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## ISEC 2019 Co-Sponsors



*Advancing Technology  
for Humanity*



## Organizing Sponsors



# Welcome Message

## Welcome to the 17th International Superconductive Electronics Conference, ISEC 2019, to be held July 28 – August 1, 2019 in Riverside, California

The 17th meeting of the International Superconductive Electronics Conference (ISEC 2019) will be held in Riverside, California, a historical agricultural community in the Inland Empire of Southern California, and home to the University of California at Riverside, conveniently located with respect to Los Angeles, Orange County, and San Diego County.

ISEC 2019 will be a four-day conference bringing together leaders of the research, university, industrial, military and commercial communities from around the world to discuss progress and challenges in the field of superconductive electronics. The ISEC 2019 program committee, led by Prof. Shane Cybart, is preparing an exciting technical program focusing on the newest results, trends, and ideas in superconductive electronics. The conference covers many rapidly developing areas such as Quantum Computing, SQUIDs and SQUID-array circuits and systems, energy-efficient mixed signal circuits, digital and memory circuits, detectors, novel superconducting devices, and other new topical research results. The sessions are organized in a single, non-parallel track featuring keynote, distinguished, invited, and contributed talks and posters from about 200 anticipated attendees from many countries. Industrial and technological applications will be showcased in a dedicated exhibition area.

The University of California, Riverside has organized a two-day Summer School on the fundamentals of superconductive electronics and its applications immediately preceding ISEC. Experts in theory, experiment, and application of qubits, SQUIDs, detectors, digital circuits and metrology will enlighten participants on these topics.

The social program will include a Welcome Reception on Sunday night, a Banquet Dinner at the historic Mission Inn on Wednesday night, and a Reception at the March Field Air Museum on Monday evening.

ISEC has established itself as the leading biennial meeting focusing on superconductive electronics. The first ISEC was held in 1987 in Tokyo, Japan. It was followed by meetings again in Tokyo (1989), then in Glasgow (Scotland, 1991), Boulder (USA, 1993), Nagoya (Japan, 1995), Berlin (Germany, 1997), Berkeley (USA, 1999), Osaka (Japan, 2001), Sydney (Australia, 2003), Noordwijkerhout (the Netherlands, 2005), Washington (USA, 2007), Fukuoka (Japan, 2009), Den Haag (the Netherlands, 2011), Boston (Massachusetts, 2013), Nagoya (Japan, 2015), and most recently in Sorrento (Italy, 2017). ISEC 2019 will be a fully sponsored IEEE conference supported by the IEEE Council on Superconductivity led by Dr. Bruce Strauss. This raises the profile of the conference and allows presenters to advantage of rapid and archival publication opportunities that IEEE provides. In addition to the traditional non-copyrighted ISEC Extended Abstract publication to be distributed at the conference, presenters will be able to publish their extended abstracts as part of a peer-reviewed proceedings available via IEEE Xplore and indexed by Scopus, Google Scholar and Thomson Reuter. Furthermore, extended abstract authors will be invited to prepare and submit an expanded full paper for publication in a special issue of the IEEE Transactions on Applied Superconductivity dedicated to ISEC

On behalf of the ISEC 2019 organizing committee, the IEEE Council on Superconductivity, the University of California at Riverside, and the city of Riverside, I welcome all of the participants to ISEC 2019. Save the date, we look forward to meeting you in Riverside!

**John Spargo, Chair of ISEC 2019**

# General Information

## Conference Venue:

The 17th International Superconductive Electronics Conference, ISEC 2019, will be held from July 28 – August 1 at the Riverside Convention Center. The new Riverside Convention Center has made a grand return with an expanded exhibit hall, additional ballrooms and meeting rooms, and a host of other amenities.

The Riverside Convention Center  
3750 University Avenue, Riverside, CA. 92501  
Phone: (951) 335-7040

## Conference Host Hotel:

The Mission Inn Hotel & Spa  
3649 Mission Inn Ave Riverside CA 92501  
(Located directly across the street from the hotel)

Framed by its breathtaking Spanish Mission-style architecture, The Mission Inn Hotel & Spa welcomes guests to a destination where rich history and classic elegance exist in perfect balance with contemporary luxury and comfort.

