

International Conference on Quantum Communications, Networking, and Computing

(QCNC 2025)

31 March-2 April 2025 (Japan Standard Time)

Conference Program and Information Booklet

Sponsored by



Advanced Program Summary (Japan Standard Time Zone)

31 March 2025 (Monday)		
	Room: Hagoromo 1	Room: Hagoromo 2
09:00-09:20	Opening Ceremony (Hiten Room)	
09:20-10:20	Keynote Speech-1 (Hiten Room)	
10:20-10:40	Coffee Break	
10:40-12:00	QCNC-1: Quantum Information Networks-1	QCNC-2: Quantum Computing and Sensing-1
12:00-13:00	Break	
13:00-14:20	QCNC-3: Quantum Information Networks-2	QCNC-4: [Short Paper] Security in the Quantum Age-S1
14:20-14:50	Coffee Break	
14:50-16:10	QCNC-5: Simulators, Demonstrations, Prototypes and Testbeds-1	QCNC-6: Security in the Quantum Age-1
16:10-16:20	Break	
16:20-17:25	QCNC-7: [Short Paper] Quantum Information Networks-S1	QCNC-8: [Short Paper] Quantum Computing and Sensing-S1
17:25-18:00	Break	
18:00-20:00	Reception & Poster Session (Hiten Room)	
1 April 2025 (Tuesday)		
	Room: Hagoromo 1	Room: Hagoromo 2
09:00-10:00	Keynote Speech-2 (Hiten Room)	
10:00-10:20	Break	
10:20-12:00	QCNC-9: Quantum Information Networks-3	QCNC-10: Security in the Quantum Age-2
12:00-13:00	Break	
13:00-14:20	QCNC-11: Invited Papers-1	QCNC-12: Quantum Information Networks-4
14:20-14:50	Break	
14:50-15:50	QCNC-13: Invited Papers-2	QCNC-14: Quantum Computing and Sensing-3
15:50-16:00	Break	
16:00-17:20	QCNC-15: [Short Paper] Quantum Information Networks-S2	QCNC-16: [Short Paper] Quantum Computing and Sensing-S2
17:20-18:00	Break	
18:00-20:00	Banquet (Hiten Room)	
2 April 2025 (Wednesday)		
	Room: Hagoromo 1	Room: Hagoromo 2
09:00-10:40	QCNC-17: Quantum Computing and Sensing-4	QCNC-18: Security in the Quantum Age-1
10:40-10:55	Break	
10:55-12:00	QCNC-19: [Short Paper] Quantum Information Networks-S3	QCNC-20: [Short Paper] Quantum Computing and Sensing-S3
12:00-13:00	Break	
13:00-14:20	QCNC-21: Quantum Computing and Sensing-5	QCNC-22: Quantum Computing and Sensing-2
14:20-14:50	Break	
14:50-15:55	QCNC-23: [Short Paper] Quantum Computing and Sensing-S4	QCNC-24: [Short Paper] Security in the Quantum Age-S2
15:55-16:00	Break	
16:00-16:50	QCNC-25: [Short Paper] Quantum Computing and Sensing-S5	QCNC-26: [Short paper] Simulators, Demonstrations, Prototypes and Testbeds-S
16:50-17:00	Closing (Room: Hagoromo 1)	

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Keynote Speech 1**Quantum Nexus for Sensing, Communication, Control, and Computing**

Prof. Moe Z. Win

*Massachusetts Institute of Technology, USA***Abstract**

Recent advancements in quantum information science are poised to unleash new sensing, communication, control, and computing (SC3) capabilities. Synergies in SC3 promise the development of next-generation networks with unprecedented performance. For instance, (i) control of statistical information facilitates practical quantum inference, (ii) communication exploiting quantum phenomena empowers concealed telecomputation, and (iii) variational computing and distributed metrology enable networked quantum sensing. Quantum Nexus unifies SC3 and provides key insights into the systematic design of quantum information technologies. Quantum Nexus has led to new theories and methodologies in, among others, quantum localization, quantum direct communication, remote entanglement establishment, optimal quantum control, and distributed quantum computation. This talk will introduce Quantum Nexus for SC3 and highlight key areas of research.

Biography

Moe Win is the Robert R. Taylor Professor at the Massachusetts Institute of Technology (MIT) and the founding director of the Wireless Information and Network Sciences Laboratory. Prior to joining MIT, he was with AT&T Research Laboratories and the NASA Jet Propulsion Laboratory. His research encompasses theoretical foundation, algorithm design, and network experimentation for a broad range of real-world problems. His current research topics include network localization and navigation, network interference exploitation, and quantum information science. Professor Win has served the IEEE Communications Society as an elected Member-at-Large on the Board of Governors, as elected Chair of the Radio Communications Committee, and as an IEEE Distinguished Lecturer. He was honored with two IEEE Technical Field Awards: the IEEE Kiyo Tomiyasu Award and the IEEE Eric E. Sumner Award. His publications, co-authored with students and colleagues, have received several awards. Other recognitions include the MIT Frank E. Perkins Award, MIT Everett Moore Baker Award, the IEEE Vehicular Technology Society James Evans Avant Garde Award, the IEEE Communications Society Edwin H. Armstrong Achievement Award, the Cristoforo Colombo International Prize for Communications, the Copernicus Fellowship and the Laurea Honoris Causa from the Università degli Studi di Ferrara, and the U.S. Presidential Early Career Award for Scientists and Engineers. Professor Win is elected Fellow of the AAAS, the EURASIP, the IEEE, and the IET.

Keynote Speech 2**Quantum Internet: The Quest for A Paradigm Shift**

Prof. Marcello Caleffi

*University of Naples Federico II, Italy***Abstract**

The Quantum Internet is widely recognised as the final stage of the quantum revolution, which aims at interconnecting heterogeneous quantum networks at a global scale. To this aim, one could naively assume that the Quantum Internet design should follow the fundamental design principles of the classical Internet. Indeed, these principles enabled the first ARPANET prototype to surprisingly evolve into current Internet, the complex global network that interconnects billions of devices. Yet, quantum bits profoundly differ from classical bits. Indeed, qubits are governed by the laws of quantum mechanics, and they are subjected to a set of no-go theorems that prohibit to directly employ classical strategies for quantum communications. As a matter of fact, quantum phenomena with non counterpart in classical world challenge a one-to-one mapping between the classical Internet protocol stack and the Quantum Internet protocol suite. And quantum entanglement, the key resource for quantum networks, demands for a major shift in the network design. This talk will delve into the paradigm shift from bit transmission to entanglement distribution, by discussing the challenges and opportunities arising from entanglement and the road towards the quantum Internet protocol suite design.

