The 24th International Symposium on Knowledge and Systems Sciences (KSS2025) Program

AI-Driven Scientific Revolutions and Cross-Disciplinary Discovery

Organizer International Society for Knowledge and Systems Sciences
Host Graduate School of Information, Production and Systems, Waseda University
Co-sponsor Kitakyushu City
Kitakyushu Convention & Visitors Association
School of Economics and Management, Dalian University of Technology

Nov 28 – Nov 30, 2025
Kitakyushu, Fukuoka, Japan
Dalian, China

CONTENTS

ABOUT KSS2025

The 24th International Symposium on Knowledge and Systems Science (KSS2025) is the annual meeting of the **International Society for Knowledge and Systems Science** (http://www.iskss.org/). KSS2025 focuses on artificial intelligence and cross-disciplinary innovation, aiming to explore cutting-edge advancements and transformative paradigms in knowledge creation, systems thinking, and scientific discovery. Under the theme "AI-Driven Scientific Revolutions and Cross-Disciplinary Discovery", KSS2025 will delve into the profound impact of artificial intelligence on accelerating scientific breakthroughs and fostering synergistic collaborations across disciplines. We invite researchers to submit original papers addressing challenges and opportunities at the intersection of AI-driven knowledge systems, interdisciplinary research frameworks, and governance of intelligent technologies.

This year, KSS2025 is held in Kitakyushu City, Fukuoka, Japan, hosted by Graduate School of Information, Production and Systems, Waseda University, Japan. The co-sponsors include Kitakyushu City, Kitakyushu Convention & Visitors Association, and School of Economics and Management, Dalian University of Technology, China. In addition, there will be a sub-venue in Dalian hosted by School of Economics and Management, Dalian University of Technology, China, to provide on-site participation of KSS2025. We will also set up online meeting channels using Zoom, where participants who cannot travel to Kitakyushu, Japan, and Dalian, China can choose to attend online.

ORGANIZATION

Organizer International Society for Knowledge and Systems Sciences

Host Graduate School of Information, Production and Systems, Waseda University

Co-sponsor Kitakyushu City
Kitakyushu Convention & Visitors Association
School of Economics and Management, Dalian University of Technology

General Chairs

Xijin Tang — CAS Academy of Mathematics and Systems Science, China
Masao Arakawa — Waseda University, Japan

Technical Program Chairs

Haoxiang Xia — Dalian University of Technology, China
Van-Nam Huynh — JAIST, Japan
Shigeru Fujimura — Waseda University, Japan

Organizing Chairs

Xianneng Li — Dalian University of Technology, China
Osamu Yoshie — Waseda University, Japan

Special Session Chairs

Deqiang Hu — Dalian University of Technology, China
Guangfei Yang — Dalian University of Technology, China

PROGRAM OVERVIEW

All venues of this conference will be live streamed simultaneously.

PLEASE NOTE THE DIFFERENCE BETWEEN Beijing Time AND Tokyo Time

Registration

Nov 28, 2025(Friday), Graduate School of Information, Production and Systems (IPS), Waseda University, Japan

Nov 28, 2025(Friday), School of Economics and Management (SEM), Dalian University of Technology, China

Nov 29, 2025 (Saturday) Morning Sessions, Zoom meeting ID: 909 922 1043, password: 888

