B248-S] Perseveration as Supercriticality in a Valence-Weighted Hawkes Model of Sensorimotor Cognition
Rafik Hadfi

• [S06203] Designing Positive Healthcare Environments to Foster Harmonious Doctor - Patient Communication: The Roles of Positive Distraction and Perceived Control in a Virtual Reality Experiment
Luxi Wang, Mengyao Zhao, and Yidi Chen

	[WI341-S(@)] Test-Time Pre-Image Optimization for Kernel-Based Emotion Steering in Large Language Models *Takumi Tachiya and Takayasu Fushimi*	[WI347-S] Agentic CBR-RAG Workflow for Household Financial Advice Generation *Julian Miwa, Da Li, Tadahiko Kumamoto, and Yukiko Kawai*	[WI228-S(@)] Reward-Punishment Sensitivity Inference from Users' Behavior via Online Learning *Sabrina Villata, Federica Cena, and Charles Bouveyron*	[B250-S] Data Scarcity Mitigation in Federated EEG Dementia Classification Using Quantum Circuit Born Machines *Muhammad Umair, Bo Song, and Paul Wen*	
12:30-13:30			**Lunch**		
13:30-15:30	**WI-IAT'26 Session 10** **Multimodal Systems and Trustworthy Agents** **Chair: *Yohei Murakami***	**WI-IAT'26 Session 11** **Human-Centered and Trustworthy AI** **Chair: *Tazeem Ahmad***	**WI-IAT'26 Session 12** **Applied Machine Learning** **Chair: *Hongzhi Kuai***	**BI'26 Session 4** **Brain Decoding and AI** **Chair: *Hrithika Usha***	**BI'26 Abstract Session II** **Posters & 3-mins Pitches** **Chair: *Chi Xiao***
	[WI222-L] Pillar-level Multimodal Fusion for Efficient LiDAR–Camera 3D Object Detection *Sanghee Suh, Pavithra. M. Girithimmappa, Xiaotong Wu, Le Shen, and Ahmed Hambaba*	[WI235-L] Vague Urgency is Action-Grounded: Calibrating LLM Temporal Interpretations to Human Judgment *Yu Suzuki, Ryota Dakie, Tadahiko Kumamoto, and Akiyo Nadamoto*	[WI348-L] Deep Autoencoder-based Data Compression for Electrical Load Analysis on IoT Devices *Mazen Bouchur and Andreas Reinhardt*	[B227-L] Geometric Eigenmodes Enable Accurate Brain Decoding of Motor Imagery *Hongfei Zhang, Changhong Jing, Yong Hu, Michael Kwok-Po Ng, and Shuqiang Wang*	• [B234-ABS] Dissociating Implicit Wanting and Liking for Shopping-Related Stimuli in High Hoarding Tendencies *Yuqi Sun, Wenlan Xie, and Chuanbang Chen* • [B217-ABS] Partner Visibility and Physical Co-Presence Shape Distinct Neural Signatures of Social Decision-Making *Kawin Yamtuan, Paisit Khanarsa, Sirawaj Itthipuripat, and Thitaporn Chaisilprungraung*
	[WI351-L] Trust Computation for Software Supply Chains *Audun Jøsang, Nataša Trkulja-Surudžić, and Yue Xu*	[WI293-S] Who Reviews the AI? The Critical Collaboration Ladder for Human-AI Symbiosis *Diana Nurbakova and Liana Ermakova*	[WI226-S] Data Efficiency and Morphology-Sensitive Augmentation for Wafer Map Defect Classification *Sanghee Suh, Young Suh, and Chang Choo*	[B228-L] Open-Vocabulary EEG-to-Text Decoding with FiLM-Based Rapid Subject Adaptation and Uncertainty-Aware Generation *Sachith Jayalath and Fouzul Hassan*	• [B216-ABS] Decoding 3D Upper-Limb Motor Imagery Trajectories from EEG Using Motor Execution Transfer Learning and Privileged IMU Information *Thitaporn Chaisilprungraung and Suparach Intarasopa* • [S05203] Protocol-specific psychological susceptibility of transcranial electrical stimulation for pain modulation *Xinxin Lin and Weiwei Peng*

[WI265-L] Semantic Masking and Context-Aware Quotation-RAG for Privacy-Aware Personalized Dialogue with a Historical Figure *Tetsuya Kitahata, Kazuhiro Seki, and Akiyo Nadamoto*	[WI294-S] Toward Human-Centric Ontology Grounded Explainable AI Framework with Large Language Models *Mostaqim Murshed, Madhushi Bandara, and Ambreen Hanif*	[WI248-S] VAD Lexicon-Guided Data Augmentation with Dual Contrastive Learning for Aspect-Based Sentiment Analysis *Chenhao Ke, Haoran Xie, and S. Joe Qin*	[B222-L] Improving Class Imbalanced Cancer Subtype Classification Using Cascading Models: A Review *Markian Jaworsky, Thanveer Shaik, Xiaohui Tao, Jianming Yong, Ji Zhang, and Shiva Raj Pokhrel*	• [B267-ABS] Incremental Multi-Source Seizure Detection with EEG Foundation Models *Jun-Mo Kim and Tae-Eui Kam* • [B215-ABS] Wearable Contactless Around-Ear and Research-Grade Whole-Scalp EEG Reveal Convergent Neural Signatures of Stress and Mindfulness *Sirawaj Itthipuripat, Pachaya Sailamul, Suparach Intarasopa, Waraset Wongsawat, Sittha Preedapirat, Abbie Pongpat, Thitikorn Kaewlee, Sarawin Khemmachotikun, Chitpol Mungprom, Barry Giesbrecht, and Stephanie Nelli*
[WI323-S] Unsupervised Multimodal Discovery of Cognitive Load States During Web Interaction *Pía Antiquera and Juan Velásquez*	[WI379-S] Understanding User Critical Thinking in Retrieval-Augmented Generation *Petra Dadić and Liana Ermakova*	[WI305-S] Short-term Intent-aware Contrastive Learning for Sequential Recommendation *Keita Matsunaka, Yoshiyuki Sone, Yihong Zhang, and Takahiro Hara*	[B257-L] Stimulus-Anchored Cross-Modal Alignment for Subject-Independent Emotion Decoding from Two-Channel Consumer EEG *Subhash Gurappa, Thejaswini M S, Sundararaj Iyengar, and V.N. Manjunath Aradhya*	• [S05204] NGI-Net: A Multimodal Neural Framework with Clinical Context for Autism Spectrum Disorder Screening *Hongliang Sun, Hongbin Dai, and Shaoguo Cui* • [S05205] Distinguishing Love Using Pain-Related EEG *Jingyang Yu, Tianze Wang, Junyu Wu, Jiayi Shi, Rong Huang, Xingyu Zhou, Jiejun Xie, and Jing Meng*
[WI393-S] The Cloud Threat Landscape: Identity Compromise, Misconfiguration, API Abuse, and Software Supply-Chain Risk *Rejaul Mazumder and Jianming Yong*	[WI358-L(@)] Tide: Trustworthy and Interpretable Battery Degradation Estimation with Contextual Learning and Symbolic Distillation *Wen Yang Tan, Jiawei Li, Fang Liu, Wei Zhang, Sumei Sun, Peng Cheng Wang, and Elisa Y. M. Ang*	[WI394-S] An Extended RFM Model for Customer Value Analysis in the Live Streaming E-commerce: Integrating Engagement, Consumption Breadth, and Return Behavior *Zhangguang Wu*	[B244-L(@)] Neurofeedback-Readiness Evaluation for Motor-Imagery BCI: A Reproducible Cross-Dataset Brain-Informatics Framework *Priyanka Pawar, Nilima Kulkarni, and Priyanka Jain*	• [S05206] A Resting-State EEG Resource for Young Adults with ADHD *Tianze Wang, Jingyang Yu, and Jing Meng* • [S05207] An Intrinsic Geometric Regression Framework for Brain Connectivity in Special Populations *Fanghong Zhang and Yinan Lin*
[WI260-S] From Pixels to Places: A Screen Vocabulary for Screen-Aware Agents *Alles Rebel, Nikil Dutt, and Bryan Donyanavard*	[WI359-L(@)] Local Evidence Modeling for Multi-view Food Nutrition Estimation: Surface Residual Calibration and Density Slot Aggregation *Ningxuan Ma and Xiaofeng Zhang*	[WI233-L)] Dialogue-Level Multimodal Emotion Recognition with Valence–Arousal Guided Affective Supervision *Bisma Ayaz, Xiaoying Gao, and Bing Xue*	[B259-L(@)] Efficient Motor Imagery Communication in Arabic BCI Spellers via Large Language Models *Fady Faragallah, Mahmoud Khalil, and Seif Eldawlatly*	

	[WI365-S(@)] Trust improvement through adaptive changes in agents' socio-emotional behavior in decision-making situations *Yoshimasa Ohmoto, Masato Kuno, and Toyoaki Nishida*	[WI316-S(@)] Human-Centric Collaborative Intelligence (HCCI): A Web-of-People Paradigm for Trustworthy Human–AI Collaboration in Digital Healthcare *Kireet Joshi, Jianming Yong, and Yahua Zhang*	[WI290-L(@)] RooseBERT: A New Deal For Political Language Modelling *Deborah Dore, Elena Cabrio, and Serena Villata*
15:30-15:45	**Afternoon Tea**		
15:45-17:00	**[AI 70th Anniversary Panel Discussion] AI at 70: Paradigm Shifts, Fundamental Challenges, and Future Frontiers** **Gilles Brassard, Minmin Luo (@), Andreas Reinhardt, Pankaj Sah, Soman Elangovan, Juan D. Velásquez, and Xiaohui Tao** **(*Chairs: Ning Zhong and Jimmy Xiangji Huang*)**		
18:30-21:00	**Banquet & Award Ceremony (Sky Room & Terrace, Brisbane Convention & Exhibition Centre)**		

Program Legend

- **L** — Long or regular presentation: 15 minutes for the presentation, followed by 5 minutes for questions and answers.
- **S** — Short presentation: 12 minutes for the presentation, followed by 3 minutes for questions and answers.
- **(@)** — Indicates that a presentation will be delivered online or that a session chair will participate online.

Conference Sessions and Presentations
Sunday, the 6th December

Time	Podium 1	Podium 2	Podium 3	Podium 4	Podium 5
09:00-10:45	**WI-IAT'26 Session 13** **AI for Language, Vision and Retrieval** **Chair: *Masanao Ochi*** [WI374-L] FragilityLens: From Family-Specific Text-Veracity Diagnosis to Coverage-Aware Defensive Rewriting *You-Zhen Su and Cheng-Te Li* [WI360-S] DBCPNet: A Physics-Aware Network with Dual-Branch Cross-Prior Guidance for Low-Light Image Enhancement *Wenqin Miao, Shaodong Zhao, and Zehua Chen* [WI389-L(@)] Leakage-Aware Evaluation of Retrieval-Augmented Rare Disease Diagnosis over Biomedical Linked Data *Larbi Mohammed Achraf, Mezrar Samiha, Klouche Badia, Pons Olivier, and Kornyshova Elena*	**WI-IAT'26 Session 14** **Language Models: Privacy, Security and Applications** **Chair: *Chenxi Yuan*** [WI373-L] Probing, Patching, and On-Demand Activation Steering of Piece-in-Hand Representations in Shogi-GPT *Takumi Kato, Yuko Sakurai, Masato Kikuchi, Tadachika Ozono, Masato Shinoda, and Satoshi Oyama* [WI319-S] Optimizing the Mechanistic Privacy-Utility Trade-off via Neuron Activation Suppression in Large Language Models *Tazeem Ahmad, Xiaohui Tao, Jianming Yong, Thanveer Shaik, and Yuefeng Li* [WI361-L(@)] PQTrust-Agent: Policy-Compiled Post-Quantum Trust Contracts for Web-of-Agents Communications *Yulliwas AMEUR, Insaf Imene Lasledj, and Samia Bouzefrane*	**WI-IAT'26 Session 15** **Trustworthy Machine Learning and Applications** **Chair: *Thanveer Shaik*** [WI313-S] Adaptive Membership Inference Attacks for Privacy Auditing of Machine Unlearning in Federated Healthcare Systems *Sadia Qureshi, Thanveer Shaik, Xiaohui Tao, and Jianming Yong* [WI232-S] When Fluency Masks Failure: A Theory of Mind Model of Error Detection in Machine Translation Post-Editing *Diana Nurbakova and Liana Ermakova* [WI397-S] Validation of Knowledge Discovery and Machine Learning Results: A Review *Ammar Elnour, Wencheng Yang, Yan Li, and Kaize Shi*	**BI'26 Session 5** **AI and Brain Informatics** **Chair: *Mufti Mahmud* (@)** [B204-L(@)] Neuro-AI Information Processing Framework: Integrating Human Brain Cognition with Artificial Intelligence *Kireet Joshi, Jianming Yong, and Yahua Zhang* [B209-L(@)] Quantum-Inspired Spatial-Aware Graph Diffusion for EEG Source Extent Reconstruction *Shihao Yang, Guoan Wang, Jun-En Ding, Shouyi Wang, and Feng Liu* [B224-L(@)] GEM-Connect: Personalized Structure-Function Connectome Translation via Genetic Mixture-of-Experts *Yaokai Yang, Nan Zhao, Yanjun Lyu, Jinchen Gu, and Lu Zhang*	