## Registration Hours:

Sunday, July 28<sup>th</sup>: 14:00 -17:00  
Monday, July 29<sup>th</sup>: 08:00 – 17:30  
Tuesday, July 30<sup>th</sup>: 08:00 – 17:30  
Wednesday, July 31<sup>st</sup>: 08:00 – 17:30  
Thursday, August 1<sup>st</sup>: 08:30 – 17:00

## Speaker's Slide Upload Hours:

Authors may upload or test their presentations Monday, July 28 through Thursday, August 1 during the following times,  
08:30 – 09:00  
11:45 – 14:00  
16:00 – 17:00

## Internet Access:

Internet will be available to all Registered Attendees.

## Conference App:

Download the ISEC 2019 app to enhance your Conference Experience. The app is available for Android, iOS, and Windows Phones. Search for "Whova" to download the app, then sync the IEEE ISEC 2019 schedule.

**Coffee Breaks:**

Coffee, tea, soft drinks and small snacks will be provided during the coffee breaks twice a day on the first floor, near the poster session and exhibition areas. Badge is required to have access to coffee breaks.

**Security and Insurance:**

The conference organization cannot accept liability for personal injuries, or for loss of, or damage to properties belonging to conference attendees or accompanying persons, either during or as a result of the conference.

Participants are asked not to leave their belongings unattended.

**Conference Areas:**

Registration Desk: Concourse 201

Exhibits, Posters, and Breaks: Exhibit Hall D&C

All Oral Session: Raincross Ballroom

## Exhibitors



Lake Shore Cryotronics

<https://www.lakeshore.com/home>



attocube systems AG

<https://www.attocube.com/en>



Oxford Instruments NanoScience

<https://www.nanoscience.com/>



CRAVITY

<https://unit.aist.go.jp/neri/cravity/ja/index.html>



Quantum Design

<https://www.qdusa.com/>



Bluefors Oy

<https://bluefors.com/>

## Patrons



Summer School Patron:

Out of the Fog Research LLC

<https://outofthefogresearch.com/>

"Out of the Fog Research was founded in 2004 to develop technology and manufacture RF products enabled by cryogenics and thin-film superconductor technology for military and intelligence end-user customers."

# Organizing Committee

## General Chair:

John Spargo  
Northrop Grumman

## Program Chair:

Shane Cybart  
Department of Mechanical Engineering Materials Science  
and Engineering: University of California Riverside

## Finance Chair:

Joshua Strong

## Local Committee:

George Kerber  
Alan Kleinsasser

## Tutorial Chair:

Ethan Cho

## Exhibits/Travel Support Chair:

Igor Vernik  
SeeQC, Inc.