Venue Location: Room N162, IPS, Waseda University

Room B309, SEM, Dalian University of Technology

Beijing Time	Tokyo Time		
8:30-8:40	**9:30-9:40**	**Opening Session**	**Dalian**
8:40-9:20	**9:40-10:20**	**Keynote Speech 1:** Prof. Yanzhong Dang (Dalian University of Technology, China)	**Dalian**
9:20-10:00	**10:20-11:00**	**Keynote Speech 2:** Prof. Quan Bai (University of Tasmania, Australia)	**Kitakyushu**
10:00-10:40	**11:00-11:40**	**Keynote Speech 3:** Prof. Jiamou Liu (University of Auckland, New Zealand)	**Online**
10:40-11:25	**11:40-12:25**	**Parallel Sessions**	
11:25-12:30	**12:25-13:30**	**Lunch**	
Nov 29, 2025 (Saturday) Afternoon Sessions, Onsite			
12:30-16:15	**13:30-17:15**	**Parallel Sessions**	
16:15-18:00	**17:15-19:00**	**Banquet**	
Nov 29, 2025 (Saturday) Afternoon Sessions, Online			
14:00-16:30	**15:00-17:30**	**Parallel Sessions**	
Nov 30, 2025 (Sunday) Morning Sessions, Zoom meeting ID: 909 922 1043, password: 888			
9:00-11:30	**10:00-12:30**	**Parallel Sessions**	

GENERAL PROGRAM

Opening Session & Onsite Session, Kitakyushu & Dalian

Nov 29, 2025 (Saturday) Morning
Zoom meeting ID: 909 922 1043, password: 888

Opening Session (Chair: Xianneng Li, Dalian University of Technology, China)			
Beijing Time	**Tokyo Time**		
8:30-8:40	9:30-9:40	Opening Addresses	
Keynote Speech 1			
8:40-9:20	9:40-10:20	Prof. Yanzhong Dang (Dalian University of Technology, China)	Third Data in Artificial Intelligence
Keynote Speech 2			
9:20-10:00	10:20-11:00	Prof. Quan Bai (University of Tasmania, Australia)	Toward Agentic Scientific Knowledge Discovery
Keynote Speech 3			
10:00-10:40	11:00-11:40	Prof. Jiamou Liu (University of Auckland, New Zealand)	Data Governance in the Age of AI: Infrastructures for Data Sovereignty and Auditable Models
Onsite Session A, Kitakyushu, Japan (Chair: Osamu Yoshie, Waseda University, Japan)			
10:40-10:55	11:40-11:55	Design of an SiC All-MOSFET Voltage Reference Using Neural Network Modeling	Yang, Wenhao; Li, Angze; Qi, Mengnan; Sun, Yuyin; Zhang, Yimeng*; Zhang, Yuming
10:55-11.10	11:55-12.10	Computing XAI user's revealed preferences: An argumentation-based approach	Nguyen Hung*
11:10-11:25	12:10-12:25	Exploring Taxi Trip Characteristics Connecting to Public Transit Stations using GPS Big Data: A Case Study of Bangkok	KYAW NYUNT, KHIN THIRI*; Hyunh, Van-Nam; Piantanakulchai, Mongkut; Karnjana, Jessada; Nguyen, Mau-Toan
11:25-12:30	12:25-13:30	Lunch	