Biography

Marcello Caleffi co-leads the Quantum Internet research group at University of Naples Federico II. His work appeared in top-tier IEEE Transactions and Journals, and he received multiple awards, including the IEEE Communications Society “Best Tutorial Paper Award” 2022 and the IEEE Communications Society “Award for Advances in Communication” 2024. Currently, he serves as editor for IEEE Trans. on Wireless Communications, IEEE Trans. on Communications, IEEE Trans. on Quantum Engineering, IEEE Open Journal of the Communications Society and IEEE Internet Computing. In 2017, he has been appointed as distinguished lecturer from the IEEE Computer Society and, in 2023, he has been appointed as distinguished lecturer from the IEEE Communications Society.

Technical Program (*Time zone: Japan Standard Time*)

Main Conference Day 1 (*Tokyo Time, UTC+9*)

Monday, 31 March 2025

Monday, 31 March 2025 | Hiten Room, 09:00 – 09:20 (Tokyo Time)
Monday, 31 March 2025 | Hiten Room, 00:00 – 00:20 (London Time)
Sunday, 30 March 2025 | Hiten Room, 19:00 – 19:20 (New York Time)

Opening Ceremony

Session Chair: Ruidong Li, Kanazawa University, Japan

Monday, 31 March 2025 | Hiten Room, 09:20 – 10:20 (Tokyo Time)
Monday, 31 March 2025 | Hiten Room, 00:20 – 01:20 (London Time)
Sunday, 30 March 2025 | Hiten Room, 19:20 – 20:20 (New York Time)

Keynote Speech 1: Quantum Nexus for Sensing, Communication, Control, and Computing

- Prof. Moe Z. Win (Massachusetts Institute of Technology, USA)

Session Chair: Angela Sara Cacciapuoti, University of Naples Federico II, Italy

Monday, 31 March 2025 | Hagoromo 1 Room, 10:30 – 11:50 (Tokyo Time)
Monday, 31 March 2025 | Hagoromo 1 Room, 01:30 – 02:50 (London Time)
Sunday, 30 March 2025 | Hagoromo 1 Room, 20:30 – 21:50 (New York Time)

Session QCNC-1: Quantum Information Networks-1 (Hagoromo 1)

Session Chair: Joaquin Chung, Argonne National Laboratory, USA

Service-the-Longest-Queue Among d Choices Policy for Quantum Entanglement Switching

Guo Xian Yau (TU Delft, Netherlands), Thirupathaiah Vasantam (Durham University, UK) and Gayane Vardoyan (University of Massachusetts, Amherst, USA)

Utility-Cost Ratio Maximization in Quantum Networks for Secure Quantum Key Distribution

Liangxin Qian and Jun Zhao (Nanyang Technological University, Singapore)

Transversality Across Two Distinct Quantum Codes and Its Application to Quantum Repeaters

Mahdi Bayanifar (Aalto university, Finland), Alexei Ashikhmin (Nokia Bell Labs, USA), Dawei Jiao and Olav Tirkkonen (Aalto university, Finland)

Applying Turbo Codes To Wireless Quantum Optical Communications Via Multipath Channels Causing Intersymbol Interference

Peter Jung, Kushtrim Dini and Hamza Almujaheed (Universität Duisburg-Essen, Germany)

Monday, 31 March 2025 | Hagoromo 2 Room, 10:30 – 11:50 (Tokyo Time)
Monday, 31 March 2025 | Hagoromo 2 Room, 01:30 – 02:50 (London Time)
Sunday, 30 March 2025 | Hagoromo 2 Room, 20:30 – 21:50 (New York Time)

Session QCNC-2: Quantum Computing and Sensing-1 (Hagoromo 2)

Session Chair: Riccardo Romanello, Ca' Foscari University of Venice, Italy

Error-Mitigated Quantum Random Access Memory

Wenbo Shi (University of New South Wales, Australia), Neel Kanth Kundu (Indian Institute of Technology Delhi, Indian), Matthew R. McKay (University of Melbourne, Australia) and Robert Malaney (University of New South Wales, Australia)

Phantom Edges in the Problem Hamiltonian: A Method for Increasing Performance and Graph Visibility for QAOA
Quinn Langfitt, Reuben Tate and Stephan Eidenbenz (Los Alamos National Laboratory, USA)

Optimization of Quantum Encoding for Combinatorial Problems in Rydberg Atom Array
Jiale Liu, Qiang Zheng, Yikang Zhu, Jiangyu Cui and Zhaofeng Su (University of Science and Technology of China, China.)

QuCloudSim: A Customizable Discrete Event Simulator for Quantum Cloud Computing Environment
Ruilin Zhou, Yuhang Gan, Lucinda Shen, Yi Liu, Mignot Mesele and Chen Qian (University of California Santa Cruz, USA)

Monday, 31 March 2025 | 13:00 – 14:20 (Tokyo Time)
Monday, 31 March 2025 | 04:00 – 05:20 (London Time)
Sunday, 30 March 2025 | 23:00 – 00:20 (New York Time)

Session QCNC-3: Quantum Information Networks-2 (Hagoromo 1)

Session Chair: David Elkouss, OIST, Japan

Towards Distributed Quantum Error Correction for Distributed Quantum Computing
Shahram Babaie and Chunming Qiao (University at Buffalo, USA)

Distribution and Purification of Entanglement States in Quantum Networks
Xiaojie Fan, Yukun Yang, Himanshu Gupta and C. R. Ramakrishnan (Stony Brook University, USA)

Overview of Quantum Key Distribution Network Key-Delivery Specifications
Miralem Mehic (University of Sarajevo, Bosnia and Herzegovina), Stefan Rass (Johannes Kepler University Linz, Austria), Emir Dervisevic (University of Sarajevo, Bosnia and Herzegovina), Peppino Fazio (Ca' Foscari University of Venice, Italy), Sergej Jakovlev (Klaipeda University, Italy) and Miroslav Voznak (VSB-Technical university of Ostrava, Czech)