	[WI350-L(@)] Extending the Discrete Key-Value Bottleneck for Continual NLP *Paul Böck, Julia Fellmeth, Ilja Sukhanov, and Ansgar Scherp*	[WI231-S(@)] Evaluating Indirect Prompt Injection in RAG Systems: Defense-in-Depth, Retrieval Effects, and Security–Utility Trade-offs *Yulliwas AMEUR, Miqeas Pedro Mendes, Samia Bouzefrane, and Lyes Khoukhi*	[WI268-S(@)] Evidence-Grounded Review Intelligence for Inspectable E-Commerce Knowledge Discovery *Nanzhu Yin, Liam Xu, Yaxuan Zhang, Zhuoer Yuan, and Chengzu Dong*	[B258-L(@)] Cross-session Neural Data Augmentation using Demixed Principal Component Analysis for Population Decoding *Pierre Attya, Benjamin Goolsby, Bassem Abdullah, Seif Eldawlatly, and Karim Oweiss*	
	[WI254-S(@)] CASER: Cost-Aware Selective Enhancement for Conversational Retrieval *Liang Cheng*	[WI355-S(@)] DeepBac: Curriculum-Grounded LLM Tutoring for the Algerian Baccalaureate via RAG and Deep Knowledge Tracing *Belkacem Achraf Zaghez, Nour El Houda Ben Chaabene, Laid Kahloul, and Imane Youkana*	[WI284-L(@)] Machine Learning-Based Predictive Scheduling for CI/CD Pipelines in Microservice Architectures *Maryem Mechraoui, Thouraya Louati, and Heithem Abbes*	[B254-S(@)] OmniCell-Brain: A Continually Pretrained Human Brain Transcriptomic Foundation Model for Single-Cell Annotation, Spatial Deconvolution and Alzheimer's Disease Analysis *Youzhe He, Jingxi Zhi, Jiangshuan Pang, Mingkai Chang, Wangyang Tang, Jianwei Zhang, Lei Han, and Lifang Wang*	
	[WI281-S(@)] A Frequency-Selective Closed-Loop Enhanced DEIM Framework for Small-Target Detection *Ziming An, Pengyu Liu, Kebin Jia, Zhonghua Sun, Zhe Li, and Jinchao Feng*	[WI258-S(@)] Mentalising Depth in Teacher Discourse: What AI Classifiers Collapse and What It Predicts *Diana Nurbakova and Duaa Baig*	[WI262-S(@)] AEGIS: Gradient Immunization via Spectral-Aware Adaptive Noise for Secure Decentralized Federated Learning *Lam Tran, Hai Lam Duong, Tuan Kiet Phan, and Thao Nguyen-Thi-Ai*		
10:45- 11:00	**Morning Tea**				
11:00- 12:30	**WI-IAT'26 Session 16 Language Models and Structured Data Chair: *Hongzhi Kuai***	**WI-IAT'26 Session 17 Multi-Agent Systems and Applications Chair: *Yang Liu* (@)**	**WI-IAT'26 Session 18 Intelligent Web Systems and Language Models Chair: *Waleed Almughalles***	**BI'26 Session 6 AI for Brain and Mental Health Chair: *Yuting Zhu***	**WIC Steering Committee Meeting (in-camera)**
	[WI276-L] LLM-Guided Negotiation Strategy for Decentralized Multi-Agent Supply Chain Management *Hajime Endo and Katsuhide Fujita*	[WI329-L(@)] Diagnosing Multi-Agent Routing under Information Asymmetry: A Layered Analysis of Routing–Answer Decoupling *Chun-Ru Yen, Cheng-Ru Wei, Wei-Po Lee, and Chih-Chiang Wang*	[WI386-L] Planner as Guarantee, LLM as Refinement: A Neuro-Symbolic Agent for Natural-Language Control of Web Applications *Roman Neruda, Martin Bakoš, and Ondřej Neruda*	[B231-L] The Impact of Long-Term Exposure to Short-Form Video Content on Neurophysiological Responses *Pratima Yadav, Chetan Rakshe, John Thomas, Rajamanickam Yuvaraj, Karthick PA, and Jac Fredo Agastinose Ronickom*	

	[WI344-L(@)] Enhancing LLM Kinematic Problem Solving via Vectorization of Bitmap Graphs *Frank Tan, Isaac Huang, and Jimmy Huang*	[WI334-L(@)] A Real-Time Multi-Agent Software Architecture for Sensor-Driven Fault Management in Zero-Touch 6G Access Networks *Sahil Yadav*	[WI342-L(@)] Retrieval-Based Natural-Language Device Discovery in the Web of Things *Muhammad Ashfaq, Muhammad Shahzad Khan, Ahmed Sadik, Niko Mäkitalo, and Tommi Mikkonen*	[B262-S] DE-CGAN: Targeted Synthetic Augmentation of Difficult Feature Regions for rTMS Response Prediction *Matthew Squires, Xiaohui Tao, Thanveer Shaik, Xinle Huang, Soman Elangovan, Haoran Xie, and Jianming Yong*	
	[WI349-L(@)] Metrics for Summaries over Temporal Graphs *Farnaz Banaeian Telki, Justin Mücke, Ansgar Scherp, and David Richerby*	[WI221-S(@)] Control-Plane Instrumental Convergence in Agent Coalitions *Ondrej Rozinek*	[WI372-L(@)] Experimental Evaluation of the Capability of LLMs in Solving Problems in the Programming Category of the Brazilian Olympiad in Informatics *Victor Hugo Silva Ângelo, Ricardo V. A. Fernandes, Lucas H. S. Anchieta, Matheus R. S. Nascimento, and Evandro de B. Costa*	[B238-L(@)] Conversational AI for Perceived Cognitive Decline Screening in Older Adults *Nikita Gautam, Doina Caragea, Moana Sargent, Kaitlyn Sievers, Ashley Sylvara, Heather Bailey, and Tianjun Sun*	
	[WI306-S(@)] A Study in Structures: Evaluating Large Language Models Against the Perturbed Tabular Web *Jamie Morales and Qinmin Vivian Hu*	[WI338-S(@)] Beyond Feature Fusion: Adaptive Multi-Agent Credibility Reasoning for Misinformation Detection *Orion Rydalch and Yiu-Kai Ng*	[WI383-S(@)] The Phantom Web: Uncovering Hidden Ties in the Web of Data and People *Carson Leung and Adam Pazdor*	[B242-S(@)] Detection of Changes in Electroencephalogram during Motion-Induced Blindness *Nabil Bakri, Foaad ALZOOR, and Zafer İŞCAN*	
	[WI362-S(@)] Structured LLM Reasoning for Clinical Data Quality Assessment in Web-Based Health Ecosystems: A Case Study on Tumor Board Reports *Titouan Hinschberger, Nasredine Cheniki, Sajda Orellana, Annaelle Jean-Baptiste, Hiba Djebabria, C. Lefebvre, E. Dorval, R. Chautard, E. Douard-Tournet, D. Chavignier, J.L. Briand, P. Giraud, P. Laplaige, Nizar Messai, Thierry Lecomte, and Yacine Sam*	[WI369-S(@)] PDAS-F: A Planning-Driven Multi-Agent System for Conversational Form-Filling in Web-Based Administrative Services *Pedro Henrique Diniz, Luís Paulo Reis, and Henrique Lopes Cardoso*		[B260-S(@)] A Mixed-Effects Architecture for P300 Scenario Analysis with Principled Epoch Aggregation *Adwait Patkhedkar, Komal Tarachandani, and Kiran Talele*	
12:30-13:30	**Lunch**				
13:30-15:30	**WI-IAT'26 Session 19 Multimodal AI and Emotion Recognition** **Chair: *Jenq-Haur Wang***	**WI-IAT'26 Session 20 Graph Learning and AI Evaluation** **Chair: *Ondrej Rozinek* (@)**	**BI'26/WI'26 Workshop Special Session (Invited Talks)** **Chair: *Zhao Feng***	**BI'26 Session 7 Human-Centered AI and Digital Wellbeing** **Chair: *Sirawaj Itthipuripat***	**IEEE TCII Executive meeting (in-camera)**

[WI275-L] Dataset construction pipeline for visual speech recognition with automatic labels *Shunsuke Ogawa, Keiichiro Oishi, and HIroyuki Nakagawa*	[WI371-L(@)] Judge Choice Systematically Moves Cognitive-Bias Benchmark Scores: Evidence from CogBias-MT *Einosuke Inui and Yoshihisa Fukuhara*	[Invited Talk (40mins)] *George Paxinos, Neuroscience Research Australia* The Workshop on Informatics Methodologies for Spatially Localizing Miscellaneous Brain Information and Knowledge	[B246-L] Uncertainty-Aware Suicide Risk Detection on Social Media via Deep Label Smoothing *Matthew Squires, Xiaohui Tao, Thanveer Shaik, Soman Elangovan, Haoran Xie, and Jianming Yong*
[WI343-L(@)] Beyond Text: Multimodal LLM-based Sequential Recommendation *Kavach Dheer*	[WI285-S(@)] X-MGTNet: A Hybrid Graph-Transformer Framework and Survey for Population-Level Multimodal Learning in ASD Neuroimaging *Sirine NAIFAR, Rim Douss, imed riadh farah, and Akrem SELLAMI*		[B252-L(@)] Self-Aware Conversational Agentic AI: Modelling Self-Regulation of Empathic Responding Based on Multilevel Causality Reification *Saffron Okubmikael, Nimat Ullah, and Jan Treur*
[WI250-L(@)] How Many Repairs Are Enough? Bounded Self-Repair for LLM-Generated ETL Workflows *Abubakari Alidu, Michele Ciavotta, and Flavio De∼Paoli*	[WI245-S(@)] OWL Consistency Checking with Logical Neural Networks *Luis Vincent Niederberger and Ansgar Scherp*	[Invited Talk (40mins)] Spation-Temporal Brain Data Modelling using Brain-Inspired Spiking Neural Networks *Maryam Doborjeh, Auckland University of Technology, New Zealand* The Special Session on Spatio-Temporal Brain Data Modelling: New Approaches to Understanding Brain Dynamics	[B213-L(@)] GoOut: AI-Integrated Framework for Hyper-Local Discovery and Sustainable Social Exploration *Vamsi Krishna, Bhukya Sunil, Kota Bharat Sai, and Dr Anoop Jacob Thomas*
[WI257-S(@)] ERC-SE: Speaker Sketch and Emotion Dynamics Supervision for LLM-Based Emotion Recognition in Conversations *Wenming Zhang, Haoran Xie, and S. Joe Qin*	[WI283-L(@)] DAGCF: Distance-aware Graph Collaborative Filtering *Yu-Shiang Huang, Shih-Yang Liu, Chin-Ying Lin, Cheng-Wei Lin, and Chuan-Ju Wang*		[B220-L(@)] Can chatbots be informative on the user interactions? Toward optimisation of interactive design of AI Chatbots *Sasha Mahdavi Hezavehi, Jianming Yong, Jun Shen, Dongming Xu, and Brian Yecies*
[WI272-S(@)] Reproducible Framework for Embedded AI Experimentation Across Heterogeneous MCU Architectures *Sara Macedo, Eva Maia, and Isabel Praça*	[WI243-S(@)] Chimaera: A Mixture-of-Graph-Experts for Graph Foundation Models *Jonatan Frank, David Richerby, and Ansgar Scherp*		[B201-S(@)] A critical review of privacy and security challenges in electronic health systems *Zual Cangmah and Jianming Yong*
[WI345-S(@)] A Feature-oriented Tensor Decomposition Method for Enhanced QoS Prediction with Limited Data *Sheng Chai, Hossam S. Hassanein, and Wenying Feng*	[WI244-S(@)] Consistency Checking of OWL Ontologies using Graph Language Models *Justin Mücke and Ansgar Scherp*		[B202-S(@)] Privacy and security in electronic healthcare systems: a quantitative study of patients and healthcare professional's experiences *Zual Cangmah and Jianming Yong*
[WI229-S(@)] LAD-KD: Latent Dialect-Aware Knowledge Distillation with Dynamic Adapter Modulation for Arabic Hate Speech Detection in Social Media *Rim Mahouachi and Imen Abbassi*	[WI364-S(@)] Early rumor detection: Evaluating the effectiveness of graph neural networks *Douglas Melo dos Santos, Elaine Ribeiro de Faria Paiva, and Fabíola Souza Fernandes Pereira*		

