QUEST 2024 Technical Program

(Venue: Centennial Hall, Kyushu University School of Medicine)

Day 1: September 9

9:00 AM - 9:30 AM
Registration and Welcome Coffee

9:30 AM - 9:40 AM **Opening Remarks**

- **Workshop Organizer**

9:40 AM - 10:35 AM

Keynote Address 1: Superconducting Kerr Parametric Oscillators based Bosonic Qubit - A Practical Quantum Information Processing Platform

- **Speaker:** Jaw-Shen Tsai, Tokyo University of Science/RIKEN

10:35 AM - 10:55 AM **Coffee Break**

10:55 AM - 11:50 AM

Keynote Address 2: Classical Electronics to Control Qubits and Correct Errors in Room-temperature and Cryogenic Environments

- **Speaker:** Kazutoshi Kobayashi, Kyoto Institute of Technology

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11:50 AM - 1:00 PM **Lunch Break**

1:00 PM - 3:30 PM **Tutorial Session**

1:00 PM - 1:50 PM

Tutorial 1: When and how we can obtain quantum advantage using early or fully-fledged fault-tolerant quantum computer

- **Speaker:** Keisuke Fujii, Osaka University

1:50 PM - 2:40 PM

Tutorial 2: Superconductor integrated circuit design: Let's start it today

- **Speaker:** Masamitsu Tanaka, Nagoya University

2:40 PM - 3:30 PM

Tutorial 3: Superconductive circuit layout verification tutorial with InductEx tool suite

- **Speaker:** Coenrad Fourie, Stellenbosch University

3:30 PM - 3:45 PM **Afternoon Coffee Break**

3:45 PM - 5:30 PM **Session 1: Device and Circuit (A)**

3:45 PM - 4:10 PM

(Invited) Novel superconducting flux qubits with improved scalability

- **Speaker:** Taro Yamashita, Tohoku University

4:10 PM - 4:35 PM

(Invited) Scaling Control Electronics For Superconducting Qubits

- **Speaker:** Juhwan Yoo, Google Quantum AI

4:35 PM - 5:00 PM

(Invited) Nanocryotrons: devices for readout of superconducting detectors and beyond

- **Speaker:** Reed Foster, Massachusetts Institute of Technology

5:00 PM - 5:25 PM

(Invited) Ultra-Low-Power Qubit Controllers Using Adiabatic Superconductor Logic

- **Speaker:** Takeuchi Naoki, AIST

Day 2: **September 10**

9:00 AM - 9:30 AM
Registration and Welcome Coffee

9:30 AM - 10:25 AM
Keynote Address 3: Low-error, Scalable Quantum Computing with Fluxonium

- **Speaker:** Youngkyu Sung, Atlantic Quantum

10:25 AM - 10:40 AM **Coffee Break**

10:40 AM - 12:20 AM **Session 2: Circuit and Device (B)**

10:40 AM - 11:05 AM

(Invited) High-Temperature Superconductor Digital Electronics

- **Speaker:** Shane Cybart, University of California, Riverside

11:05 AM - 11:30 AM

(Invited) The Josephson balanced comparator as a fab sensor and a testbed for digital circuits

- **Speaker:** Timur Filipov, Hypres

11:30 AM - 11:55 AM

(Invited) Tile-able design of superconducting quantum computers

- **Speaker:** Yutaka Tabuchi, RIKEN

11:55 AM - 12:20 AM

(Invited) Physics-Inspired Device Concepts and the QUEST for Energy Conservative Computing

- **Speaker:** David Ferguson, Northrop Grumman

12:20 AM - 1:20 PM **Lunch Break**

1:20 PM - 3:30 PM **Session 3: Architecture**

1:20 PM - 1:45 PM

(Invited) Efficient compilation and controls for fault-tolerant quantum computers

- **Speaker:** Yasunari Suzuki, NTT

1:45 PM - 2:10 PM

(Invited) Revitalizing Superconducting Electronics: A Renaissance in Machine Learning and Neuromorphic Systems