Satellite-Aided Entanglement Distribution for Optimized Quantum Networks
Jakob Kaltoft Søndergaard, René Bødker Christensen and Petar Popovski (Aalborg University, Denmark)

Monday, 31 March 2025 | 13:00 – 14:20 (Tokyo Time)
Monday, 31 March 2025 | 04:00 – 05:20 (London Time)
Sunday, 30 March 2025 | 23:00 – 00:20 (New York Time)

Session QCNC-4: [Short Paper] Security in the Quantum Age-S1 (Hagoromo 2)

Session Chair: Kouichi Sakurai, Kyushu University, Japan

From Free-Space Quantum Communication Systems to Satellite-based Networks
Laszlo Bacsardi, Andras Mihaly and Kitti Olah (Budapest University of Technology and Economics, Hungary)

Commitment Schemes from OWFs with Applications to Quantum Oblivious Transfer
Thomas Lorünser, Sebastian Ramacher and Federico Valbusa (Austrian Institute of Technology, Austria)

Adapting Communication Networks to the Quantum Safe Era: Lessons Learned in the Coexistence of Polarization-entangled QKD and Classical Channels
Ane Sanz, Asier Atutxa, David Franco, Jasone Astorga and Eduardo Jacob (University of the Basque Country (UPV/EHU), Spain)

A QPUF-Based Scheme for Secure and Adaptable Quantum Device Attestation in NISQ Devices
Franco Cirillo and Christian Esposito (University of Salerno, Italy)

A Hybrid Approach to Address the Transition to Quantum-Resistant Cryptography in Telecommunication Environments
Javier Faba, Juan Pedro Brito, Josefina Cresta, Antonio Pastor (Telefónica Innovación Digital), Diego López (Telefónica Innovación Digital, Spain), Rubén Brito, Jaime S. Buruaga and Vicente Martín-Ayuso (Universidad Politécnica de Madrid, Spain)

Monday, 31 March 2025 | 14:50 – 16:10 (Tokyo Time)
Monday, 31 March 2025 | 05:50 – 07:10 (London Time)
Monday, 31 March 2025 | 00:50 – 02:10 (New York Time)

Session QCNC-5: Simulators, Demonstrations, Prototypes and Testbeds-1 (Hagoromo 1)

Session Chair: Zizwe Chase, University of Illinois at Chicago, USA

Design and Simulation of the Adaptive Continuous Entanglement Generation Protocol

Caitao Zhan, Joaquin Chung (Argonne National Lab, USA), Allen Zang, Alexander Kolar (University of Chicago, USA) and Rajkumar Kettimuthu (Argonne National Lab, USA)

Bayesian Optimization for Repeater Protocols

Lorenzo La Corte (Okinawa Institute of Science and Technology, Japan), Kenneth Goodenough (University of Massachusetts, USA), Ananda G. Maity (Okinawa Institute of Science and Technology, Japan), Siddhartha Santra (Indian Institute of Technology, India) and David Elkouss (Okinawa Institute of Science and Technology, Japan)

A Digital Twin Approach to Quantum Key Distribution Under Eavesdropping

Angela Diaz-Bricio, Blanca Lopez (IMDEA Networks, Spain), Ivan Vidaland Francisco Valera (Universidad Carlos III de Madrid, Spain)

Testbed and Experiments for Quantum-Conventional Networking

Nageswara Rao, Muneer Alshowkan, Joseph Chapman, Nicholas Peters (Oak Ridge National Laboratory, USA), Joseph Lukens (Arizona State University, USA), Hsuan-Hao Lu (Oak Ridge National Laboratory, USA), Guoliang Xue (Arizona State University, USA), Saikat Guha (University of Maryland, USA), Don Towsley, Gayane Vardoyan, Leonardo Bacciottini (University of Massachusetts, USA), Emily Van Milligen (University of Maryland, USA) and Linran Fan (University of Texas at Austin, USA)

Monday, 31 March 2025 | 14:50 – 16:10 (Tokyo Time)
Monday, 31 March 2025 | 05:50 – 07:10 (London Time)
Monday, 31 March 2025 | 00:50 – 02:10 (New York Time)

Session QCNC-6: Security in the Quantum Age-1 (Hagoromo 2)

Session Chair: Martin Vicente, Universidad Politécnica de Madrid, Spain

Continuous-Variable Quantum Oblivious Transfer in Realistic Environments

Fred Fung, Ikshul Jagannath, Hans H. Brunner and Momtchil Peev (Huawei Technologies Duesseldorf GmbH, Germany)

A Formal Security Definition for Quantum Private Query and Worst-Case Analysis of the GLM Protocol

Shima Hassanpour (TU Dresden, Germany), Marcel Tiepelt, Christoph Cojjanovic, Jörn Müller-Quade and Thorsten Strufe (KIT, Germany)

Coexistence of SDN Management Protocols in QKD Networks

Ruben B. Mendez, Jesus Ballesta, Ramon Querol (Universidad Politécnica de Madrid, Spain), Antonio Pastor, Diego Lopez (gCTIO/I+D, Telefonica, Spain), Vicente Martín and Juan Pedro Brito Méndez (Universidad Politécnica de Madrid, Spain)

Transition of Self-Sovereign Identity to Post-Quantum Cryptography

Alberto Solavagione and Andrea Vesco (LINKS Foundation, Italy)

Monday, 31 March 2025 | 16:20 – 17:10 (Tokyo Time)
Monday, 31 March 2025 | 07:20 – 08:10 (London Time)
Monday, 31 March 2025 | 02:20 – 03:10 (New York Time)

Session QCNC-7: [Short Paper] Quantum Information Networks-S1 (Hagoromo 1)

Session Chair: Joaquin Chung, Argonne National Laboratory, USA

Modeling and Feasibility of Space-based Measurement-device-independent Quantum Key Distribution

Xingyu Wang and Lei Shi (Air Force Engineering University, China)

Performance of CSS Quantum Codes in Asymmetric Channels

Alexei Ashikhmin (Nokia Bell Labs, USA)

Passive State QKD for Last Mile Applications

Yury Kurochkin, James Grieve (Quantum Research Centre, Technology Innovation Institute, Abu Dhabi, UAE), Anton Trushechkin (Heinrich Heine University Düsseldorf, Germany), Sana Amairi-Pyka and Vadim Rodimin (Technology Innovation Institute, Abu Dhabi, UAE)