15:30-15:45	**Afternoon Tea**			
15:45-16:50	**WI-IAT'26 WS Session 5** **Chair: *Zehua Chen*** [S08202-WIAA-L] A Tiered, Multi-tool Faithfulness Validation Protocol for CoT-based IDS in Next Generation Network Cores *Nasibeh Rahbar-Nodehi, Jouni Isoaho, Seppo Virtanen, Tahir Mohhammad, and Andrzej Janusz* [S13201-CWIW-L] DFLC-DETR: Dual-Stage Frequency Enhancement and Local-Context Refinement for Traffic Object Detection *Boyang Jing, Xiyao Xiao, Shaozhen Wang, Lianghao Xu, and Zehua Chen* [WI217-WIAA-L] AI SaaS Copyright Policy And Open Source Related Vulnerabilities *Anunaya Sinha and Jianming Yong*	**WI-IAT'26 WS Session 6** **Chair: *Min Pan*** [S02219-AI&CS-L] Set-aware Dense Passage Retrieval for Relevance-preserving Retrieval Diversification *Mao Wang, Qi Wang, Xiaoxiao Liu, Zhiyuan Zhou, Shaoxiong Feng, ZuHua Chen, Sixiang Zhang, and Min Pan* [S02221-AI&CS-L] Integrating LLM-Generated External Knowledge with Pseudo-Relevance Feedback for Dense Retrieval *Yuting Yuan, Xiaoxiao Liu, Qi Wang, Can Luo, and Min Pan* [S17202-AIMLBR-L] ConSS: Improving Motor Imagery Classification with Convolutional Squeeze-Excitation Spiking Networks and Diffusion-Based Data Generation *Duc Thien Pham and Roman Mouček*	**WI-IAT'26 WS Session 7** **Chair: *Thitaporn Chaisilprungraung*** [S03207-IDP-L] Recommender Systems based on Generative Adversarial Networks and Mutual Information Maximization *Shou-Yuan Liu and Jenq-Haur Wang* [S03208-IDP-L] A Hybrid Multi-Scale Framework for Network-Free Sentinel Selection in Epidemic Surveillance *Yunquan Gu, Yu Chen, Benyun Shi, and Qi Tan* [S10202-GAI4Neuro-L] Fairness Verification of Machine Learning Models in Alzheimer's Disease Progression Prediction *Chenan Wang, Hanwen Li, Jinhao Duan, Tianlong Chen, Kaidi Xu, and Chenxi Yuan*	**BI'26 Workshop Session 2** **Chair: *Jing Meng*** [S05201-BIMSP-L] AI-Assisted Classification of Children with ASD: A Review of Brain Data–Driven Studies *Zixian Zhao, Hongzhi Kuai, Junyu Wu, Jingyang Yu, and Jing Meng* [S05202-BIMSP-L] AI-assisted classification based on brain data of children with ADHD *Yuxi Sun, Jing Meng, Rong Huang, Jiayi Shi, and Hongzhi Kuai* [S08202-IBI-BIBC-L] A Deep Dictionary Learning Method for Brain Fingerprinting from fMRI Connectivity *Rickarya Das, Yashaswini Chand, and Sanjay Ghosh*
16:50-17:00	**Closing Ceremony (Chair: *Xiaohui Tao*)**			

Program Legend

- **L** — Long or regular presentation: 15 minutes for the presentation, followed by 5 minutes for questions and answers.
- **S** — Short presentation: 12 minutes for the presentation, followed by 3 minutes for questions and answers.
- **(@)** — Indicates that a presentation will be delivered online or that a session chair will participate online.

BI 2026 Abstracts

High-Precision Whole-Brain Spatial Localization by Quantitative Feature Selection: From Visibility Census to Influence Tensor

Xin Lu[1], *Jie Luo*[2], *Yuegang Wang*[2], *and Zhao Feng*[3]
[1]*Huazhong University of Science and Technology, China*
[2]*HUST-Suzhou Institute for Brainsmatics, JITRI, China*
[3]*Hainan University, China*

Spatially localizing whole-brain information within a common reference atlas is the first step in most quantitative neuroscience workflows, and the informatics methods that perform this localization must be both precise and interpretable. The recently released Stereotaxic Topographic Atlas of the Mouse Brain (STAM) provides a Nissl-based reference with isotropic 1-μm resolution and three-dimensional topographies of 916 structures, representing the most demanding accuracy target to date. Prevailing pipelines first segment a set of brain regions and then use these anatomical features to drive image registration; however, feature selection remains dependent on expert intuition. Two questions therefore remain unanswered quantitatively. First, which regions can be reliably delineated in micro-optical whole-brain data under a given staining or contrast? Second, which regions should drive registration? This question involves two independent objectives: maximizing whole-brain accuracy and ensuring high accuracy within a user-specified target region. Drawing on several hundred whole-brain registration cases, we addressed the first question using a visibility census. For every region in every slice, three normalized contrasts—gray level, edge strength, and texture energy—each defined as a relative difference from a surrounding ring whose width scales with region size, were summed with equal weights and aggregated by area weighting. Scores were computed separately for propidium iodide, autofluorescence, light-sheet, and serial two-photon micro-optical data and for magnetic resonance imaging. For the second question, we decomposed the atlas into 5,338 anatomical interfaces and computed an interface-level influence tensor that quantifies, under the exact multi-scale smoothing of the deployed diffeomorphic registration, the degree of constraint each interface exerts on each of the 688 atlas regions. We validated the tensor using a leave-one-out ensemble of 40 synthetic ground-truth deformations drawn from the real cohort (480 registrations). Circularity was avoided by design: cohort fields served only as realistic deformation generators; the registrations under test used feature sets distinct from those that produced the fields; and scoring was based solely on the known field. Conclusions were unchanged when the

deformation direction was inverted, although deformation statistics inherited from the generating algorithm remained a residual bias. The ensemble raised observational reliability to approximately 0.98 and yielded confidence intervals for every candidate region, showing that feature importance is highly uneven and that some conventionally used features do not improve accuracy. Recommended feature sets were benchmarked against the conventional expert-selected set under identical ground truth. Tracing feature removal through the multi-scale optimization showed that region-wise effects are mediated by solver-induced displacement differences and become apparent at intermediate pyramid levels. A truncated-registration surrogate built on this insight predicted target-region effects with Spearman $\rho = 0.92$ and 99% sign accuracy at a fraction of the full cost. The framework requires only an atlas parcellation and the registration algorithm's smoothing kernel, transferring directly to other atlases and, by substituting the kernel, to other regularized deformable methods; empirical validation is so far confined to one algorithm. We integrated the census, the tensor, and the surrogate into a visualized, AI-agent-driven pipeline that recommends feature sets, predicts region-wise accuracy, and executes registration at high throughput.

Keywords: *Spatial localization, Whole-brain image registration, Feature selection, Influence analysis*

Multimodal Image-Guided Stereotactic Localization of the Mouse Brain Based on STAM

Hongqin Liu[1] *and Anan Li*[1,2]
[1]*Hainan University, China*
[2]*HUST-Suzhou Institute for Brainsmatics, Wuhan National Laboratory for Optoelectronics, and MoE Key Laboratory for Biomedical Photonics, Huazhong University of Science and Technology, China*

High-resolution standard brain atlases provide a unified spatial reference for mouse stereotactic localization, but accurately mapping standard atlas coordinates to individual living subjects remains a critical challenge. In particular, the operational definitions of cranial landmarks such as Bregma and Lambda vary across procedures, and it remains unclear whether intracranial structures can be reliably inferred from skull-based scaling alone. In this study, based on the STAM atlas, multimodal CT, T2-weighted MRI, TOF angiography, and DTI data from three mice were registered into a unified physical space. Global fitting of the coronal, sagittal, and lambdoid sutures was used to construct a Bregma–Lambda (B-L) cranial coordinate framework. Intracranial features from the anterior commissure (AC) and corpus callosum (CC) were further incorporated to evaluate the effects of different Bregma definitions, B-L scale normalization, and intracranial anatomical constraints on individualized localization.

The results showed that changes in the Bregma definition mainly affected the anterior–posterior (AP) coordinate. The mean absolute AP displacement was $0.372mm$, markedly greater than those in the mediolateral (ML; $0.031mm$) and dorsoventral (DV; $0.059mm$) directions. Under an evaluation tolerance radius of 230 μm, the left-intersection Bregma achieved the highest local landmark hit rate in within-individual comparisons, reaching 57.74% with a meanD of $0.239mm$. In cross-individual comparisons, the globally fitted-line Bregma achieved the highest hit rate of 61.11%, with a meanD of $0.227mm$, indicating that within-individual coordinate consistency and cross-individual spatial transfer favor different Bregma definitions.

Further analysis showed that AP-axis scale normalization based solely on individual B-L length did not improve the correspondence between the STAM atlas and individual intracranial features. Under a representative condition, meanD increased from $0.794mm$ to $0.803mm$ after normalization. Moreover, in an analysis that did not use STAM

coordinates as the reference, the mean cross-individual pairwise Euclidean distance of seven homologous intracranial landmarks increased from $0.227mm$ to $0.240mm$, indicating that simple skull-based scale normalization did not reduce the spatial dispersion of intracranial structures across individuals. By contrast, residual errors were substantially reduced after intracranial anatomical information was introduced. When the AC provided positional and scale constraints in the ML direction, the mean absolute ML error decreased from $0.213mm$ to $0.084mm$. When the CC provided an AP-direction constraint, the mean absolute AP error decreased from $0.556mm$ to $0.085mm$. With combined AC and CC constraints, meanD decreased from $0.728mm$ to $0.414mm$.

In summary, cranial landmarks are suitable for establishing a common coordinate framework between a standard atlas and an individual subject, but are insufficient on their own for precise individualized intracranial localization. Further incorporation of internal anatomical references obtainable from in vivo imaging may be critical for improving individualized adaptation of standard atlases.

