IWSDA'2025 Program

December 7 (Sunday)	December 8 (Monday)	December 9 (Tuesday)	December 10 (Wednesday)	December 11 (Thursday)
	8:30 - 9:00 AM Registration with Coffee & Tea	**8:30 - 9:20 AM** Coffee & Tea	**8:30 - 9:20 AM** Coffee & Tea	**8:30 - 9:20 AM** Coffee & Tea
	9:00 - 9:20 AM Opening Remarks	**9:20 - 10:20 AM** **Keynote Speech 2** **(Professor Sihem Mesnager)**	**9:20 - 11:00 AM** Session 4 (5 papers)	**9:20 - 10:20 AM** Session 6 (3 Papers)
	9:20 - 11:00 AM Session 1 (5 papers)	**10:20 - 10:40 AM** Coffee & Tea	**11:00 - 11:20 AM** Coffee & Tea	**10:20 - 10:40 AM** Coffee & Tea
	11:00 - 11:20 AM Coffee & Tea	**11:00 - 7:00 PM** Tour Half Day	**11:20 - 12:20 PM** **Keynote Speech 3** **(Professor Stephen Bartlett)**	**10:40 - 12:20 PM** Session 7 (4 Papers)
	11:20 - 12:20 PM **Keynote Speech 1** **(Proferssor Pingzhi Fan)**			
	12:20 - 1:50 PM Lunch		**12:20 - 1:50 PM** Lunch	**12:20 - 1:50 PM** Lunch
	1:50 - 3:30 PM Session 2 (5 Papers)		**1:50 - 3:30 PM** Session 5 (5 Papers)	**1:50 - 3:30 PM** Session 8 (3 Papers)
	3:30 - 4 PM Coffee & Tea		**3:30 – 4:00 PM** Coffee & Tea	**3:30 - 4 PM** Coffee & Tea
	4:00 - 5:40 PM Session 3 (5 Papers)		**4:00 - 4.30 PM** **Invited Talk** **(Dr. Farhad Farokhi)**	
6:00 PM Evening Welcome Event *(Manhari Room, Melbourne Connect)*			**6:30 PM** Conference Banquet *(University House)*	

Note: All coffee breaks and lunch will be provided in the Peter Hall Building.

Session 1: Sequences -I (Dec 8)		
Session Chair: Yang Yang		
Sl. No.	**Paper ID**	**Paper Title**
1.	**12**	**New Sequence Design Metric for AMP Synchronization Field** ***Authors: Shukai Wang, Zhengchun Zhou, Yang Yang and Xiaohu Tang***
2.	**13**	**Four Families of Binary Sequences With Low Ambiguity Function Properties** ***Authors: Furong Bao, Zhengchun Zhou, Yang Yang and Ping Deng***
3.	**8**	**New Constructions of Golay-ZCZ Arrays with Flexible Parameters via EGBFs** ***Authors: Aditya Prakash, Prashant Kumar Srivastava and Sudhan Majhi***
4.	**10**	**Integer-valued Complete Complementary Codes Based on Hadamard-type Matrices over Finite Fields** ***Authors: Tetsuya Kojima***
5.	**20**	**New Sets of Even-Length Binary Z-Complementary Pairs With Large Zero Correlation Zones** ***Authors: Avik Adhikary, Zhengchun Zhou, Xiaohu Tang and Ping Deng***

Session 2: Decoding, Detection, and DNA Storage (Dec 8)		
Session Chair: Adrish Banerjee		
Sl. No.	**Paper ID**	**Paper Title**
1.	**1**	**A Fast Decoding Algorithm for Generalized Reed-Solomon Codes and Alternant Codes** ***Authors: Nianqi Tang, Yunghsiang Han, Danyang Pei and Chao Chen***
2.	**34**	**Backward Fano Decoding for PAC Codes** ***Authors: Po-Cheng Kung, Chung-Hsuan Wang and Chi-Chao Chao***
3.	**17**	**Clustering-Free and Clustering-Based Outer Channel Modeling and Decoding for DNA Storage** ***Authors: Zhijun Yuan, Yi Ding, Xuan He and Xiaohu Tang***
4.	**9**	**Double skew cyclic codes over Z_4 + u Z_4** ***Authors: Saumya Shah and Amit Sharma***
5.	**25**	**Construction of Codes Over $\mathbb{F}_{p^3}$ From Cyclic Codes Over $\mathscr{M}_3 (\mathbb{F}_p + u\mathbb F_p + u^2\mathbb F_p)$** ***Authors: Shikha Patel, Soham Ravikant Joshi and Om Prakash***