Parallel Sessions, Dalian

Nov 29, 2025 (Saturday) Afternoon
Zoom meeting ID: 909 922 1043, password: 888

Onsite Session B, Dalian China (Chair: Haoxiang Xia, Dalian University of Technology, China)			
Beijing Time	**Tokyo Time**	**Title**	**Authors**
12:30-12:45	13:30-13:45	A Stacking-Based Machine Learning Approach for Early Gastric Cancer Subtype Prediction	Xu, Zhenyuan; Li, Qinyi*; Mo, Miaomiao; Zhao, Rujin
12:45-13:00	13:45-14:00	Exploiting Evolutionary Strategies to Prevail in Iterated Prisoner's Dilemma Games	Xing, Xiaoyu*; Li, Juan; Xia, Haoxiang
13:00-13:15	14:00-14:15	The evolution of cumulative reciprocity strategies on complex network structures	Luo, Shuangling; Guo, Yungui*; Li, Juan; Xia, Haoxiang
13:15-13:30	14:15-14:30	Beyond the Face: Enhancing Interview Decision Prediction by Fusing Personality Traits with Facial Features	Yue, Xin; Gao, Mingzhe; Hu, Deqiang*
Onsite Session C, Dalian China (Chair:Deqiang Hu, Dalian University of Technology, China)			
13:30-13:45	14:30-14:45	Multimodal Fake News Detection Method Based on Multi-granularity Feature Collaborative Learning	Yan, Yang*
14:00-14:15	15:00-15:15	Dynamic Evolution Analysis of Network Public Opinion in Emergencies from the Perspective of Information Ecology	Zhang, Jing*
14:15-14:30	15:15-15:30	Research on Mining Citizen Major Concerns and Government Response Characteristics Based on Large Language Models: A Case Study of the "Leaders' Message Board" Online Political Inquiry Platform on People's Daily Online	Wei, Zikai*; Tang, Xijin
14:30-14:45	15:30-15:45	An Agent-Based Simulation Framework for Misinformation Susceptibility Test with LLMs: Insights from Psychological Factors	Han, Chen*; Tang, Xijin
14:45-15:00	15:45-16:00	Tea Break	
Onsite Session D, Dalian China (Chair: Lin Yan, Dalian Maritime University, China)			
15:00-15:15	16:00-16:15	BBOD-CAD: Bounding Box Reconstruction and Cross-Block Boundary Fusion Method	Liu, Shikai; Sun, Lihang; Zhu, Yi; Quan, Wei*
15:15-15:30	16:15-16:30	Firms' collaboration strategy in the context of digital innovation: The Role of partners' geographic distance and technological similarity	Siqi Yang*
15:30-15:45	16:30-16:45	Research on the Impact of Digital Transformation in Manufacturing Firms on Their ESG Performance: From the Perspective of Internal Synergy in Digital Transformation	Wang, Chenxi*; Lin, Yan; Song, Yiping
15:45-16:00	16:45-17:00	Content-aware Instruction for Zero-shot Chinese Legal Case Retrieval: A Large Language Model-based Framework	Zhou, Zhiwei; Li, Xianneng*
16:00-16:15	17:00-17:15	Resource Expectation, Collaborative Behavioral Patterns and Human-Bot Collaborative Relationships: A social Exchange Perspective on Online Knowledge Communities	Cai, Chang; Qiu, Jiangnan*; Gao, Shuangyan
16:15-16:30	17:15-17:30	Efficient Parallel Genetic Algorithm for Perturbed Substructure Optimization in Complex Network	Yu, Shanqing; Zhou, Meng*; Zhou, Jintao
16:30-16:45	17:30-17:45	A Semantic Integration Framework Bridging	Mengru

Onsite Session B, Dalian China (Chair: Haoxiang Xia, Dalian University of Technology, China)			
		Systems Engineering and Model-Based Systems Engineering Ontologies.	Dong;Guoxin Wang;Yihui Gong
16:45-	17:45-	Banquet	