# International Advisory Committee

Jian Chen

Masataka Ohkubo

John Clarke

Thomas Ortlepp

Dennis Crete

Niels Pedersen

Shane Cybart

Giampiero Pepe

Paul Dresselhaus

John Przybysz

Cathy Foley

Horst Rogalla

Coenrad Fourie

Paul Seidel

Akira Fujimaki

Oleg Snigirev

Yong Ho Lee

John Spargo

George Kerber

Saburo Tanaka

Alan Kleinsasser

Masayoshi Tonouchi

Donald Miller

Elie Track

Oleg Mukhanov

Dag Winkler

Yasanobu Nakamura

Peiheng Wu

Marty Nisenoff

Nobuyuki Yoshikawa



# Program Committee

**Thilo Bauch** - Chalmers University of Technology Sweden

**Matt Bell** - University of Massachusetts Boston USA

**Sam Benz** - National Institute of Standards and Technology (NIST) USA

**Karl Berggren** - Massachusetts Institute of Technology USA

**Stuart Berkowitz** - Out of the Fog Research USA

**Jian Chen** - Nanjing University China

**Sergey Cherednichenko** - Chalmers University of Technology Sweden

**Ethan Cho** - UC Riverside USA

**John Clarke** - UC Berkeley USA

**Daniel Cunnane** - Jet Propulsion Laboratory USA

**Bob Fagaly** - Honeywell INC. USA

**Cathy Foley** - Commonwealth Scientific and Industrial Research Organization (CSIRO) Australia

**Akira Fujimaki** - Nagoya University Japan

**Scott Holmes** - IEEE Council on Superconductivity USA

**Emile Hoskinson** - DWave Systems Canada

**Risto Ilmonemi** - Aalto University Finland

**Dieter Koelle** - Tubingen University Germany

**Rainer Körber** - Physikalisch-Technische Bundesanstalt (PTB) Germany

**Anna Leese** - SPAWAR USA

**Hao Li** - UC Riverside USA

**Don Miller** - Northrup Grumman USA

**Doug Paulson** - Tristan Technologies INC. USA

**Britton Plourde** - Syracuse University USA

**Jason Robinson** - Cambridge University UK

**Paul Seidel** - Jena University Germany

**Enrico Silva** - Università Degli Studi Roma Tre Italy

**Saburo Tanaka** - Toyohashi University Japan

**Hirotaek Terai** - National Institute of Information and Communications Technology (NICT) Japan

**Masahiro Ukibe** - National Institute of Advanced Industrial Science and Technology (AIST) Japan

**Zhen Wang** - Shanghai Institute of Microsystem and Information Technology (SIMIT) China

**Harold Weinstock** - AFOSR (retired) USA

**Dr. Tusyoshi Yamamoto** - NEC Japan

Keynote Presentations: 60 Minutes  
Distinguished Presentations: 35 Minutes  
Invited Presentations: 25 Minutes  
Contributed Presentations: 15 Minutes

## Program at a Glance

	Sunday, July 28	Monday, July 29	Tuesday, July 30	Wednesday, July 31	Thursday, August 1
08:00		Registration	Registration	Registration	Registration
09:00		Keynote Speaker: John Martinis	Keynote Speaker: Nobuyuki Yoshikawa	Keynote Speaker: SaeWoo Nam	Keynote Speaker: Dr. Ronny Stolz
10:00		Quantum	Digital	Detectors	SQUIDs
12:00		Lunch & Posters	Lunch & Posters	Lunch & Posters	Lunch
14:00	Registration	SQUIDs	Fabrication	Digital	Novel Devices
15:00				Reversible	
16:00				Posters	
17:00	RF	Digital	Quantum		
18:00		Metrology			
19:00	Welcome Reception	March ARB Reception		Banquet Dinner	
20:00					
22:00					

\*\*Authors presenting a poster should have their poster set up before 12:00 on the day of presentation and taken down by 18:00 on the same day. We ask that authors are available by their poster for a minimum of 30 minutes during the Lunch & Poster Session (12:00-14:00) and for the full hour during the Poster Session (16:00-17:00) to answer questions.

# Keynote Speaker



## John Martinis

Research Scientist and Professor of Physics  
Google and UCSB

### Quantum Supremacy: Checking a Quantum Computer With a Classical Supercomputer

**Abstract:** As microelectronics technology nears the end of exponential growth over time, known as Moore's law, there is a renewed interest in new computing paradigms such as quantum computing. A key step in the roadmap to build a scientifically or commercially useful quantum computer will be to demonstrate its exponentially growing computing power. I will explain how a 7 by 7 array of superconducting xmon qubits with nearest-neighbor coupling, and with programmable single- and two-qubit gate with errors of about 0.2%, can execute a modest depth quantum computation that fully entangles the 49 qubits. Sampling of the resulting output can be checked against a classical simulation to demonstrate proper operation of the quantum computer and compare its system error rate with predictions. With a computation space of  $2^{49} = 5 \times 10^{14}$  states, the quantum computation can only be checked using the biggest supercomputers. I will show experimental data towards this demonstration from a 9 qubit adjustable-coupler "gmon" device, which implements the basic sampling algorithm of quantum supremacy for a computational (Hilbert) space of about 500. We have begun testing of the quantum supremacy chip.