Keywords: *Multimodal Imaging, Mouse Brain Stereotactic Localization, STAM, Bregma–Lambda*

A Stereotaxic Brain Knowledge Graph for Integrating Heterogeneous Neural-circuit Evidence

Xiaonan Ge[1]*, Zhao Feng*[1]*, and Jie Luo*[2]
[1]*Hainan Univerisity, China*
[2]*HUST-Suzhou Institute for Brainsmatics, JITRI, China*

Neural-circuit knowledge is distributed across studies that differ in biological scale, experimental modality, spatial resolution, anatomical nomenclature, and evidential strength. Integrating these observations requires a common anatomical framework that preserves the meaning and provenance of individual experimental reports while enabling comparison across studies. We developed a stereotaxic brain knowledge graph that organizes heterogeneous neural-circuit evidence in STAM brain space.The framework integrates four methodological components: extraction and evidence assessment of paper-level connectivity assertions; disambiguation of anatomical names before atlas mapping; synthesis of findings across experimental modalities while retaining projection direction, provenance, and disagreement; and quality-controlled revision of the evidence-assessment workflow. Language models assist in organizing literature evidence, whereas scientific interpretation follows predefined standards. We also established a validation-constrained procedure for refining research-planning strategies. This procedure supports computational simulation of neuroscience research designs, while a decision-point memory module provides supplementary advice for literature retrieval and experimental prioritization without changing mandatory rules or final decisions.Applied to a large PubMed-derived corpus together with reconstructed single-neuron morphology, the framework produced an atlas-anchored representation of directed neural-circuit evidence. It preserves not only reported connections but also the strength, source, direction, and degree of independent corroboration associated with each claim. This representation enabled systematic comparison of circuit hypotheses and provided an independent morphological reference for evaluating literature-derived connectivity patterns.We further examined whether evidence-based prioritization could inform subsequent research. Rankings derived from an earlier literature corpus showed enrichment for connections reported in later publications, indicating limited but detectable prospective predictive value. We also implemented stereotaxic viral-injection trajectory planning and structure-resolved anatomical auditing. In a lateral habenula demonstration, projection evidence was translated into anatomical constraints on the injection route, which was

then checked against the atlas at the level of individual structures.This framework provides a spatially organized and traceable basis for integrating neural-circuit evidence, comparing competing circuit claims, prioritizing experimental hypotheses, and simulating research designs. Its predictive signal supports experimental prioritization, whereas the existence and causal roles of individual connections require direct experimental validation.

Keywords: *Neural-circuit evidence integration, Stereotaxic viral-injection planning, Stereotaxic brain knowledge graph, Anatomical entity disambiguation, Neuroscience research planning*

Multimodal Self-Supervised Learning of Brain Spatial Representations

Rou Li
Hainan University, China

Brain structural information spans multiple spatial scales and is acquired through heterogeneous modalities, including volumetric imaging and neuronal morphology. Learning reusable representations that integrate these observations within a common spatial reference is important for understanding how local brain structure relates to brain-wide organization. Here, we present a multimodal self-supervised framework for learning brain spatial representations in a common three-dimensional mouse brain space. The framework first learns structural features from volumetric image patches and neuronal morphologies and subsequently integrates multiscale spatial context together with atlas-derived information to obtain unified spatial representations. We first examined whether the learned representations captured biologically meaningful spatial organization. The resulting representations exhibited structured spatial continuity and cross-individual consistency across mice, while disrupting biological correspondence reduced the association between representational similarity and spatial organization from a Spearman correlation of 0.616 to 0.339, indicating that the learned spatial structure substantially depends on biological content. Consistent with this observation, frozen-representation evaluation further showed that spatially contextualized representations improved anatomical region decoding over modality-specific pretrained representations in both volumetric imaging and neuronal morphology, suggesting that anatomically relevant information is preserved and enhanced across modalities. We then investigated whether such spatial representations could relate local neuronal structure to organization beyond the directly observed neighborhood. Using local neuronal morphology to predict distal regional neurite distributions, representations incorporating spatial context consistently outperformed their modality-specific counterparts, with the mean per-neuron Spearman rank correlation increasing from 0.467 to 0.518 at a 1,200-μm local input scale. Together, these findings indicate that heterogeneous brain structural data contain shared and reproducible spatial organization and that multiscale contextual modeling can strengthen both anatomical representation across modalities and the relationship between local neuronal structure and brain-wide organization. This work provides a computational framework for integrating heterogeneous structural observations and learning reusable representations within a shared brain-space reference.

Keywords: *Foundation model, Spatial representation learning, Multimodal learning, Neuronal morphology*

PGRMamba: Geometry-Guided State Space Models for 3D Soma Detection in Large-Scale Whole-Brain Images

Zibin Cai[1], *Rou Li*[1], *Yan Jiang*[1], *Jiamin Lin*[1], *Qingming Luo*[1], *Anan Li*[1,2], *and Chi Xiao*[1]
[1]*Hainan University, China*
[2]*HUST-Suzhou Institute for Brainsmatics, Wuhan National Laboratory for Optoelectronics, and MoE Key Laboratory for Biomedical Photonics, Huazhong University of Science and Technology, China*

Accurate and scalable 3D soma detection is essential for whole-brain cellular quantification and single-neuron reconstruction, yet remains challenging because of severe fibrous interference, heterogeneous soma densities, and the computational burden of large-scale volumetric imaging. We propose PGRMamba, a geometry-guided state-space framework for efficient 3D soma detection in whole-brain microscopy images. PGRMamba integrates three complementary designs. First, a Dual-Stage Filtering Block introduces learnable 3D Difference-of-Gaussians priors to enhance compact soma-like responses while attenuating structured background interference. Second, a Geometry-Guided Sparse Mamba module combines slice-wise geometric cues with saliency-guided Top-K selection and sparse state-space modeling to refine informative candidate regions with long-range context. Third, a Gradient-Calibrated Affinity Loss couples localization-aware confidence supervision with adaptive gradient calibration to improve optimization under heterogeneous soma distributions.

We further construct 3D-NSD, a retrograde-tracing dataset comprising 184 volumetric sub-images derived from five retrogradely labeled mouse brains with 42,612 manually annotated somata, and evaluate PGRMamba together with the public anterograde-tracing WMBSD benchmark. Under the block-wise protocols, PGRMamba achieved 93.07% Precision, 92.57% Recall, and a 92.82% F1-score on 3D-NSD, and 97.54% Precision, 96.82% Recall, and a 97.18% $F1$-score on WMBSD, yielding the highest mean $F1$-score on both datasets. Five-fold leave-one-brain-out evaluation on 3D-NSD further produced an average F1-score of 91.18%, providing brain-level evidence of cross-brain generalization. PGRMamba also demonstrated favorable computational efficiency, requiring 0.40 M parameters and 1.92 GB peak GPU memory for a 2563 input. On two additional independently held-out retrograde-tracing mouse brains, the model completed whole-brain soma localization at a voxel spacing of $1 \times 1 \times 2$ μm^3 in approximately 45 minutes per brain using a single NVIDIA RTX 5880 Ada GPU. These results demonstrate the potential of PGRMamba as an efficient tool for large-scale whole-brain soma quantification and seed-point extraction.

Keywords: *Whole-brain imaging, 3D soma detection, deep learning, mamba*

A Mouse Brain Atlas based on Dendritic Microenvironments

Yufeng Liun and Yukai Yang
Fudan University, China

Digital brain atlases have become essential anatomical references for understanding the spatial and functional organization of brains. For mice, typical resources include the Allen Reference Atlas, the Allen Common Coordinate Framework (CCF), and their variants, like CCFv3. However, previous whole-brain atlases were constructed based on limited neuronal features, such as cell body (soma) density or average maps from collections of registered brain images, without considering the spatial organization of neuronal arbors. This study introduces a microenvironment representation that incorporates the morphological

features of neighboring neurons to better quantify brain modularity. We generated a large dataset containing dendrites from 101,136 neurons across 111 mouse brains, covering 91% of non-ventricular, non-fiber-tract CCF regions, and constructed a multidimensional microenvironment feature map of the whole brain. Our findings reveal that the spatial organization of these microenvironments supplements the current atlases including CCFv3 and a state-of-the-art spatial transcriptomic cell atlas by providing complementary subregions within established regions, nearly doubling the total number of brain regions compared to CCFv3. In this way, our atlas enables the identification of previously unobserved neuron groupings or "subtypes". Our results also demonstrate that this microenvironment atlas enhances local spatial homogeneity while maintaining spatial differentiation within established CCF brain regions. For example, we found that the microenvironments of hippocampal neurons are correlated with axonal projection targets and improve the specificity of projection mapping, which implies the potential characterization of long-range axonal projections of mammalian neurons based on only local dendritic organization. The sub-parcellation of the caudoputamen (CP) aligns well with previous studies on projections, connectivity, and transcriptomics, revealing diverse input and output wiring patterns among CP subregions.

Keywords: *Dendritic microenvironments, Mouse brain atlas*

Attentional Bias Toward Emotional Faces in Gelotophobe and the Effects of Social Exclusion: The Biopsychosocial Model

Shuo Wang[1], Junwen Mo[2], Yang Yang[1], Xiangjun Xu[1], and Junjia Shi[1]
[1]*School of Humanities and Social Sciences, Beijing Forestry University, Beijing, China*
[2]*School of Psychological and Cognitive Sciences, Peking University, Beijing, China*

Gelotophobia is a social-emotional vulnerability characterized by a fear of being laughed at by others. However, systematic evidence remains limited regarding attentional biases toward emotional faces among Gelotophobes and how these biases change following social exclusion. Drawing on the biopsychosocial model, the present research used a dot-probe task and simultaneously assessed cardiac activity, electrodermal activity, and eye movements to examine emotional-face attentional biases among Gelotophobes and the effects of social exclusion.

Two studies were conducted. Study 1 investigated differences in emotional-face attentional bias between the Gelotophobe group ($n = 24$) and the Non-Gelotophobe group ($n = 27$). The results showed that (a) the Gelotophobe group had longer overall reaction times, $F(1, 49) = 4.346, p = .042$; (b) the Gelotophobe group exhibited lower high-frequency power difference scores when viewing negative emotional faces, $F(1, 48) = 9.088, p = .004$; and (c) total saccade-duration difference scores differed significantly between the two groups, $F(1, 32) = 5.049, p = .032$. These findings indicate that Gelotophobes responded more slowly overall and exhibited distinct behavioral, physiological, and oculomotor response patterns across emotional-face conditions. Study 2 examined changes in emotional-face attentional bias among Gelotophobes following social exclusion. Cyberball was used to manipulate social exclusion, whereas all other procedures and measures were identical to those employed in Study 1. All participants were Gelotophobes and were assigned to either the social-exclusion group ($n = 24$) or the social-inclusion group ($n = 21$). No significant effects were observed for overt behavioral measures. However, social exclusion significantly affected the standard deviation of heart rate, $F(1, 43) = 5.074, p = .029$. An interaction between social condition and facial valence emerged for electrodermal-activity difference scores,

$F(1, 43) = 4.181, p = .047$, with higher scores for positive emotional faces under social exclusion. A corresponding interaction was found for first-fixation latency difference scores, $F(1, 42) = 4.186, p = .047$, with larger scores for negative emotional faces under social exclusion. These findings suggest that social context primarily influences physiological arousal and attentional allocation rather than overall overt behavioral performance. Taken together, the results indicate that Gelotophobes are not only sensitive to negative social cues but also exhibit atypical processing of positive cues. Social context primarily alters their covert physiological arousal and attentional allocation, rather than their overt behavioral responses.

Keywords: *Gelotophobia, emotional face processing, social exclusion, eye-tracking, psychophysiological measure*

Designing Positive Healthcare Environments to Foster Harmonious Doctor-Patient Communication: The Roles of Positive Distraction and Perceived Control in a Virtual Reality Experiment

Luxi Wang, Mengyao Zhao, and Yidi Chen
Department of Psychology, School of Humanities and Social Sciences, Beijing Forestry University, Beijing 100083, China

Background and Objectives Overburdened healthcare systems, compressed consultation times, and resource limitations increasingly strain doctor–patient relationships. Outpatient waiting areas are often high-stress environments characterized by uncertainty, anxiety, and perceived threat. Such settings can intensify negative affect, stress, and aggression toward healthcare staff while undermining doctor–patient trust. Ulrich's supportive design theory identifies positive distraction and perceived control as core environmental resources that may reduce stress and restore well-being. However, empirical evidence from outpatient waiting areas remains limited. Findings on perceived control are inconsistent, its interaction with positive distraction has rarely been tested, and doctor–patient trust is underexplored as an environmental design outcome. Immersive virtual reality (VR) offers a safe, controllable, and ecologically valid method for testing environmental interventions before real-world implementation. This study therefore examined the independent and interactive effects of positive distraction and perceived control on patient experience in a simulated outpatient setting. Outcomes included positive affect, negative affect, stress, aggression toward physicians, and doctor–patient trust. We hypothesized that (*H1*) positive distraction would improve patient experience by reducing negative affect, stress, and aggression and by increasing positive affect and trust; (*H2*) perceived control would significantly improve patient experience; and (*H3*) positive distraction and perceived control would interact to jointly influence patient experience.