Parallel Sessions, Online

Nov 29, 2025 (Saturday) Afternoon
Zoom meeting ID: 859 7559 7889

Online Session A (Chair: Chen, Jindong, Beijing Information Science and Technology University, China)			
Beijing Time	**Tokyo Time**	**Title**	**Authors**
14:00-14:15	15:00-15:15	LLMTest: Combining Symbolic Execution and LLM Capabilities for Commutativity Test of Reduce Functions	Zhang, Xuan; Zhang, Peng; Liu, Qin*; Zhao, Fengshan
14:15-14:30	15:15-15:30	Combination of Deep Reinforcement Learning and Supervised Learning Method for Credit Card Fraud Detection	Cheng, Meixu*; Chen, Jindong; Zhang, Wen
14:30-14:45	15:30-15:45	Intelligent Path Planning for Off-Road Navigation: A Q-Learning Approach with Terrain and Distance Optimization	Sun, Duohang*; Wang, Chenxi; Zhou, Chengxu; Liu, Xiaoqing; Xiao, Haitao
14:45-15:00	15:45-16:00	Hard Disk Failure Prediction Based on Improved Generative Adversarial Network	Liu, Junping; Wu, Lihua*
15:00-15:15	16:00-16:15	Break	
Online Session B (Chair: Huynh, Van-Nam, Japan Advanced Institute of Science and Technology, Japan)			
15:15-15:30	16:15-16:30	HeritageTransNet: A Hybrid CNN-Transformer Framework for Automated Digital Restoration of Ancient Chinese Caihua	Lou, Junhong; Zhao, Qingcong*
15:30-15:45	16:30-16:45	Beyond Matrix Factorization: Deep Neural Network Embeddings for Hotel Recommendation	Tran, Xuan-Thang*; Nguyen, Dang-Man; Nguyen, Mau-Toan; Huynh, Van-Nam
15:45-16:00	16:45-17:00	GAT-ADASYN: A Graph Attention–Guided Adaptive Oversampling Method	Zhou, Xuecheng; Han, Lu*
16:00-16:15	17:00-17:15	A Knowledge Graph Framework for Purpose-Driven Privacy Policy Compliance Auditing	Liu, Hanchang; ZHANG, NING*; Su, Zekun
16:15-16:30	17:15-17:30	Unveiling Electric Vehicle Traffic Accident Risks: A Data-Driven Analysis of Accident Severity and Key Influencing Factors	ZHOU, Huiyu*; FU, Yiyang

Parallel Sessions, Online

Nov 30, 2025 (Sunday) Morning
Zoom meeting ID: 827 4312 3438

Online Session C (Chair: Quan Bai, University of Tasmania, Australia)			
Beijing Time	**Tokyo Time**	**Title**	**Authors**
9:00-9:15	10:00-10:15	Developing Cross-Regional Expert Agents through Domain Knowledge Integration in the Guangdong-Hong Kong-Macao Greater Bay Area	Yaxin, Cao; Dawei, He; Binwei, Gao; Liqun, Xiang*
9:15-9:30	10:15-10:30	Epidemic Scenario Construction for Major Epidemics in Communities: Driven by Hazard-Affected Body Dynamics	MING, CONG; FENG, YUE*; Rong, Lili; Du, Yaxin
9:30-9:45	10:30-10:45	Multi-Factor Coupling Risk Assessment of Water Distribution Networks Integrating the N-K Model and Random Forest	He, Qiong; Yang, Zhenwei*; Tang, Jingyun
9:45-10:00	10:45-11:00	Model-Based System Engineering Supporting Mission Engineering Modeling	Bangjun, Guo; Tianning, Liu; Jinzhi, Lu*; Xiang, Jiang; Wenglong, Zhu
10:00-10:15	11:00-11:15	Break	
Online Session D (Chair: Gong, Weihua, Zhengzhou University, China)			
10:15-10:30	11:15-11:30	Multimodal Fake News Detection based on Crossmodal Attention and Contrastive Learning	Yan, zhihua*; Li, zhenpeng; Tang, Xijin
10:30-10:45	11:30-11:45	Systematic measurement of carbon emissions and influencing factors decomposition for China's tourism industry: A new measurement system and decomposition framework	Gong, Weihua*; Wei, Wei; Chen, Yapeng; Li, Tao
10:45-11:00	11:45-12:00	Predicting Credit Risk in Technology Finance: An Explainable Graph Machine Learning Framework Leveraging Credit Guarantee Relationships	Li, Zhihong; Li, Shuxiang*; Zhou, Qi; Xu, Xiaoying
11:00-11:15	12:00-12:15	Data Shapley-Based Incentive Mechanism for Online Q&A Communities with Internal Large Language Models	Chen, Yuan*; Xu, Xiaoying; Ren, Peijia; Li, Shuxiang
11:15-11:30	12:15-12:30	Incorporating the acceptability of opinions and individual semantics variations among decision-makers in group decision-making	Zhou, Xueling*; Wei, Cuiping; Liu, Ying
11:30-11:45	12:30-12:45	Joint Mitigation of Data and Model Uncertainty in Ride-Hailing Demand Prediction: An Integrated Statistical‐Learning Framework.	Liu, Xianwei; Guo, Yuying; Wang, Jiangbo*; Liu, Kai; Yamamoto, Toshiyuki