Monday, 31 March 2025 | 16:20 – 17:25 (Tokyo Time)

Monday, 31 March 2025 | 07:20 – 08:25 (London Time)

Monday, 31 March 2025 | 02:20 – 03:25 (New York Time)

Session QCNC-8: [Short Paper] Quantum Computing and Sensing-S1 (Hagoromo 2)

Session Chair: Aikaterini Mandilara, National and Kapodistrian University of Athens, Greece

Quantum Arithmetic for Real-Number 2's Complement Multiplication

Wiwat Asawalertsak, Rajchawit Sarochawikasit and Prapong Prechaprapranwong (King Mongkut's University of Technology Thonburi, Thailand)

An Equivalent Baseband Signal Model for Rydberg Atomic Quantum Receiver Aided Wireless Communications and Sensing

Tierui Gong, Jiaming Sun, Chau Yuen, Guangwei Hu, Yufei Zhao, Yong Liang Guan (Nanyang Technological University, Singapore), Chong Meng Samson See (DSO National Laboratories, Singapore), Merouane Debbah (Khalifa University of Science and Technology, UAE) and Lajos Hanzo (University of Southampton, U.K.)

Solving the Cruise Passenger Itinerary Scheduling Problem Using Quantum-Inspired Computing

Chia-Ho Ou, Yan-Cheng Lin and Kuo-Chuan Wu (National Pingtung University, Taiwan)

Noise-Aware Detectable Byzantine Agreement for Consensus-based Distributed Quantum Computing

Kuan-Cheng Chen (Imperial College London, U.K.), Matthew Prest (Columbia University, USA), Felix Burt, and Shang Yu (Imperial College London, U.K.)

Monday, 31 March 2025 | 18:00 – 20:00 (Tokyo Time)

Monday, 31 March 2025 | 09:00 – 11:00 (London Time)

Monday, 31 March 2025 | 04:00 – 06:00 (New York Time)

Session QCNC Poster: Reception & Poster (Room Hiten, 18:00-20:00)

Session Chair: Siddhartha Santra, Indian Institute of Technology, Bombay, India

Linear Balanced Boolean Sequence and Comparative Analysis of Random Number Generators

Shashi Kant Pandey (Society for Electronic Transaction and Security, India)

QFide: Quantum Teleportation Fidelity Simulator for Developing Quantum Networks

Yuto Lim, Zhaowei Zhong, Thu Trang Nguyen and Ruidong Li (Kanazawa University, Japan)

Quantum AI in the NISQ Era: A Relevance Taxonomy

Ahmed Ben Elswayeh (Talan Tunisia), Ala Harroum (Talan Tunisia), Mohamed Aziz Ben Romdhane (Talan Tunisia), Mehdi Houas (Talan), Behjet Boussofara (Talan Tunisia), Imen Ayari (Talan Tunisia), Rasha Friji (Talan Tunisia)

Quantum Binary Neural Networks for Reinforcement Learning

Andrew Haverly, Shahram Rahimi and Mark Novotny (Mississippi State University, USA)

Quantum Networks in 6G Communications: Technologies, Challenges, and Applications

Liangxin Qian and Jun Zhao (Nanyang Technological University, Singapore)

Quantum Walkers and Diffusion

John Vining and Howard Blair (Syracuse University, USA)

Secure Quantum Transportation Framework for Telepsychiatry Applications in the Metaverse

Chun-Hung Lee (I-Shou University, Taiwan), Andrew An-Zhe Lee (National Cheng Kung University; Taiwan), Yu-Hsin Liu (King's College London, UK), Guan-Hsiung Liaw and Wu-Chuan Yang (I-Shou University, Taiwan)

Simulator of Quantum Bit Error Correction Process based on Artificial Neural Networks

Tymoteusz Widlarz and Marcin Niemiec (AGH University of Krakow, Poland)

Main Conference Day 2 (*Time zone: Tokyo Time, UTC+9*)

Tuesday, 1 April 2025

Tuesday, 1 April 2025 | Hiten Room, 09:00 – 10:00 (Tokyo Time)

Tuesday, 1 April 2025 | Hiten Room, 00:00 – 01:00 (London Time)

Monday, 31 March 2025 | Hiten Room, 19:00 – 20:00 (New York Time)

Keynote Speech 2: Quantum Internet: The Quest for A Paradigm Shift

- Prof. Marcello Caleffi (University of Naples Federico II, Italy)

Session Chair: Chunming Qiao, University at Buffalo, USA

Tuesday, 1 April 2025 | Hagoromo 1 Room, 10:10 – 11:50 (Tokyo Time)

Tuesday, 1 April 2025 | Hagoromo 1 Room, 01:10 – 02:50 (London Time)

Monday, 31 March 2025 | Hagoromo 1 Room, 20:10 – 21:50 (New York Time)

Session QCNC-9: Quantum Information Networks-3 (Hagoromo 1)

Session Chair: Lorenzo Valentini, University of Bologna, Italy

Sequential Entanglement-Swapping Assisted by Quantum Protocol over Ethernet Networks

Kun Chen-Hu, Kristian S. Jensen and Petar Popovski (Aalborg University, Denmark)

An On-demand Routing Scheme with QoS Provisioning for QKD Networks

Yuqi Yang, Jian Li, Zhonghui Li, Shaochuang Heng, Lutong Chen Qibin Sun and Jun Lu (University of Science and Technology of China, China)

Leveraging SDN Control for Time-Precise Quantum Position Verification

Ziyan Zhang, Florian Speelman and Paola Grosso (University of Amsterdam, Netherlands)

Dynamic Distribution of Quantum Circuits with Minimum Circuit-Execution Time

Ranjani G Sundaram and Himanshu Gupta (Stony Brook University, USA)

Optimal Quantum State Discrimination with Fixed Measurements

Maison Clouatre (Massachusetts Institute of Technology, USA), Stefano Marano (University of Salerno, Italy), Andrea Conti (University of Ferrara, Italy), Peter Falb and Moe Win (Massachusetts Institute of Technology, USA)