Methods A 2 (positive distraction: present vs. absent; within-subjects) × 2 (perceived control: present vs. absent; between-subjects) mixed experimental design was employed. Fifty-four healthy undergraduate students (7 male; mean age = 20.72 years, $SD = 1.55$) were recruited. All had normal or corrected-to-normal vision and normal hearing. The study was approved by the university ethics committee, and written informed consent was obtained. An immersive VR hospital environment, including an outpatient waiting area and a consultation room, was developed in Unity and presented via a VR headset with wireless controllers. Participants acted as a patient with cervical discomfort seeking care. Positive distraction was operationalized as background music (a piano version of Canon in C) without visual confounding. Perceived control was manipulated via a wall-mounted television (TV): TV-off served as the higher-control condition, whereas TV-on playing a suspenseful medical documentary clip served as the lower-control

condition. A pre-test with 25 participants confirmed that the TV-off condition elicited significantly higher perceived control than the TV-on condition, $t(23) = 3.21$, $p = .004$, Cohen's $d = 1.34$. In the waiting-area subtask, participants could move and were teleported to a seat near the TV. In the consultation-room subtask, they used dialogue buttons to communicate with a doctor based on ambiguous scripts. The two perceived-control groups differed only in the waiting-area TV condition; the consultation task was identical. Measures included the Chinese International Positive and Negative Affect Schedule Short Form (I-PANAS-SF) for positive and negative affect, a $0 - -100$ visual analogue scale for stress, the Hot Sauce Paradigm for aggression, and the Chinese Wake Forest Physician Trust Scale for doctor–patient trust. Baseline trust and affect were collected. Data were analyzed with repeated-measures ANOV A in SPSS 24.0, with alpha set at .05.

Results Baseline equivalence was confirmed for doctor–patient trust, positive affect, and negative affect (all $p > .05$). Positive distraction significantly reduced negative affect, $F(1, 52) = 11.79$, $p = .001$, partial $\eta^2 = .185$; stress, $F(1, 52) = 22.26, p < .001$, partial $\eta^2 = .300$; and aggression, $F(1, 52) = 5.38, p = .024$, partial $\eta^2 = .094$; and significantly increased doctor–patient trust, $F(1, 52) = 14.74, p < .001$, partial $\eta^2 = .221$. However, its effect on positive affect was not significant, $F(1, 52) = 3.57, p = .064$. Perceived control showed no significant main effects on positive affect, $F(1, 52) = 0.34, p = .565$; negative affect, $F(1, 52) = 3.18, p = .080$; stress, $F(1, 52) = 1.75, p = .192$; aggression, $F(1, 52) = 0.09, p = .769$; or doctor–patient trust, $F(1, 52) = 0.069, p = .794$. No significant interactions between perceived control and positive distraction were found for positive affect, $F(1, 52) = 0.11, p = .740$; negative affect, $F(1, 52) = 0.44, p = .508$; stress, $F(1, 52) = 0.27, p = .608$; aggression, $\mathrm{F}(1, 52) = 0.15, p = .701$; or doctor-patient trust, $F(1, 52) = 0.03, p = .869$. Correlation analyses further showed that doctor–patient trust was negatively correlated with aggression ($r = -.46, p < .001$) and stress ($r = -.29, p = .033$), while stress was positively correlated with aggression ($r = .30, p = .027$) and negative affect ($r = .57, p < .001$).

Discussion These findings support and refine supportive design theory by showing that passive positive distraction can act as a robust, independent, and low-cost environmental intervention in high-stress outpatient contexts. The asymmetric effect—reduced negative affect but not increased positive affect—suggests that music primarily buffers distress and restores a baseline state rather than generating positive emotion. This aligns with attention restoration and stress-coping accounts: music may occupy auditory attention, interrupt rumination, and alter appraisal of an uncertain waiting situation. The increase in doctor–patient trust is consistent with affect-infusion and emotional-buffering pathways, in which improved emotional states shape interpersonal judgments. In contrast, perceived control had no effect. In high-stakes medical waiting, minor control over a TV may be too superficial to counter outcome-related anxiety. Cultural context may also matter: in a high power-distance, collectivist setting, patients may be less motivated to seek environmental control and more willing to defer to medical authority. The absence of an interaction suggests that positive distraction and perceived control operate through relatively independent mechanisms.

Limitations and Future Directions This study has several limitations. The sample consisted of healthy college students, whose responses may not fully capture the anxieties of real patients facing medical risks. The VR setting, while controlled and safe, cannot replicate all aspects of an operational hospital. Future research should include clinical patient populations, field studies in real waiting areas, cross-cultural comparisons, and objective physiological measures such as eye-tracking or cortisol. It should also examine more ecologically valid manipulations of perceived control and test other types of positive distraction, such as nature visuals or soundscapes.

Conclusion Positive distraction, rather than perceived control, was a robust and independent driver of patient experience in a simulated high-stress outpatient setting. Low-cost passive environmental

interventions such as music should be prioritized as therapeutic design features to improve patient well-being and doctor–patient trust.

Keywords: *patient experience, positive distraction, perceived control, physician-patient trust, virtual reality technology*

Dissociating Implicit Wanting and Liking for Shopping-Related Stimuli in High Hoarding Tendencies

Yuqi Sun[1]*, Wenlan Xie*[1]*, and Chuanbang Chen*[3]
[1] *Wenzhou Medical University, China*
[2] *Ningbo Childhood Education College, China*
[3] *The First Affiliated Hospital of Wenzhou Medical University, China*

Many individuals engage in hoarding tendencies without being fully aware of them—repeatedly purchasing items with similar functions, which leads to unnoticed financial loss and environmental concerns. Is such hoarding behavior associated with an addictive psychopathology? To address this question, the present study examined hoarding tendencies from the perspective of the "wanting-liking" distinction. Drawing on incentive sensitization theory, we used the Wanting-Implicit Association Test (W-IAT) and Liking-IAT (L-IAT) to investigate whether individuals with high hoarding tendencies show different patterns of implicit wanting versus implicit liking when processing shopping-related cues.

A total of 126 college students were recruited. Based on the Hoarding Rating Scale-Revised, participants were selected via the extreme 27% grouping method, yielding 68 participants: 34 high-hoarding and 34 controls. A 2 (group) × 2 (time: pre-test, post-test) × 2 (task: W-IAT, L-IAT) mixed design was used. In the pre-test, both groups completed both IATs. In the post-test, after exposure to shopping cues, they completed the IATs again.

Results showed that overall, W-IAT scores were significantly higher than L-IAT scores, indicating a stronger implicit association between shopping cues and motivational wanting than between shopping cues and evaluative liking. The group × task interaction was significant, revealing different implicit "wanting-liking" patterns between groups. Simple effect analyses showed that after cue exposure, the high-hoarding group exhibited a significant increase in W-IAT scores, whereas their L-IAT scores remained stable. The control group showed no significant pre-post changes in either task. However, the three-way interaction (group × time × task) did not reach conventional significance, so the cue-exposure effect should be interpreted with caution. Correlation analyses revealed no significant group difference in the association between W-IAT and L-IAT scores.

These findings provide preliminary evidence that shopping-related cues more readily activate implicit wanting than implicit liking, and suggest that individuals with high hoarding tendencies may show heightened acquisition-motivation in shopping contexts. This study offers exploratory insights into the relationship between hoarding tendencies and problematic shopping from an implicit reward motivation perspective.

Keywords: *Hoarding tendencies, Wanting vs. liking, Implicit Association Test (IAT), Shopping-related cues, Incentive sensitization theory*

Partner Visibility and Physical Co-Presence Shape Distinct Neural Signatures of Social Decision-Making

Kawin Yamtuan, Paisit Khanarsa, Sirawaj Itthipuripat, and Thitaporn Chaisilprungraung

King Mongkut's University of Technology Thonburi, Thailand

Remote communication alters access to interpersonal cues, yet how partner visibility and reward magnitude shape social decisions and their neural correlates remains unclear. We examined dyadic decision-making and reward-cue event-related potentials (ERPs) during a modified iterated Prisoner's Dilemma task across same-site and remote (multi-site) interaction contexts. Twenty-two participants (11 dyads) completed both sessions in counterbalanced order (six same-site first; five multi-site first). During same-site interaction, monitors prevented direct facial visibility. Within each session, partner visibility was manipulated through open- and closed-camera blocks, while reward magnitude varied across trials. High-reward outcomes were tenfold larger than low-reward outcomes, with accumulated points determining participants' relative shares of a fixed bonus pool. EEG was recorded simultaneously from both partners using consistent acquisition settings across locations, and ERP analyses were time-locked to locally recorded reward-cue markers. Higher rewards were associated with reduced mutual cooperation and increased mutual defection. Open-camera visibility was associated with reduced mutual defection but did not reliably increase mutual cooperation. Partner visibility was also associated with differences in reward-cue ERPs at 300–600 ms and occipital anticipatory activity at 850–1000 ms, both surviving false discovery rate correction. No reliable location-related ERP differences were detected in the examined time windows. Together, these findings suggest that reward magnitude and partner visibility are associated with distinct patterns of dyadic decision-making, with partner visibility also linked to pre-decision neural responses. Interpretation is limited by the modest dyad-level sample, potential residual site differences, and the camera manipulation's simultaneous alteration of visual input and interpersonal information, which precludes attributing ERP effects exclusively to social mechanisms. Furthermore, the absence of reliable location effects does not establish equivalence between same-site and remote interaction contexts.

Keywords: *EEG hyperscanning, Social decision-making, Physical co-presence, Partner visibility, Inter-brain connectivity*

Decoding 3D Upper-Limb Motor Imagery Trajectories from EEG Using Motor Execution Transfer Learning and Privileged IMU Information

Thitaporn Chaisilprungraung and Suparach Intarasopa
King Mongkut's University of Technology Thonburi, Thailand

Motor imagery (MI) brain–computer interfaces hold promise for assistive robotic control, but reconstructing continuous upper-limb movements from non-invasive electroencephalography (EEG) remains challenging. We investigated whether motor execution (ME) pretraining and privileged inertial measurement unit (IMU) information could improve EEG-based reconstruction of movement-related velocity templates during MI. Eighteen healthy participants performed visually cued right-arm ME and MI tasks involving four target directions. EEG was recorded using a 64-channel BioSemi system. During ME, Kinect-based tracking captured three-dimensional shoulder, elbow, and wrist kinematics, while two IMUs recorded arm rotational movements. The decoding target consisted of nine velocity components across the three joints. For each participant and target direction, averaged ME velocity profiles served as reference labels for MI trials. We compared a time-lagged multilinear regression baseline with three deep-learning approaches: an MI-only convolutional neural network–temporal convolutional network (CNN–TCN), ME-to-MI transfer learning, and ME pretraining incorporating privileged IMU information. Models were

evaluated using a subject-independent split, ensuring that test participants were excluded from all training stages, including ME pretraining. All models relied exclusively on EEG during MI inference, with IMU information used only during ME training. Performance was assessed using the mean correlation between predicted and reference velocity profiles across participants and output dimensions. Deep-learning approaches achieved higher observed mean correlations than the regression baseline. The MI-only CNN–TCN achieved a mean correlation of $r = 0.428$, increasing to $r = 0.470$ with ME pretraining and $r = 0.477$ when privileged IMU information was incorporated. The additional gain of 0.007 from IMU information was not statistically tested and is therefore interpreted descriptively. These preliminary findings suggest that ME-guided training may enhance EEG-based reconstruction of upper-limb movement templates during MI. However, because reference labels were derived from averaged execution profiles, decoding performance reflects correspondence with participant- and target-specific movement templates rather than reconstruction of trial-specific imagined trajectories. Further statistical evaluation is needed to establish whether privileged IMU information provides a reliable incremental benefit.