KEYNOTE SPEECH

1. Professor Yanzhong Dang (Dalian University of Technology, China)
   Third Data in Artificial Intelligence
2. Professor Quan Bai (University of Tasmania, Australia)
   Toward Agentic Scientific Knowledge Discovery
3. Professor Jiamou Liu (University of Auckland, New Zealand)
   Data Governance in the Age of AI: Infrastructures for Data Sovereignty and Auditable Models

1. Third Data in Artificial Intelligence

Yanzhong Dang

Abstract

At the Scientific Frontier Plenary Session of the 2025 World Artificial Intelligence Conference, Richard Sutton, the father of reinforcement learning, stated in his keynote speech: "In recent years, although large models following the Scaling Law have developed rapidly, the data used to train these models has almost been exhausted. The 'data era' of artificial intelligence development may come to an end in the near future." He further emphasized, "We are now at the end of the human data era and the beginning of the human experience era."

It appears that the data available for AI development is becoming insufficient, particularly lacking in data that encapsulates human experience. However, on the other hand, amid the current research fervor around big data and artificial intelligence, a highly important category of data has been overlooked and has not received sufficient research attention. This type of data contains an extremely high density of human experience and represents a critical knowledge resource for both knowledge management and AI development. This is the "Third Data" to be discussed in this report—a form of data generated during problem-solving processes that is of paramount importance.

This report uses the manufacturing industry as a case study to elaborate on the following aspects: the concept of Third Data—its sources and generation process; the value creation process; the knowledge creation spiral model based on Third Data; and finally, an application example.

2. Toward Agentic Scientific Knowledge Management and Discovery

Quan Bai

Abstract

The accelerating growth of scientific data and complexity of modern research have surpassed the limits of traditional human-driven knowledge management and discovery. With the development of Large AI models and Generative AI, AI agents are capable of autonomous information retrieval, reasoning, information generation. This presentation explores the conceptual foundations, architectures, and emerging applications of agentic AI in scientific discovery. It discusses how large AI models, knowledge graphs, and reasoning engines can collaborate with human to create useful knowledge in more effective and efficient ways. Key challenges, such as trust, transparency, and epistemic soundness, will be highlighted alongside some existing case studies. Ultimately, the talk envisions a future where human–AI partnerships accelerate the generation of new knowledge and enable a more systematic and scalable approach to scientific knowledge management and discovery.

3. Data Governance in the Age of AI: Infrastructures for Data Sovereignty and Auditable Models

Jiamou Liu

Abstract

As AI systems permeate healthcare, education, finance, and cultural heritage, data governance has become a defining systems challenge: how can we enable powerful data-driven models while respecting individual rights, community sovereignty, and societal trust? This talk develops a lifecycle view of data governance in the age of AI, spanning data collection, sharing and pricing, model training, and deployment-time accountability. I will first motivate this perspective with global legal and societal pressures. I then present two complementary technical strands as examples of governance-aware infrastructure. The first is a blockchain-based, privacy-preserving data marketplace that combines cryptography, differential privacy, and auction-theoretic mechanisms to support confidential, integrity-preserving, and fair brokerage of personal and community data. The second is a family of black-box auditing methods for retrieval-augmented generation and knowledge-graph-based AI systems, which allow individuals and regulators to test whether their data or derived knowledge are implicitly embedded in deployed models and external knowledge stores. Throughout, I will emphasise design trade-offs, deployment constraints, and open questions for system sciences and AI, arguing for socio-technical architectures that deliver ex-ante control over data use and ex-post auditability of AI behaviour.