Tuesday, 1 April 2025 | Hagoromo 2 Room, 10:10 – 11:50 (Tokyo Time)
Tuesday, 1 April 2025 | Hagoromo 2 Room, 01:10 – 02:50 (London Time)
Monday, 31 March 2025 | Hagoromo 2 Room, 20:10 – 21:50 (New York Time)

Session QCNC-10: Security in the Quantum Age-2 (Hagoromo 2)

Session Chair: Masahiro Mambo, Kanazawa University, Japan

Monitoring Strategy for Enhanced Adaptability in QKD Networks

Blanca Lopez, Angela Diaz-Bricio (IMDEA Networks, Spain), Ivan Vidal, Francisco Valera (Universidad Carlos III de Madrid, Spain) and Diego Lopez (Telefonica I+D, Spain)

Secure Network Innovation in Defense: SDN and Quantum Cryptography with DISCRETION

Juan Pedro Brito Méndez, Jesús Ballesta, Rubén B. Méndez, Laura Ortiz (Universidad Politécnica de Madrid, Spain), Rafael Cantó, Stephan Laschet (AIT Austrian Institute of Technology, Austria), Pietro Piscione, Ahmed K Abdulwahed, Pietro Giardina (Nextworks, Italy), Gustavo Anjos (Instituto de Telecomunicações, Portugal), Sebastian Ramacher (AIT Austrian Institute of Technology, Austria), Luis Maia (Adyta, Brazil), Ricardo Chaves (INESC-ID/IST/ULisboa, Portugal), Tiago Dias (INESC-ID/IST/ULisboa, Portugal), Joana Afonso, Pedro Martins (INESC-ID, Portugal), Luis Magalhães (Adyta, Brazil), Francisco Pinto, Margarida Vieira, Rodrigo Bacar (Deimos Engenharia), Rui Calé (Altice Labs), Vicente Martin (Universidad Politécnica de Madrid, Spain), Diego López (Telefónica Innovación Digital, Spain) and Catarina Bastos (Deimos Engenharia, Portugal)

Enabling Oblivious Key on a Quantum Network in QuantaGENOMICS project

Juan José Romero, Rafael J. Vicente, Juan P. Brito, Vicente Martin and Laura Ortiz (Universidad Politécnica de Madrid, Spain)

Reinforcement Learning for Entanglement Swapping in Quantum Networks

Álvaro Troyano, Marco Pérez, Andrés Agustí, Javier Faba, Vicente Martin and Laura Ortiz (Universidad Politécnica de Madrid, Spain)

A Scalable Framework for Post-Quantum Authentication in Public Key Infrastructures

Antonia Tsili (National and Kapodistrian University of Athens, Greece), Konstantinos Kordolaimis, Konstantinos Krilakis (Eulambia Advanced Technologies, Greece) and Dimitris Syvridis (National and Kapodistrian University of Athens, Greece)

Tuesday, 1 April 2025 | 13:00 – 14:20 (Tokyo Time)
Tuesday, 1 April 2025 | 04:00 – 05:20 (London Time)
Monday, 31 March 2025 | 23:00 – 00:20 (New York Time)

Session QCNC-11: Invited Papers-1 (Hagoromo 1)

Session Chair: Robert Malaney University of New South Wales, Australia

Joint Optimal Design for Speed and Routing in Maritime Logistics with Quantum Optimization

Vu Phong Pham, Dang Van Huynh, Bradley D. E. McNiven, Berk Canberk, Octavia A. Dobre (Memorial University, Canada), Trung Q. Duong (Edinburgh Napier University, United Kingdom)

Quantum Key Distribution - A Networking Business Model

Miralem Mehic (Klaipeda University, Lithuania), Stefan Rass (Johannes Kepler University Linz, Austria), Sergej Jakovlev, Miroslav Voznak (Klaipeda University, Lithuania)

Combined Quantum and Post-Quantum Security for Earth-Satellite Channels

Anju Rani, Xiaoyu Ai, Aman Gupta, Ravi Singh Adhikari, and Robert Malaney (The University of New South Wales, Australia)

An Architectural Framework in Support of the Quantum Internet

Diego Lopez (Telefonica, Spain), Blanca Lopez (IMDEA Networks, Spain) and Vicente Martin (UPM, Spain)

Tuesday, 1 April 2025 | 13:00 – 14:20 (Tokyo Time)
Tuesday, 1 April 2025 | 04:00 – 05:20 (London Time)
Monday, 31 March 2025 | 23:00 – 00:20 (New York Time)

Session QCNC-12: Quantum Information Networks-4 (Hagoromo 2)

Session Chair: Nageswara Rao, Oak Ridge National Laboratory, USA

Efficient Quantum Conference Key Agreement over Quantum Networks

Samuel Oslovich (TU Delft, QuTech, Netherlands), Md Zakir Hossain, Trevor Thomas, Bing Wang, Walter O. Krawec (University of Connecticut, USA) and Kenneth Goodenough (University of Massachusetts, Amherst, USA)

Quantum Key Distribution over an Encoded Repeater Chain with Sequential Swapping

Javier Rey Dominguez and Mohsen Razavi (University of Leeds, U.K.)

Optimal Resource Requirements for Connected Quantum Sub-networks

Shashank Shekhar, Md Sohel Mondal and Siddhartha Santra (Indian Institute of Technology Bombay, India)

Mi-Co: Models and Algorithms for Cost-efficient Entanglement Distribution in the Quantum Internet

Huayue Gu, Zhouyu Li, Xiaojian Wang (North Carolina State University, USA), Dejun Yang (Colorado School of Mines, USA), Guoliang Xue (Arizona State University, USA) and Ruozhou Yu (North Carolina State University, USA)

Tuesday, 1 April 2025 | 14:50 – 15:50 (Tokyo Time)

Tuesday, 1 April 2025 | 05:50 – 06:50 (London Time)

Tuesday, 1 April 2025 | 00:50 – 01:50 (New York Time)

QCNC-13: Invited Papers-2 (Hagoromo 1)

Session Chair: Laura Ortiz, Universidad Politécnica de Madrid, Spain

Towards Stability and Utility Maximization in Adversarial Quantum Networks under Bandit Feedback

Yu Chen, Longbo Huang (Tsinghua University, China) and John C.S. Lui (The Chinese University of Hong Kong, China)

Co-Design of Network Topology and Qubit Allocation for Distributed Quantum Computing