Session 3: Coding Theory: Hulls and Structures (Dec 8)		
Session Chair: Zhengchun Zhou		
Sl. No.	**Paper ID**	**Paper Title**
1.	**11**	**The Hull of Subfield Codes / Subcodes and Their Relationship with Two Generic Constructions of Linear Codes** ***Authors: Virginio Fratianni and Sihem Mesnager***
2.	**35**	**On the Euclidean and Hermitian Hulls of a Class of Twisted Generalized Elliptic Curve Codes** ***Authors: Xiaofeng Liu, Jun Zhang and Fang-Wei Fu***

3.	**3**	**Lexicographic Unequal Error Protection Codes** ***Authors: Tomohiko Saito, Yoshifumi Ukita and Toshiyasu Matsushima***
4.	**26**	**A class of Distance-Optimal Divisible Codes from Simplicial Complexes** ***Authors: Vidya Sagar, Rong Luo, Avik Ranjan Adhikary and Zhengchun Zhou***
5.	**42**	**On some p-ary few-weight linear codes by the help of Weil sums** ***Authors: Mrinal Kanti Bose, Udaya Parampalli and Abhay Kumar Singh***

Session 4: Security and Communication Protocols (Learning-Based) (Dec 10)		
Session Chair: Hong-Yeop Song		
Sl. No.	**Paper ID**	**Paper Title**
1.	**43**	**Learning-Based RIS-Assisted Secure Beamforming Design: A User-Scalable GNN Approach** ***Authors: Natasha Elizabeth Francis, Peng Cheng, William D. Lukito and Yijie Gao***
2.	**36**	**Soft-DDQN-Based Frequency Selection Strategy in Time-Slotted Channel Hopping Networks** ***Authors: Siming Pang, Xianhua Niu, Shiyang Zhou, Bing Liu, Bosen Zeng and Pengxu Chen***
3.	**37**	**Frequency Hopping Sequences Search Algorithm Based on Deep Reinforcement Learning** ***Authors: Siqi Yang, Xianhua Niu, Shiyang Zhou, Bing Liu, Pengxu Chen and Chao Qi***
4.	**41**	**Verifiability of SPIR Schemes with Malicious Users** ***Authors: Emelie Ekenstedt and Lawrence Ong***
5.	**33**	**A Two-Stage Queue-Aware Prioritized ACB Scheme for Massive Machine-Type Communications** ***Authors: Yuxuan Wen, Liu Yang, Chaoyuan Bai, Heng Liu, Ping Wang and Xinhang Tan***

Session 5: Security and Cryptography (Dec 10)		
Session Chair: Sedar Boztas		
Sl. No.	**Paper ID**	**Paper Title**
1.	**16**	**Silver Nano particles device based lightweight cryptographic system toward IoT edge security** ***Authors: Hiroki Tabata, Yuma Yamashita, Yusuke Nakaoka, Oradee Srikimkaew, Yuki Usami, Shunsuke Araki and Hirofumi Tanaka***
2.	**22**	**A Study on Integerization of 4-Dimensional Lorenz-Stenflo System for A Key Sharing Method** ***Authors: Keishi Kanzaki, Kohei Takaichi, Jun-Juh Yan, Takeru Miyazaki, Satoshi Uehara and Shunsuke Araki***
3.	**4**	**On the Chaotic Behavior of Integer Sequences from Linear Feedback Shift Registers** ***Authors: Hyojeong Choi, Gangsan Kim, Hong-Yeop Song and Hongjun Noh***
4.	**15**	**MATRIX: Mixed-basis Architecture using Towering Field Representations for Extendable Grostl State Blocks** ***Authors: Yuta Kodera and Yasuyuki Nogami***
5.	**14**	**A study on extract bits of pseudorandom sequences generated by Me operation on the elliptic curve** ***Authors: Renta Yamauchi, Natsuo Hayashi, Takeru Miyazaki, Shunsuke Araki and Satoshi Uehara***