Keywords: *EEG, Motor imagery, Brain-computer interface, Trajectory decoding, Transfer learning*

Protocol-specific Psychological Susceptibility of Transcranial Electrical Stimulation for Pain Modulation

Xinxin Lin and Weiwei Peng
School of psychology, Shenzhen University, China

Variability in analgesic responses limits the reproducibility and translation of transcranial electrical stimulation (tES), but whether different stimulation protocols are equally susceptible to psychological influences remains unclear. Here, we pooled individual-level data from four randomized experimental datasets comprising 435 participants receiving sham stimulation, transcranial direct current stimulation (tDCS), or transcranial random noise stimulation with a direct-current offset (tRNS+DC-offset), and assessed conditioned pain modulation as an index of endogenous pain modulation. Among six baseline psychological traits, pain catastrophizing selectively tracked variability in tDCS-related analgesic enhancement, whereas tRNS+DC-offset responses remained comparatively stable across catastrophizing levels. Post-stimulation appraisal of treatment efficacy showed a convergent pattern, with more positive appraisal associated with stronger tDCS responses but little detectable variation in tRNS+DC-offset efficacy. These trait- and appraisal-related associations were separable when modeled jointly. The same protocol-specific pattern extended to individual response heterogeneity, with both factors predicting enhanced-response trajectory membership primarily following tDCS. Stimulation-specific sensations were associated with efficacy appraisal but neither predicted analgesic outcomes nor accounted for appraisal-related effects. Together, these convergent population- and individual-level findings show that tES protocols differ in their psychological susceptibility, identifying a protocol-level source of analgesic response variability beyond individual differences alone.

Keywords: *Transcranial electrical stimulation, Analgesic effect, Individual response heterogeneity, Pain catastrophizing, Treatment efficacy appraisal*

Incremental Multi-Source Seizure Detection with EEG Foundation Models

Jun-Mo Kim and Tae-Eui Kam
Korea University, Republic of Korea

Electroencephalography (EEG) foundation models provide a common pretrained representation for downstream neurological applications, yet seizure detection is still typically adapted and evaluated on individual datasets or a fixed collection of sources. In practice, EEG recordings are collected across heterogeneous hospitals, acquisition systems, protocols, and patient populations, resulting in substantial cross-source distribution shifts even for the same seizure detection task. Moreover, clinical EEG collections naturally expand as new institutions, cohorts, and recording settings are incorporated, making repeated joint retraining over all accumulated data increasingly costly. These characteristics motivate a unified multi-source seizure detector that can accommodate heterogeneous sources while remaining efficiently extensible as the source collection grows. We propose AIMS-EEG, an adapter-based framework for multi-source seizure detection with incremental source expansion. AIMS-EEG freezes the pretrained EEG foundation backbone and decomposes downstream adaptation into complementary source-specific and cross-source components. For each source, an independently initialized Specialist Adapter, consisting of source-specific LoRA parameters and a cost-efficient prediction head, captures source-dependent seizure characteristics and is preserved after training. In parallel, a Generalist Adapter is incrementally updated using a replay-based continual adaptation strategy to capture seizure-related knowledge shared across sources. Each source is additionally represented by a prototype derived from frozen-backbone patient embeddings. During inference, prototype-based retrieval identifies relevant Specialist Adapters, whose predictions are aggregated and combined with the Generalist Adapter through validation-selected blending. We evaluate AIMS-EEG on four heterogeneous seizure EEG datasets using two EEG foundation models. Across both backbones, AIMS-EEG consistently outperforms representative multi-source cross-domain and continual-learning approaches, while remaining competitive with or superior to retrospective joint retraining. It also achieves the lowest catastrophic forgetting among the compared methods, while preserving previously learned source-specific adaptations as new sources are incorporated. These results demonstrate that combining source-specific specialization with shared cross-source adaptation is an effective strategy for robust multi-source seizure detection and efficient source expansion.

Keywords: *Electroencephalography, Seizure detection, Foundation model, LoRA*

Wearable Contactless Around-Ear and Research-Grade Whole-Scalp EEG Reveal Convergent Neural Signatures of Stress and Mindfulness

Sirawaj Itthipuripat [1]*, Pachaya Sailamul* [2]*, Suparach Intarasopa*[3]*, Waraset Wongsawat* [1]*, Sittha Preedapirat* [1]*, Abbie Pongpat* [1]*, Thitikorn Kaewlee* [4]*, Sarawin Khemmachotikun*[4]*, Chitpol Mungprom*[4]*, Barry Giesbrecht*[5]*, and Stephanie Nelli* [6]

[1]*Neuroscience Center for Research and Innovation, Learning Institute, King Mongkut's University of Technology Thonburi, Thailand*
[2]*National Electronics and Computer Technology Center, Thailand*
[3]*King Mongkut's University of Technology Thonburi, Thailand*
[4]*Brainspoke Lab, Alphie, Singapore*
[5]*Psychological & Brain Sciences Department, University of California Santa Barbara, USA*
[6]*Cognitive Science Department, Occidental College, USA*

Mindfulness-based interventions are widely used to reduce stress and anxiety, yet their underlying neural mechanisms remain insufficiently understood. A major barrier to real-world brain informatics applications is the lack of validated, scalable neural sensing systems that can reliably monitor stress and recovery dynamics. In this study, we ran two experiments -one combined full-coverage scalp EEGand around-ear wearable EEG ($N = 30$), and another used a novel contactless EEG system to investigate convergent neural signatures of stress and mindfulness ($N = 28$). Participants underwent mental arithmetic stress induction followed by recovery conditions involving mindful breathing meditation or mind-wandering under different sensory contexts (eyes open or closed). Stress induction robustly increased subjective stress and elicited canonical neural responses, including elevated midline frontal theta ($\sim 3 - 7Hz$), suppressed posterior alpha ($\sim 10 - 12Hz$), and increased gamma activity ($\sim 35 - 48Hz$). Contactless around-ear EEG further revealed gradual increases in gamma power that tracked subjective stress levels and inter-individual variability (ρ's = 0.3932–0.5995, ρ's = 0.0007–0.0385), alongside reliable, time-locked theta responses reflecting cognitive engagement in the arithmetic task (mean $z(\rho) = 0.2272$, 95% CI = $[0.1095, 0.3449], t(27) = 3.96, p < 0.001$). During recovery, mindful breathing produced rapid and context-dependent modulation of neural activity. Eyes-closed meditation resulted in the strongest stress reduction and maximal suppression of gamma and theta band activity, whereas eyes-open meditation moderately suppressed these oscillatory neural activity patterns. Temporal dynamics of theta and gamma oscillations were significantly modulated by both meditation and eye state. Critically, contactless around-ear EEG systems captured these neural signatures with comparable fidelity to scalp EEG. Test–retest analyses confirmed the reliability of key neural markers, particularly theta-band dynamics during stress engagement. Together, these findings demonstrate that stress and mindfulness are associated with rapid, context-sensitive neural dynamics that can be robustly detected using wearable and contactless around-ear EEG technologies. This work establishes the feasibility of scalable, real-time neurophysiological monitoring for stress assessment and mindfulness guidance, advancing the integration of brain informatics into relatively more naturalistic environments.

Keywords: *Stress, Mindful Breathing, Gamma and Theta Oscillations, Contactless EEG, Around-Ear EEG*

NGI-Net: A Multimodal Neural Framework with Clinical Context for Autism Spectrum Disorder Screening

Hongliang Sun, Hongbin Dai, and Shaoguo Cui
College of Artificial Intelligence and Advanced Interdisciplinary Sciences, Chongqing Normal University, China

Clinical diagnosis of autism spectrum disorder (ASD) relies primarily on behavioral observation and developmental history. Neuroimaging techniques such as structural MRI and magnetoencephalography offer objective, quantifiable measures that could augment existing diagnostic workflows. However, translating these heterogeneous data sources into reliable decision-support tools is complicated by substantial inter-subject variability and the confounding effects of demographic factors including age and cognitive development. To address these challenges, we introduce NGI-Net, a deep learning architecture that jointly processes sMRI, task-evoked MEG, and subject-level clinical metadata through a unified cortical graph representation.

At the core of our approach is a 68-node cortical scaffold based on the Desikan-Killiany parcellation. This anatomical backbone enables direct alignment of structural morphometrics—surface area, thickness, and volume—with functional signatures extracted from MEG recordings, including spectral power distributions, time-frequency characteristics,

and amplitude envelope dynamics. Rather than treating imaging data in isolation, NGI-Net encodes each modality through dedicated MLP branches, then blends regional representations via a learnable Fusion Core. A Modality Gate further adapts the balance between structural and functional evidence on a per-subject basis, while a Graph Neural Readout propagates fused regional information across the cortical network to produce a diagnostic probability. Critically, clinical variables (age, full-scale IQ, handedness) and global structural summaries are incorporated as contextual inputs at specific stages, allowing the model to account for subject-level heterogeneity without conflating it with imaging-derived patterns.

The framework was assessed on OpenNeuro ds005234, comprising paired auditory-task MEG and T1-weighted MRI from 74 pediatric participants (35 ASD, 39 typically developing). Rigorous evaluation was conducted via repeated nested cross-validation (5 repeats $\times$ 5 outer folds, with hyperparameter tuning restricted to inner folds). The ensemble strategy achieved 86.5% accuracy and an AUC of 0.9106, significantly surpassing both MRI-only (AUC 0.692) and MEG-only (AUC 0.763) baselines (both $p < 0.001$). Notably, a standalone clinical-demographic classifier attained AUC 0.932 on this cohort, whereas the imaging pathway alone reached only 0.670—underscoring that the two information streams carry distinct and complementary discriminative signals.

Systematic architectural ablations were performed to disentangle the contributions of individual components. Alternative readout mechanisms (mean-pooling and global-token attention) exhibited marginally higher ranking performance (AUC 0.915 and 0.914 respectively), yet the reference Graph Neural Readout delivered superior threshold-dependent metrics including accuracy, balanced accuracy, and F1 score. Cross-cohort generalization was investigated using ABIDE I ($n = 811$), where the structural MRI plus clinical-context branch achieved AUC 0.550 overall, dropping to 0.509 after demographic matching—findings that reinforce the importance of integrating MEG functional data alongside anatomical and clinical evidence.

These results establish NGI-Net as a promising candidate for multimodal ASD screening, demonstrating that principled anatomical alignment, explicit multimodal fusion, and contextual conditioning together yield robust discriminative performance. The modular design facilitates transparent interrogation of model behavior and supports future extension to independent MEG cohorts and prospective clinical validation.