- **Speaker:** Dilip Vasudevan, Lawrence Berkeley National Laboratory

2:10 PM - 2:35 PM

(Invited) Withstanding the effects of correlated errors in quantum error correction

- **Speaker:** Kevin Miao, Google Quantum AI

2:35 PM - 3:00 PM

(Invited) Clocking SFQ Circuits: Optimizations for High-Performance, Area-Efficiency, and Robustness

- **Speaker:** Peter Bereel, University of Southern California

3:00 PM - 3:25 PM

(Invited) Superconducting Circuits and Pulse Neural Networks

- **Speaker:** Gang Chen, SEMI

3:25 PM - 3:40 PM **Afternoon Coffee Break**

3:40 PM - 5:45 PM **Session 4: Algorithm and Application**

3:40 PM - 4:05 PM

(Invited) How to control quantum dot spin qubits gracefully

- **Speaker:** Takashi Nakajima, RIKEN

4:05 PM - 4:30 PM

(Invited) Transition from NISQ to early FTQC

- **Speaker:** Nobuyuki Yoshioka, University of Tokyo

4:30 PM - 4:55 PM

(Invited) Quantum Computing for Space Plasma Simulations

- **Speaker:** Hayato Higuchi, Kyushu University

4:55 PM - 5:20 PM

(Invited) Towards Better Software Quality in the Era of Quantum Computing

- **Speaker:** Jianjun Zhao, Kyushu University

5:20 PM - 5:45 PM

(Invited) Digital and analog quantum simulation with superconducting quantum processors

- **Speaker:** Amir Karamlou, Google Quantum AI

7:00 PM - 9:00 PM **Dinner (Pay On-Site)**

Day 3: **September 11**

9:00 AM - 9:30 AM
Registration and Welcome Coffee

9:30 AM - 10:25 AM
Keynote Address 4: Ultra-Energy-Efficient Superconductive Logic for Classical and Quantum Applications

- **Speaker:** Nobuyuki Yoshikawa, Yokohama National University

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10:25 AM - 10:40 AM **Coffee Break**

10:40 AM - 12:20 AM **Session 5: Design Automation**

10:40 AM - 11:05 AM

(Invited) Effectively Utilizing JoSIM in Large Scale Circuit Simulation

- **Speaker:** Johannes Delport, Stellenbosch University

11:05 AM - 11:30 AM

(Invited) Design Automation Techniques for Superconducting RSFQ Circuits

- **Speaker:** Xiaochun Ye, ICT

11:30 AM - 11:55 AM

(Invited) Superconductors and CRYO CMOS Together Toward Efficient HPC

- **Speaker:** Jamil Kawa, Synopsys

11:55 AM - 12:20 AM

(Invited) Technology-aware logic synthesis for superconducting electronics

- **Speaker:** Alessandro Tempia Calvino, EPFL

12:20 AM - 1:30 PM **Lunch Break**

1:30 PM - 3:35 PM **Session 6: Fabrication**

1:30 PM - 1:55 PM

(Invited) Several directions of improvement for superconducting digital circuit fabrication process

- **Speaker:** Mutsuo Hidaka, AIST

1:55 PM - 2:20 PM

(Invited) Development of Multi-Layer Fabrication Process for Superconducting Integrated Digital Circuits

- **Speaker:** Liliang Ying, SIMIT

2:20 PM - 2:45 PM

(Invited) Recent FLUXONICS technologies and application examples

- **Speaker:** Ronny Stolz, Leibniz IPHT

2:45 PM - 3:10 PM

(Invited) Advancements in Reciprocal Quantum Logic Fabrication Processes

- **Speaker:** Zachary Keane, Northrop Grumman

3:10 PM - 3:35 PM

(Invited) Superconducting Devices and Circuits at 300 mm Wafer Scale

- **Speaker:** Satyavolu ‘Pops’ Papa Rao, NY CREATES

3:35 PM - 3:50 PM **Afternoon Coffee Break**

3:50 PM - 4:00 PM	**Closing Remarks**