Session 6: Next-Gen Wireless Systems and Estimation (Dec 11)		
Session Chair: Chi-chao Chao		
Sl. No.	**Paper ID**	**Paper Title**

1.	21	**Grid Evolution Based on Cluster Fusion for Doubly Fractional Channel Estimation in OTFS Systems** *Authors: Xiangjun Li, Qianli Wang, Zilong Liu and Zhengchun Zhou*
2.	18	**Efficient Signal Detection Method Based on Sparse Bayesian Learning in ZP-OTFS Systems** *Authors: Xueping Lan, Xiaoxu Zhang, Pingzhi Fan, Zhengquan Zhang, Xianfu Lei, Yi Zhou, Li Hao and Zheng Ma*
3.	39	**Improved Channel Estimation Scheme for STAR-RIS-Assisted Communication Systems** *Authors: Shibsankar Das and Adrish Banerjee*

Session 7: Sequences -II (Dec 11)		
Session Chair: Tetsuya Kojima		
Sl. No.	**Paper ID**	**Paper Title**
1.	32	**Two Novel Constructions of Mutually Orthogonal Complementary Sets** *Authors: Yu Wang, Dejiao Cai, Yongqiu Chen, Zilong Liu, Chunlei Li and Xiuping Peng*
2.	38	**Golay-ZCZ Sequence Sets with Flexible Lengths Based on Matrices of Polynomials** *Authors: Shibsankar Das, Adrish Banerjee, Udaya Parampalli and Zilong Liu*
3.	27	**Training Design for Generalized Spatial Modulation Systems Based on Sparse Zero-Correlation Zone Arrays** *Authors: Cheng-Yu Pai, Hen-Geul Yeh and Chao-Yu Chen*
4.	31	**Construction of Binary Sequence Having PMEPR Bounded by 4** *Authors: Piyush Priyanshu, Sudhan Majhi and Subhabrata Paul*

Session 8: Sequences, Source Coding, and Applications (Dec 11)		
Session Chair: Avik Ranjan Adhikary		
Sl. No.	**Paper ID**	**Paper Title**
1.	19	**On Decimations of m-sequences giving few valued cross correlations** *Authors: Serdar Boztas, Ferruh Ozbudak, Elif Kurtaran Ozbudak and Eda Tekin*
2.	28	**Simulated Channel State Information in Indoor Environments for Respiration Monitoring Using Sionna** *Authors: James Rhodes, Lawrence Ong and Duy Ngo*
3.	7	**Fairer Noiseless Broadcast Source Coding** *Authors: Serdar Boztas*

Sl. No.	**Paper Title: Keynote Presentations**
1.	**2D Delay-Doppler Pilots Based on Perfect Arrays/Sequences and Channel Estimation for MIMO OTFS** *Author: Prof. Pingzhi Fan*
2.	**Algebraic Equations over Finite Fields: Advances in Resolution Techniques and Practical Impacts in Modern Technology** *Authors: Prof. Sihem Mesnager*
3.	**On Quantum computing and Quantum Error Correction** *Authors: Prof. Stephen Bartlett*

Keynote Speeches:

1. Keynote Speaker: Prof. Pingzhi Fan

Title: 2D Delay-Doppler Pilots Based on Perfect Arrays/Sequences and Channel Estimation for MIMO OTF

Talk Outline: Orthogonal time frequency space (OTFS) is a novel modulation scheme to handle the high Doppler effect under time varying channels. In this paper, in order to improve channel estimation accuracy and to reduce pilot overhead, two types of two-dimensional (2D) pilots and the corresponding matched filters are designed for multi-antenna OTFS systems. Our 2D pilots are formed using perfect arrays (such as Frank array, Chu array, etc) or perfect-sequence based Kronecker array (PKA). Different from the previous multi-antenna OTFS pilots, these 2D pilots are placed on the same area in the delay-Doppler domain, using code division multiplexing to deal with the interference between pilots of different antennas, known as pilot pollution. To improve the channel estimation performance, matched filters are also designed to better compensate the phase shift of the 2D pilot response in the delay-Doppler domain. Compared with the conventional multi-antenna OTFS schemes, the proposed scheme achieves significantly better NMSE performance, while having lower pilot overhead under multi-antenna scenarios. Finally, more recent new pilot arrays are also reported.