Keywords: *autism spectrum disorder, multimodal neuroimaging, graph neural networks, magnetoencephalography, deep learning*

Distinguishing Love Using Pain-Related EEG

Jingyang Yu, Tianze Wang, Junyu Wu, Jiayi Shi, Rong Huang, Xingyu Zhou, Jiejun Xie, and Jing Meng
Chongqing Normal University, China

Interpersonal-affective context modulates pain perception, yet whether naturally occurring relationship states alter the temporal dynamics and distributed neural representation of nociceptive processing remains unresolved. We examined behavioral and cortical responses to pain in 91 healthy young adults classified into the fall-in-love, fall-out, and single groups. Participants received low- and high-intensity electrical stimulation while behavioral responses and 64-channel EEG were recorded. Pain-related cortical processing was indexed by the N1 and P2 event-related potential components. To assess whether group-level electrophysiological effects extended to distributed neural representations, we complemented ERP analysis with multivariate EEG decoding that integrated spectral differential-entropy features and temporal statistical descriptors in a channel-attentive dual-stream architecture. Classification performance was evaluated using participant-grouped five-fold cross-validation, ensuring that data from the same individual did not appear across training and test folds. Pain

intensity ratings and P2 amplitudes showed significant stimulus-intensity-by-group interactions. Under high-intensity stimulation, participants in the fall-out group reported lower pain intensity and exhibited attenuated P2 responses relative to those in the single group, whereas no corresponding group differences emerged under low-intensity stimulation. Relationship status did not significantly modulate N1 amplitude, indicating that the observed effect was expressed primarily during later evaluative-affective processing rather than early sensory encoding. Multivariate decoding further identified distributed EEG information associated with relationship status: CADS-Net achieved 48.21% ± 6.91% slice-level accuracy and 51.58% ± 8.47% participant-level accuracy, with a participant-level macro-F1 score of 0.5102, numerically above the nominal 33.3% chance level. The convergence of behavioral, ERP, and multivariate findings suggests that interpersonal-affective context is reflected in both subjective pain evaluation and later distributed cortical responses to nociceptive input. Although participant-level decoding remained moderate, the results support an integrative Brain Informatics approach in which temporally resolved neurophysiological markers and data-driven computational models jointly characterize socially contextualized brain states.

Keywords: *Brain Informatics, EEG, ERP, pain processing, machine learning*

A Resting-State EEG Resource for Young Adults with ADHD

Tianze Wang, Jingyang Yu, and Jing Meng
Chongqing Normal University, China

Attention-deficit/hyperactivity disorder (ADHD) symptoms in university students are associated with heterogeneous cognitive and neurophysiological profiles, yet well-characterized resting-state EEG resources for this population remain limited. Here, we present a resting-state EEG dataset designed to support reproducible brain-informatics research on individual differences in ADHD symptoms among young adults. The dataset includes 80 university students aged 18–25 years, comprising 40 participants with elevated ADHD symptoms and 40 participants with low ADHD symptoms. The sample is sex-balanced overall, with 40 women and 40 men. ADHD symptoms were assessed using the World Health Organization Adult ADHD Self-Report Screening Scale for DSM-5. The Symptom Checklist-90 was administered to screen for other psychopathological symptoms, and the Autism Spectrum Quotient-10 was used to screen for elevated autistic traits and reduce potential confounding from co-occurring characteristics. Participants completed 5 min of eyes-open and 5 min of eyes-closed resting-state EEG recording using a 64-channel Brain Products actiCHamp system with a sampling rate of 1,000 Hz. Raw recordings are stored in BrainVision format, including header and marker files with the associated EEG data files. The dataset includes resting-state EEG recordings together with demographic information and symptom-screening measures. EEG preprocessing and quality-control procedures have been completed, providing a basis for subsequent analyses of spectral dynamics, eyes-open/eyes-closed reactivity, functional connectivity, and individual differences in ADHD-related neurophysiological characteristics. The dataset is being prepared for de-identified release and is intended to support further reuse in computational neuroscience, brain informatics, and machine-learning studies of special populations. This resource adopts a dimensional perspective on ADHD-related traits rather than representing a clinically diagnosed ADHD cohort. Its balanced group design, sex-balanced sample, paired eyes-open/eyes-closed recordings, and accompanying psychopathology and autistic-trait screening measures provide a structured foundation for investigating resting-state brain dynamics in university students with different levels of ADHD symptoms. The

dataset may also serve as a basis for future integration with task-evoked EEG measures collected within the broader research programme.

Keywords: *resting-state EEG, ADHD symptoms, brain informatics, neural individual, differences*

An Intrinsic Geometric Regression Framework for Brain Connectivity in Special Populations

Fanghong Zhang and Yinan Lin
Chongqing Normal University, China

Functional connectivity matrices provide an important representation of coordinated brain activity. However, conventional analyses often vectorize these matrices and consequently overlook their intrinsic geometric structure, which may limit both statistical efficiency and interpretability, especially in studies of special populations with moderate sample sizes and substantial heterogeneity. We introduce an intrinsic geometric regression framework that directly relates a binary population indicator to a functional connectivity matrix. The method preserves the positive-definite structure of connectivity matrices and identifies a principal direction of connectivity variation associated with changes in population status. It therefore provides both probability-based classification and an interpretable representation of group-related connectivity differences. We illustrate the framework using fMRI data from the Autism Brain Imaging Data Exchange to investigate differences between individuals with autism spectrum disorder and typically developing controls. The analysis can identify whether functional connectivity is globally associated with autism status and reveal coordinated changes among brain regions related to social cognition, language, and information integration. By characterizing connectivity differences as an integrated network pattern rather than a collection of isolated connections, the proposed framework offers an interpretable and broadly applicable tool for studying brain information mechanisms in special populations.

Keywords: *Functional connectivity, Geometric regression, Special populations, Autism spectrum disorder, fMRI data*

Conference Venue

Podium Ballroom, Rydges Hotel, South Bank, Brisbane (Floor Map)

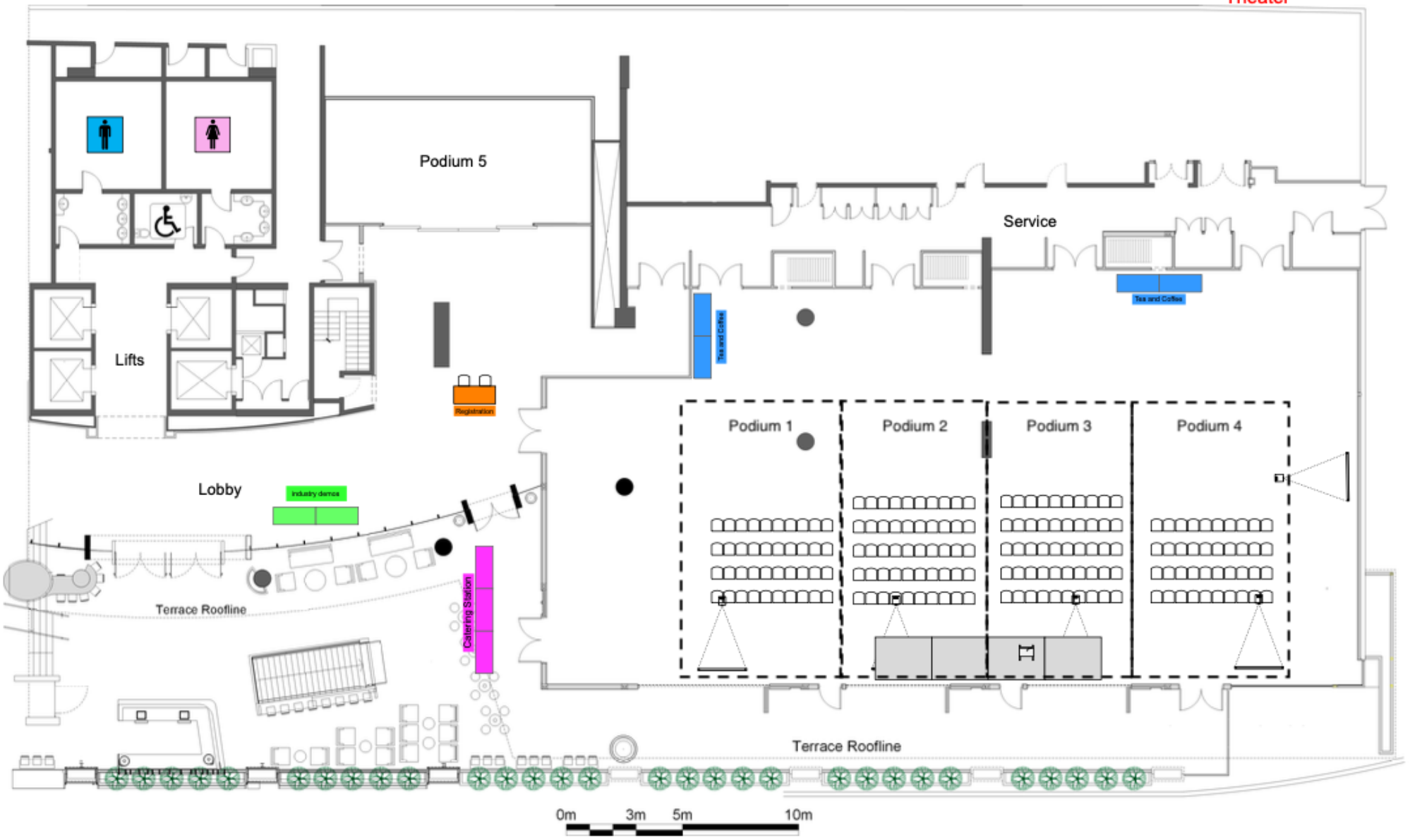
RYDGES

PODIUM BALLROOM

SOUTH BANK BRISBANE

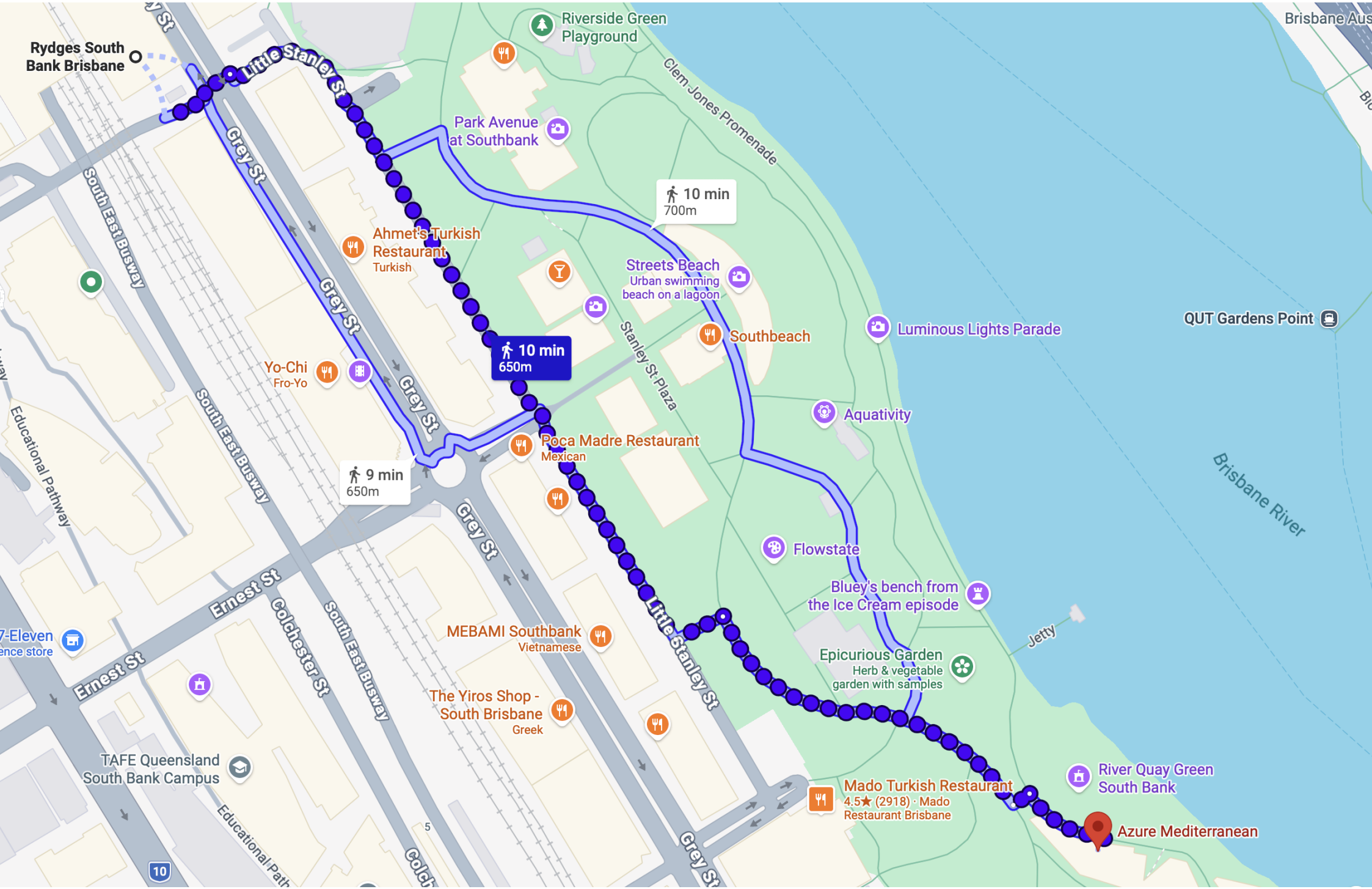
Web Intelligence Conference

180pax
Theater



DEI Reception Venue

Azure Mediterranean Restaurant, South Bank (How to Get There)