Jiyao Liu (Temple University, USA), Lei Fan (University of Houston, USA), Yuanxiong Guo (University of Texas at San Antonio, USA), Zhu Han (University of Houston, USA) and Yu Wang (Temple University, USA)

QPLAN: Deep Reinforcement Learning Assisted Quantum Network Planning

Yuhang Gan, Shiyi Ling, Ruilin Zhou, Lucinda Shen and Chen Qian (University of California, Santa Cruz, USA)

Tuesday, 1 April 2025 | 14:50 – 15:50 (Tokyo Time)

Tuesday, 1 April 2025 | 05:50 – 06:50 (London Time)

Tuesday, 1 April 2025 | 00:50 – 01:50 (New York Time)

Session QCNC-14: Quantum Computing and Sensing-3 (Hagoromo 2)

Session Chair: Lorenzo Valentini, University of Bologna, Italy

Quantum Pointwise Convolution: A Flexible and Scalable Approach for Neural Network Enhancement

An Ning (Korea Advanced Institute of Science and Technology, South Korea), Tai-Yue Li (National Synchrotron Radiation Research Center, Taiwan) and Nan-Yow Chen (National Center for High-Performance Computing, Taiwan)

Uncomputing Ancilla Qubits in Quantum Circuits

Ashutosh Tiwari, Ranjani Sundaram, Himanshu Gupta, C R Ramakrishnan and Nengkun Yu (Stony Brook University, USA)

Quantum Ranging with Squeezed States

Bunyamin Kartal (Massachusetts Institute of Technology, USA), Stefano Marano (University of Salerno, Italy), Andrea Conti (University of Ferrara, Italy) and Moe Z. Win (Massachusetts Institute of Technology, USA)

Tuesday, 1 April 2025 | 16:00 – 17:05 (Tokyo Time)

Tuesday, 1 April 2025 | 06:00 – 07:05 (London Time)

Tuesday, 1 April 2025 | 02:00 – 07:05 (New York Time)

Session QCNC-15: [Short Paper] Quantum Information Networks-S2 (Hagoromo 1)

Session Chair: Joaquin Chung, Argonne National Laboratory, USA

A Measurement Device Independent Quantum Key Distribution Protocol in the Service of Three Users

Nikolaos Stefanakos, Georgios Maragkopoulos, Aikaterini Mandilara and Dimitris Syvridis (National and Kapodistrian University of Athens, Greece)

Quantum-Simultaneous Wireless Information and Power Transfer

Nizar Khalfet and Ioannis Krikidis (University of Cyprus, Cyprus)

Problem Specific Communications in Distributed Quantum Computing

Joyanta Basak, Bing Wang and Sanguthevar Rajasekaran (University of Connecticut, USA)

Micius, the World's First Quantum Communication Satellite, was Hackable

Alexander Miller (National University of Singapore, Singapore)

Tuesday, 1 April 2025 | 16:00 – 17:20 (Tokyo Time)

Tuesday, 1 April 2025 | 06:00 – 07:20 (London Time)

Tuesday, 1 April 2025 | 02:00 – 07:20 (New York Time)

Session QCNC-16: [Short Paper] Quantum Computing and Sensing-S2 (Hagoromo 2)

Session Chair: Alexei Ashikhmin, Nokia Bell Labs, USA

Understanding Noise-Adaptive Transpilation Techniques Using the SupermarQ Benchmark

Supasate Vorathamthorn, Muhummud Binhar, Rajchawit Sarochawikassit, Suthep Chanchuphol, and Natchapol Patamawisut (King Mongkut's University of Technology Thonburi, Thailand)

Quantum Kernel-Based Long Short-term Memory for Climate Time-Series Forecasting

Yu-Chao Hsu, Nan-Yow Chen (National Center for High-Performance Computing, Taiwan), Tai-Yu Li (National Synchrotron Radiation Research Center, Taiwan), Po-Heng Lee (Imperial College London, U.K.) and Kuan-Cheng Chen (Imperial College London, U.K.)

Protein Folding and Drug Discovery using Quantum Computing's Grover's Algorithm

Andrew Haverly and Shahram Rahimi (Mississippi State University, USA)

Variational Quantum Circuits for Molecular Classification Using Graph Neural Network

Don Rooson (Merrimack College, USA), Md Rahatul Ashakin (Tekurai, LLC, USA), Rubayat Khan (University of Nebraska Medical Center, USA), Hasiba Mahshed Khan (Tekurai, LLC, USA), Tiffany Khou (Western University of Health Sciences, USA), Maria-Isabel Canasiali (Merrimack College, USA) and Mohammad Rifat Haider (University of Georgia, USA)

Towards Motion Sensing Using Asymmetric Coupled Quantum Dots

Kyle Wright, Roummel Marcia, Michael Scheibner and Boaz Ilan (University of California, Merced, USA)

Main Conference Day 3 (*Time zone: Tokyo Time, UTC+9*)

Wednesday, 2 April 2025

Wednesday, 2 April 2025 | 09:00 – 10:20 (Tokyo Time)

Wednesday, 2 April 2025 | 00:00 – 01:20 (London Time)

Tuesday, 1 April 2025 | 19:00 – 20:20 (New York Time)

Session QCNC-17: Quantum Computing and Sensing-4 (Hagoromo 1)

Session Chair: Alexei Ashikhmin, Nokia Bell Labs, USA

Softer is Better: Tweaking Quantum Dropout to Enhance Quantum Neural Network Trainability

Daniele Lizzio Bosco, Riccardo Romanello, Giuseppe Serra and Carla Piazza (University of Udine, Italy)

The Better Solution Probability Metric: Optimizing QAOA to Outperform its Warm-Start Solution

Sean Feeney, Reuben Tate and Stephan Eidenbenz (Los Alamos National Laboratory, USA)

Hybrid Quantum Algorithms for N-Body Simulations

Sanguthevar Rajasekaran, Priyanshu Agrawal, Ryan Lagasse, Bodhi Chaudhuri and Saeed Najafian (University of Connecticut, USA)

Spider Web-Inspired Quantum Circuit for Autoencoder

Agi Prasetyadi and Masahiro Mambo (Kanazawa University, Japan)

Wednesday, 2 April 2025 | 09:00 – 10:40 (Tokyo Time)