Speaker's Short Bio:

Pingzhi Fan (Fellow, IEEE) is currently a distinguished professor of Southwest Jiaotong University (SWJTU), honorary dean of the SWJTU-Leeds Joint School (2015-), honorary professor of the University of Nottingham (Ningbo, 2025), and a visiting professor of Leeds University, UK (1997-). He is a recipient of the UK ORS Award (1992), the National Science Fund for Distinguished Young Scholars (1998, NSFC), IEEE VT Society Jack Neubauer Memorial Award (2018), IEEE SP Society SPL Best Paper Award (2018), IEEE VT Society Best Magazine Paper Award (2023), and several IEEE conference best paper awards. He served as chief scientist of a National 973 Plan Project (MoST, 2012.1-2016.12). He also served as general chair or TPC chair of a number of IEEE conferences, including VTC2016Spring, ITW2018, IWSDA2022, PIMRC2023, VTC2025Fall, as well as the coming ISIT2026,

ICC2028. His research interests include high mobility wireless communications, multiple access techniques, ISAC, signal design & coding, etc. He is an IEEE VTS Distinguished Speaker (2022-2028), a fellow of IEEE, IET, CIE and CIC.

2. Keynote Speaker: Prof. Sihem Mesnager

Title: Algebraic Equations over Finite Fields: Advances in Resolution Techniques and Practical Impacts in Modern Technology

Talk Outline: This talk will discuss the problem of solving algebraic equations over finite fields. This fundamental issue has become increasingly important due to its critical role in various applied domains, particularly information theory and cryptography. Addressing equations over finite fields is essential from both theoretical and practical perspectives. Historically, researchers have focused on determining the number of solutions for certain equations rather than explicitly deriving all possible solutions. While this limited approach has sufficed for some practical applications in cryptographic function theory, we need to enhance our understanding to yield more comprehensive results. Developing tools and performing methods to solve an extensive range of equations over finite fields is crucial, as it provides valuable resources for theorists, cryptographers, and coding theorists. We will begin by outlining our primary motivations for this work. Next, we will present significant recent achievements in solving key algebraic equations over finite fields and discuss the methodologies and key mathematical ingredients of these developments.

Speaker's Short Bio:

Sihem Mesnager is a French mathematician who received a PhD degree in Mathematics from the University of Pierre et Marie Curie (Paris VI), now part of Sorbonne University, Paris, France, in 2002, and the Habilitation to Direct Theses (HDR) in Mathematics from the University of Paris VIII, France, in 2012. She is currently a professor of mathematics at the University of Paris VIII (France) in the laboratory LAGA (Laboratory of Analysis, Geometry, and Applications), University of Sorbonne Paris Nord, and CNRS. She is also an adjunct professor at Telecom Paris (France) in the INFERES department, part of the Telecom Paris Institute, Polytechnique of Paris. Her research interests include discrete mathematics, symmetric cryptography, coding theory, commutative algebra, and computational algebraic geometry. She was awarded the 2020 first international George Boole Prize and received several awards from 2014 to 2023 from the University of Paris VIII (national evaluation). She is the Editor-in-Chief of the international journal Advances in Mathematics of Communications (AMC), published by AIMS. She was an Associate Editor for the international journal IEEE Transactions on Information Theory (IEEE-IT) from Sept 2014 to Aug. 2021. Also, She serves on the editorial board of of the