Rydges South Bank Brisbane
Little Stanley St
Grey St
South East Busway
Riverside Green Playground
Clem Jones Promenade
Park Avenue at Southbank
10 min
700m
Ahmet's Turkish Restaurant
Turkish
Streets Beach
Urban swimming beach on a lagoon
Luminous Lights Parade
QUT Gardens Point
Southbeach
Stanley St Plaza
10 min
650m
Yo-Chi
Fro-Yo
Aquativity
Poca Madre Restaurant
Mexican
9 min
650m
Brisbane River
Flowstate
Bluey's bench from the Ice Cream episode
Jetty
Educational Pathway
Ernest St
Colchester St
MEBAMI Southbank
Vietnamese
Epicurious Garden
Herb & vegetable garden with samples
The Yiros Shop - South Brisbane
Greek
TAFE Queensland South Bank Campus
Mado Turkish Restaurant
4.5★ (2918) · Mado Restaurant Brisbane
River Quay Green South Bank
Azure Mediterranean
10

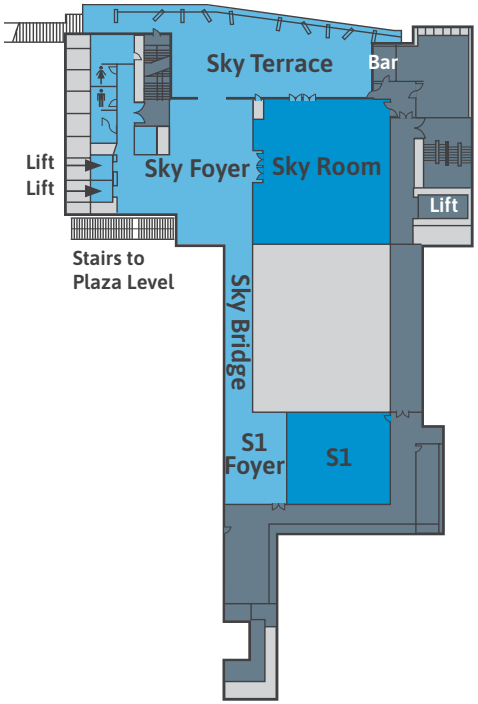
Banquet Venue

Sky Room & Terrace, Brisbane Convention & Exhibition Centre (How to Get There)


Sky Room & Terrace
2 min
150m
Grey St
Grey St
Grey St
Grey St
Grey St
Library Queensland...
Queensland Conservatorium...
Public Toilet - South Bank Piazza
Conservatorium Theatre - CT
Soleil Pool Bar
4.2★(131) · Fall into forever with Rydges
Rydges South Bank Brisbane
Little Stanley St
The Spaghetti House
Italian
South East Busway
South East Busway
Parent
139
56
1E
1C
1B
F1
Bar

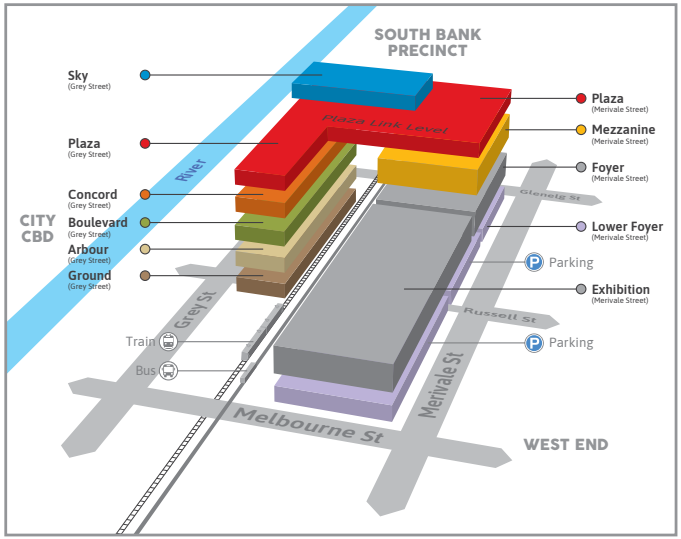
Sky Level

BCEC ON GREY STREET



S SKY LEVEL ROOMS	Theatre	Class-room	Banquet	Cocktail	Metres²
Sky Room	315	180	190	300	270
Meeting Room S1	150	75	80	130	135

Important note: Addition of dance floors and staging may affect capacities.



Acknowledgements and Sponsors

The organising committees of the 25th IEEE/WIC International Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT 2026) and the 19th International Conference on Brain Informatics (BI 2026) wish to express their sincere gratitude to all sponsors for their generous support and valuable contributions to the two conferences.

Their commitment has been instrumental in bringing together researchers, practitioners, educators and students from around the world to share knowledge, present research and explore new opportunities for collaboration. Through their support, the conferences provide a forum for advancing the fields of web intelligence, intelligent agent technology and brain informatics, and for strengthening connections across disciplines and communities.

We deeply appreciate the confidence our sponsors have placed in these conferences and their continued commitment to scientific inquiry, innovation and the exchange of ideas. Their contributions have helped make possible a program that reflects the breadth and vitality of our research communities.

On behalf of the organising committees and all participants, we extend our sincere thanks to our sponsors for their partnership and for their contribution to the success of WI-IAT 2026 and BI 2026.

WI-IAT 2026 and BI 2026 Organising Committees
Brisbane, December 2026


University of
Southern
Queensland


IEEE COMPUTER SOCIETY
TCII
Technical Community on Intelligent Informatics


Web Intelligence Consortium
2002


AsiaPacificNeuralNetworkSociety

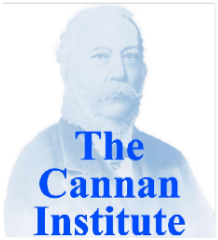

IEEE
COMPUTER
SOCIETY


THE INTERNATIONAL
NEURAL NETWORK
SOCIETY


中国人工智能学会
Chinese Association for Artificial Intelligence
中国人工智能学会脑科学与人工智能专业委员会
CAAI Technical Committee on Brain Science and Artificial Intelligence (CAAI-TCBSAI)


中国认知
科学学会
Chinese Society for Cognitive Science


Springer


The
Cannan
Institute


Aurora
Belmont
Private Hospital


LINKINTELLI
TECHNOLOGY


Psytech
心 仪 科 技


MY SERVICE
让信息系统运行更省心

Proud Platinum Sponsor of BI 2026

Belmont Private Hospital

Belmont Private Hospital

1220 Creek Road, Carina QLD 4152
T 07 3398 0111 F 07 3398 3105
belmontprivate.com.au

ABOUT US

Belmont Private Hospital is Queensland's largest private acute mental health service and a recognised centre for the treatment of complex psychiatric conditions. As an Authorised Mental Health Service under the Queensland Mental Health Act, Belmont provides specialist inpatient care across a broad spectrum of mood, anxiety, trauma-related, neurodevelopmental and life-stage mental health presentations. The hospital is home to nationally recognised specialty programs, including the Brisbane Centre for Postnatal Disorders and Australia's only dedicated inpatient service for dissociative disorders, delivering evidence-based multidisciplinary care supported by experienced psychiatrists, psychologists and allied health clinicians.

SPECIALIST REFERRAL AREAS

- Perinatal & Women's Mental Health
- Trauma & Dissociation
- Young Adult Mental Health (15+)
- Older Persons' Mental Health
- Mood Disorders
- Anxiety Disorders
- Bipolar Disorder
- Borderline Personality Disorder
- Neurodiversity
- Acute Community Service



CENTRES OF CLINICAL EXCELLENCE (DEDICATED UNITS)

Perinatal & Women's Mental Health

A nationally recognised service providing specialised inpatient care for women experiencing perinatal and reproductive life-stage mental health disorders, including complex presentations associated with pregnancy, the postnatal period and hormonal transitions. The program supports mother-infant attachment, parenting adjustment, trauma recovery and psychosocial functioning through multidisciplinary, evidence-based interventions including CBT, ACT and DBT.

Young Adult Mental Health

A dedicated program for adolescents and young adults experiencing complex mood, personality, trauma-related and emerging mental health conditions. Treatment combines psychiatric care, psychological therapies and allied health interventions, including DBT, ACT, exercise physiology, art therapy and music therapy, within a developmentally appropriate model of care. Referrals accepted from age 15+, subject to clinical suitability assessment.

Trauma & Dissociation Unit

Australia's only dedicated inpatient Trauma and Dissociation Unit, providing specialised treatment for complex trauma-related disorders and dissociative presentations. Established in 1997, the unit delivers multidisciplinary, evidence-based care focused on stabilisation, emotional regulation, safety, functional recovery and long-term treatment planning in partnership with community treating teams.

Older Persons

Specialised inpatient assessment and treatment for older adults experiencing mood disorders, cognitive changes, age-related psychiatric presentations and adjustment difficulties associated with ageing and declining functional capacity. The program incorporates comprehensive psychiatric care, multidisciplinary rehabilitation and therapeutic activities designed to support quality of life, independence and recovery.

Aurora
Belmont
Private Hospital

Belmont Private Hospital

1220 Creek Road, Carina QLD 4152
T 07 3398 0111 F 07 3398 3105
belmontprivate.com.au

ADVANCED BIOLOGICAL TREATMENTS & NEUROSTIMULATION

Belmont Private Hospital provides a range of advanced biological and neurostimulation therapies for individuals experiencing complex, severe and treatment-resistant mental health conditions. These services are delivered within a multidisciplinary framework, supporting psychiatrists with access to evidence-based treatment options tailored to individual clinical needs.

Esketamine & Emerging Therapies

Belmont continues to support innovation in psychiatric care through access to Esketamine therapy and the evaluation of emerging evidence-based interventions. These treatments expand therapeutic options for patients who have not achieved adequate outcomes through conventional pharmacological and psychological approaches.

Neurostimulation Services

Electroconvulsive Therapy (ECT)

- Comprehensive inpatient ECT services delivered within a specialist psychiatric setting.
- Suitable for severe mood disorders, treatment-resistant depression, psychotic depression and other clinically indicated presentations.

Repetitive Transcranial Magnetic Stimulation (rTMS)

- Non-invasive neurostimulation therapy for selected patients with treatment-resistant depression and other emerging clinical indications.
- Delivered as part of an integrated treatment plan supported by psychiatric review and monitoring.

STRUCTURED GROUP TREATMENT PROGRAMS & CONTINUING CARE PATHWAYS

Belmont delivers a comprehensive suite of evidence-based therapeutic programs incorporating CBT, DBT, ACT, psychoeducation, mindfulness and allied health interventions. Programs support patients across a range of clinical presentations including mood disorders, anxiety disorders, trauma-related conditions, personality disorders, women's mental health, neurodiversity and recovery-focused care.

Program Streams

- Mood Disorders & Bipolar Disorder
- Anxiety & Emotional Regulation
- Trauma & Dissociation
- Personality Disorders
- Women's & Perinatal Mental Health
- Neurodiversity
- Young Adult Mental Health
- Older Persons Mental Health
- Recovery, Wellness & Relapse Prevention



Aurora Belmont Private Hospital

Referring to Belmont Private is easy.

Scan to refer your patient within 60 seconds or contact us

P: 1800 700 274
F: 07 3398 3105
E: belmont.admissions@aurorahealth.com.au

The Cannan Institute

WI-IAT 2026 | BI 2026

Brisbane, Queensland, Australia
3–6 December 2026