Wednesday, 2 April 2025 | 00:00 – 01:40 (London Time)

Tuesday, 1 April 2025 | 19:00 – 20:40 (New York Time)

Session QCNC-18: Security in the Quantum Age-1 (Hagoromo 2)

Session Chair: Marcel Tiepelt, Karlsruhe Institute of Technology, Germany

Machine Learning for Phase Estimation in Satellite-to-Earth Quantum Communication

Nathan K. Long, Robert Malaney (University of New South Wales, Australia) and Kenneth J. Grant (Defence Science and Technology Group, Australia)

A Novel Slice Error Correction Reconciliation for Continuous-variable Quantum Key Distribution

Lin Zhu, Xue-Qin Jiang, Han Hai, Jisheng Dai (Donghua University, China), Peng Huang (Shanghai Jiao Tong University, China) and Shengyuan Xue (Donghua University, China)

Secure Key Forwarding for Large-Scale Quantum Key Distribution Networks

Nicole Franzoi (Università di Trento, Italy), Stephan Krenn, Thomas Lorünser and Sebastian Ramacher (AIT Austrian Institute of Technology, Austria)

Towards holistic Quantum Communications Infrastructures

Alberto Sebastián-Lombrana (Universidad Politécnica de Madrid, Spain), Hans H. Brunner (Huawei Technologies Duesseldorf GmbH, Germany), Rubén B. Méndez (Universidad Politécnica de Madrid, Spain), Fred Fung (Huawei Technologies Duesseldorf GmbH, Germany), Juan P. Brito (Universidad Politécnica de Madrid, Spain), Momtchil Peev (Huawei Technologies Duesseldorf GmbH, Spain) and Vicente Martin (Universidad Politécnica de Madrid, Spain)

Cascade Error Correction Attack; Exploiting Implicit and Side Channel Information Leakage

Niall Canavan, Ayesha Khalid, and Máire O'Neill (Queen's University Belfast, U.K.)

Wednesday, 2 April 2025 | 10:50 – 11:55 (Tokyo Time)

Wednesday, 2 April 2025 | 01:50 – 02:55 (London Time)

Tuesday, 1 April 2025 | 20:50 – 21:55 (New York Time)

Session QCNC-19: [Short Paper] Quantum Information Networks-S3 (Hagoromo 1)

Session Chair: Nageswara Rao, Oak Ridge National Laboratory, USA

Free-Running Analysis for a Fully-Passive Self-Characterizing Reference-Frame-Independent Quantum Key Distribution Receiver

Massimo Giacomini (Università degli Studi di Padova, Italy), Francesco Santagiustina (University of Padova, Italy), Giuseppe Vallone, Paolo Villoresi and Costantino Agnèsi (University of Padova, Italy)

QuFM: Towards Efficient Quantum Link Fidelity Measurements in Quantum Networks

Ziming Zhao, Tingting Li (Zhejiang University, China) and Zhaoxuan Li (University of Chinese Academy of Sciences, China)

Parity is Not Optimal for Distilling Correlations with Nontrivial Marginals

Syed Affan Aslam, Areej Ilyas and Jibran Rashid (Institute of Business Administration, U.K.)

PRISM: Malta's Quantum Key Distribution Test-bed Network

Noel Farrugia, Eleanor Scerri, Nicholas Frendo, Daniel Bonanno, Zachary Cauchi (Mercury Cybersecurity, Malta), Christian Galea, Johann Briffa (University of Malta, Malta) and André Xuereb (Mercury Cybersecurity, Malta)

Wednesday, 2 April 2025 | 10:50 – 11:55 (Tokyo Time)

Wednesday, 2 April 2025 | 01:50 – 02:55 (London Time)

Tuesday, 1 April 2025 | 20:50 – 21:55 (New York Time)

Session QCNC-20: [Short Paper] Quantum Computing and Sensing-S3 (Hagoromo 2)

Session Chair: Aikaterini Mandilara, National and Kapodistrian University of Athens, Greece

Quantum Annealing for Strategic Meter Placement in Power Distribution Networks

Priyanka Arkalgud Ganeshamurthy, Ferdinanda Ponci and Antonello Monti (RWTH Aachen University, Germany)

Enhancing Classification Accuracy with Quantum Non-Negative Matrix Factorization and Quantum Support Vector Machines

Belkacem Chikhaoui (TELUQ University, Canada)

Programming Variational Quantum Circuits with Quantum-Train Agent

Chen-Yu Liu (National Taiwan University, Taiwan), Samuel Yen-Chi Chen (Wells Fargo, USA), Kuan-Cheng Chen (Imperial College London, U.K.), Wei-Jia Huang (Hon Hai (Foxconn) Research Institute, Taiwan) and Yen-Jui Chang (Chung Yuan Christian University, Taiwan)

Efficient Channel Generation for QCNN based on Multi-Pauli Matrices

Takuma Miwa (Nara Institute of Science and Technology, Japan), Yusuke Oda (LLMC of National Institute of Informatics, Japan), Seiya Kawano (Nara Institute of Science and Technology, Japan) and Koichiro Yoshino (Institute of Science Tokyo, Nara Institute of Science and Technology, Japan)

Wednesday, 2 April 2025 | 13:00 – 14:20 (Tokyo Time)

Wednesday, 2 April 2025 | 04:00 – 05:20 (London Time)

Tuesday, 1 April 2025 | 23:00 – 00:20 (New York Time)

Session QCNC-21: Quantum Computing and Sensing-5 (Hagoromo 1)

Session Chair: Alexei Ashikhmin, Nokia Bell Labs, USA

Impact of Decoding Latency in the Assessment of Quantum Surface Codes Performance

Lorenzo Valentini, Diego Forlivesi and Marco Chiani (University of Bologna, Italy)

Harnessing Quantum-Classical Techniques for Improved Breast Cancer Prediction

Amrita Kundu, Samya Muhuri and Rajesh Kumar (Thapar Institute of Engineering and Technology, India)

Tensor-Based Binary Graph Encoding for Variational Quantum Classifiers

Shiwen An and Konstantinos Slavakis (Institute of Science, Tokyo, Japan)

Quantum Fanout and GHZ States using Spin-exchange Interactions
Stephen Fenner and Rabins Wosti (University of South Carolina, Columbia, USA)