international journal Design, odes and cryptography (DCC), of the international journal Cryptography and Communications Discrete Structures and Boolean Functions and Sequences (CCDS) published by SPRINGER, the International Journal Finite Fields and their Applications (FFA) Published by ELSEVIER, the international journal RAIRO ITA (Theoretical Informatics and Applications), the International Journal of Computer Mathematics (Published by Taylor Francis), and International Journal of Applicable Algebra in Engineering, Communication, and Computing (AAECC)-Published by SPRINGER. She was a program co-chair for several International Workshops, served on the boards of program committees for 50 international conferences and workshops, and co-chaired/co-organised 18 international conferences (notably, she was the main organiser of the international conference on Finite Fields and Their Applications, Fq15 conference). She is (co)-author of 220 articles, two books, and three chapters of books, and has given more than 125 national and international conferences (36 invited talks). Since 2016, she has served as president of the IEEE Information Theory French Chapter. She is heading the research group AGC3 (Algebra, Geometry, Combinatorics, and Applications to Cryptography and Coding) at the LAGA Laboratory. She is an elected member (term 2024-2027) of College A of the National Council of Universities (CNU) for Section 25 Mathematics in France.

3. Keynote Speaker: Prof. Stephen Bartlett

Topic: Quantum computing with faulty devices.

Talk Outline: The incredible potential of quantum computing has been recognised by innovative companies in all sectors—quantum computers will perform calculations that are impossible for conventional computation. But in practice, building a quantum computer and harnessing its power is daunting, given the challenges faced by these complex machines in retaining their quantum nature as they scale up in size. While the technology for quantum computing components has matured significantly in recent years, integrating these components to achieve utility-scale quantum computers will require quantum error correction to tolerate the high error rates of today's quantum devices.

In this talk, I'll provide an overview of the recent developments in fault-tolerant architectures for quantum computing, including the use of new types of quantum codes based on low-density parity check (LDPC) codes, and why I believe these developments will enable large-scale quantum computing before the end of this decade.

Speaker's Short Bio:

Stephen Bartlett is an advocate and leader of the burgeoning quantum technology ecosystem, in Sydney and globally. A theoretical quantum physicist and Professor in the School of Physics at the University of Sydney, he leads a team pursuing both fundamental and applied research in the design of quantum computers.

Stephen is Director of the University of Sydney Nano Institute, the Director of the Australian Research Council Training Centre for Future Leaders in Quantum Computing (FLiQC), and led the establishment of the national growth centre for quantum industry, Quantum Australia. He is the inaugural Lead Editor of the premier international research journal PRX Quantum. He is a Fellow of the American Physical Society, the Australian Institute of Physics, and the Royal Society of NSW.

4. **Invited Speaker: Dr. Farhad Farokhi**

   Topic: Maximal Quantum Information Leakage: Application to Privacy and Inference

   Talk Outline: An alternative measure of information leakage for quantum encoding of classical data is defined. An adversary can access a single copy of the state of a quantum system that encodes some classical data and is interested in correctly guessing a general randomized or deterministic function of the data (e.g., a specific feature or attribute of the data in quantum machine learning) that is unknown to the security analyst. The resulting measure of information leakage, referred to as maximal quantum leakage, is the multiplicative increase of the probability of correctly guessing any function of the classical data upon observing measurements of the quantum state. Maximal quantum leakage satisfies various axioms for information leakage and can be used to study various important problems in quantum computing and communication relating to security, privacy, and statistical inference.

Speaker's Short Bio:

Farhad Farokhi is a Senior Lecturer at the Department of Electrical and Electronic Engineering at the University of Melbourne. Prior to that, he was Research Scientist at CSIRO's Data61, Research Fellow at the University of Melbourne, and Postdoctoral Fellow at KTH Royal Institute of Technology. In 2014, he received his PhD degree in Automatic Control from KTH Royal Institute of Technology. Farhad has been the recipient of the IEEE Signal Processing Society Best Paper Award, Victorian State Government VESKI Victoria Fellowship as well as the McKenzie Fellow and the 2015 Early Career Researcher Award, 2020 MSE Excellence Award for Early Career Research, 2021 School of EMI Special Recognition Award from the University of Melbourne. His research interests include interplay between information and utility in cyber-physical systems.