Wednesday, 2 April 2025 | 13:00 – 14:20 (Tokyo Time)

Wednesday, 2 April 2025 | 04:00 – 05:20 (London Time)

Tuesday, 1 April 2025 | 23:00 – 00:20 (New York Time)

Session QCNC-22: Quantum Computing and Sensing-2 (Hagoromo 2)

Session Chair: Aikaterini Mandilara, National and Kapodistrian University of Athens, Greece

QuFrame: A Novel Encoding Ensemble Framework for Quantum Neural Networks

Tingting Li, Ziming Zhao, Liqiang Lu and Jianwei Yin (Zhejiang University, China)

HQC-Bend: A Python Package of Hybrid Quantum-Classical Multi-cuts Benders' Decomposition Algorithm

Zhongqi Zhao, Mingze Li, Lei Fan and Zhu Han (University of Houston, USA)

Towards Classical Software Verification using Quantum Computers

Sebastian Issel, Kilian Tschärke and Pascal Debus (Fraunhofer AISEC, Germany)

Study and Application of QUnfold, an Innovative Quantum Annealing-based Unfolding Tool, using Simulated ATLAS Data

Matteo Franchini, Simone Gasperini, Marco Lorusso, Gianluca Bianco and Valerio Brugnamì (Alma Mater University of Bologna, Italy)

Wednesday, 2 April 2025 | 14:50 – 15:55 (Tokyo Time)

Wednesday, 2 April 2025 | 05:50 – 06:55 (London Time)

Wednesday, 2 April 2025 | 00:50 – 01:55 (New York Time)

Session QCNC-23: [Short Paper] Quantum Computing and Sensing-S4 (Hagoromo 1)

Session Chair: Seng Loke, Deakin University, Australia

Quantum Mean Filter: Features and Issues

Freddy Alejandro Chaurra Gutiérrez, Claudia Feregrino Uribe, Julio César Pérez Sansalvador and Gustavo Rodríguez Gómez (National Institute of Astrophysics, Optics and Electronics, Mexico)

Distributed Quantum Computing in Dynamic Environments: Concept and Challenges

Seng Loke (Deakin University, Australia)

Predicting Heat Plume Temperature and Spatial Location Using Quantum Convolutional Neural Networks

Danyal Maheshwari, Julia Pelzer and Miriam Schulte (University of Stuttgart, Germany)

Quantum Implementation of the Four-Bit Ring Counter

Hassan Hajjdiab (Concordia University, Canada)

Wednesday, 2 April 2025 | 14:50 – 15:55 (Tokyo Time)

Wednesday, 2 April 2025 | 05:50 – 06:55 (London Time)

Wednesday, 2 April 2025 | 00:50 – 01:55 (New York Time)

Session QCNC-24: [Short Paper] Security in the Quantum Age-S2 (Hagoromo 2)

Session Chair: Sebastian Ramacher, AIT Austrian Institute of Technology, Austria

Quantum Code Division Multiple Access based Continuous-Variable Quantum Key Distribution

Shahnoor Ali and Neel Kanth Kundu (Indian Institute of Technology Delhi, India)

Quantum-Safe Technologies Application to Lawful Interception

Antonio Pastor, Laura Dominguez, Diego Lopez (Telefonica Innovacion Digital, Spain), Juan P. Brito, Javier Faba and Laura Ortiz (Universidad Politécnica de Madrid, Spain)

Feasibility of Entanglement - based QKD Protocols with SPDC and QD Sources

Mariia Gumberidze, Radim Filip and Vladyslav C. Usenko (Palacky University Olomouc, Czech)

Authentication of the QKD Classical Channel through Post-Quantum Cryptography in a Multi-site 5G/6G Quantum-Safe Communication Network

Asier Atutxa, Ane Sanz, Eire Salegi, Maider Huarte, Jasone Astorga and Eduardo Jacob (University of the Basque Country (UPV/EHU), Spain)

Wednesday, 2 April 2025 | 16:00 – 16:50 (Tokyo Time)

Wednesday, 2 April 2025 | 07:00 – 07:50 (London Time)

Wednesday, 2 April 2025 | 02:00 – 02:50 (New York Time)

Session QCNC-25: [Short Paper] Quantum Computing and Sensing-S5 (Hagoromo 1)

Session Chair: Belkacem Chikhaoui, TELUQ University, Canada

Hypergraphic Representation for Adaptive Quantum Circuits

Waldemir Cambiucci, Regina M. Silveira and Wilson V. Ruggiero (University of São Paulo, Brazil)

Quantum Local Search for Traveling Salesman Problem with Path-Slicing Strategy

Chen-Yu Liu (National Taiwan University, Taiwan), Hiromichi Matsuyama, Wei-Hao Huang and Yu Yamashiro (Jij Inc., Japan)

Grover's Algorithm for Neural Networks

Andrew Haverly, Shahram Rahimi and Mark Novotny (Mississippi State University, USA)

Wednesday, 2 April 2025 | 16:00 – 16:50 (Tokyo Time)

Wednesday, 2 April 2025 | 07:00 – 07:50 (London Time)

Wednesday, 2 April 2025 | 02:00 – 02:50 (New York Time)

Session QCNC-26: [Short paper] Simulators, Demonstrations, Prototypes and Testbeds-S (Hagoromo 2)

Session Chair: Seng Loke, Deakin University, Australia

An Equivariant Machine Learning Decoder for 3D Toric Codes

Oliver Weiß (fortiss GmbH, Germany) and Evgenii Egorov (University of Amsterdam, Netherlands)

Feasibility of Logical Bell State Generation in Memory Assisted Quantum Networks

Vladlen Galetsky (TUM, Germany), Nilesh Vyas, Alberto Comin (Airbus Central R&T, Germany) and Janis Nötzel (Technical University of Munich (TUM, Germany))

Applications of Hybrid Machine Learning Methods to Large Datasets: A Case Study

Georgios Maragkopoulos, Nikolaos Stefanakos, Aikaterini Mandilara and Dimitris Syvridis (University of Athens, Greece)

Wednesday, 2 April 2025 | 16:50 – 17:00 (Tokyo Time)

Wednesday, 2 April 2025 | 07:50 – 08:00 (London Time)

Wednesday, 2 April 2025 | 02:50 – 03:00 (New York Time)

Closing (Hagoromo 1)