**Bio:** John Martinis pioneered research on superconducting quantum-bits as a graduate student at U.C. Berkeley. He has worked at CEA France, NIST Boulder, and UC Santa Barbara. In 2014 he was awarded the London Prize for low-temperature physics research on superconducting qubits. In 2014 he joined the Google quantum-AI team, and now heads an effort to build a useful quantum computer.

# Keynote Speakers



## Dr. Ronny Stolz

Head of the Research group Magnetometry, Head of the Radiometry group in the Deptm. of Quantum detection  
Leibniz Institute of Photonic Technology

### **SQUIDS - From Ideas to Instruments and Applications**

**Abstract:** Still after more than 5 decades after the invention of Superconducting Quantum Interference Devices (SQUIDs), they are driving research as an enabling technology and lead to emerging applications due to their unique properties. This presentation will not provide an exhaustive review on the

background, theory and working principles of SQUID sensors and the Josephson effects, but will review the key facets of SQUID design, fabrication, readout circuitry and operation. In terms of fabrication technology, a short excursus will be provided on the differences of low and high temperature SQUIDs, new developments, and specific aspects in their readout circuitry. There is a variety of SQUID readout electronics which enable to use SQUIDs in a number of applications with demanding properties such as bandwidths of more than 100 MHz, exceptional slew rate and dynamic range without compromises on the usable resolution even at very low frequencies. Some examples will be introduced and discussed in view of specific applications.

Of course there is no review article without the fascinating insights into applications of SQUIDs. We will shortly review a number of areas such as non-destructive evaluation, biomagnetic, NMR and geophysical measurements as well as emerging applications in detector physics as high frequency amplifiers and multiplexing circuits.

**Bio:** Research Interests/Areas of Expertise: Photonic magnetometers and applications, Superconducting Quantum Interference Detectors (SQUIDs) and applications, Magnetic and electromagnetic sensors and methods for near surface geophysics, Supercond. radiation detectors, Macroscopic quantum systems, Ultra-precision magnetometry, Superconducting materials and technologies, Processing of data acquired with magnetic and electromagnetic sensors. Publications: More than 165 scientific papers and >100 of technical reports and non-scientific works, 3 book chapters and 4 patent families.

# Keynote Speakers



**Nobuyuki Yoshikawa**  
Professor  
Yokohama National University

## **Superconducting computing: present status and perspectives**

**Abstract:** Recent rapid growth in high-performance processor applications, such as AI and cryptocurrency, ultimately enhances the demand of more energy-efficient computing technologies, which would not be achievable by the CMOS technology nearing the end of Moore's law. Superconducting computing based on

Boolean logic is thought to be the most promising candidate as post-CMOS computing in terms of performance and energy efficiency. A distinguished feature in the superconducting computing is the availability of two unique logic styles: one is high-speed single-flux-quantum logic and the other is energy-efficient adiabatic logic. After reviewing the present research status in superconducting computing, this talk will present a perspective on energy-efficient superconducting computing based on adiabatic quantum flux parametron (QFP) with introducing new circuit technologies, including EDA tools, a direct-coupled QFP, a reversible QFP, three-dimensional integration and hybridization with CMOS memories. A roadmap toward the realization of superconducting computing will be discussed.

**Bio:** Nobuyuki Yoshikawa received the Ph.D. degrees in electrical and computer engineering from Yokohama National University, Japan in 1989. Currently he is a professor of the Department of Electrical and Computer Engineering, Yokohama National University. He is also a chair of the Superconducting Electronics Committee of the Japan Society for the Promotion of Science (JSPS) and the Technical Committee on Metal and Ceramics of the Institute of Electrical Engineering of Japan. His research interests include superconductive devices and their application in digital and analog circuits. He is also interested in single-electron-tunneling devices, quantum computing devices, and cryo-CMOS devices. He has led the Superconductivity Electronics Group in Yokohama National University. He is an expert in the field of superconductivity electronics and the foremost active researcher of superconducting logic. He has published more than sixty articles on single-flux-quantum (SFQ) and adiabatic quantum flux parametron (AQFP) circuits or closely related topics in the past five years alone.

# Keynote Speakers



**SaeWoo Nam**  
NIST

## **“Super” Neuromorphic Computing with Photonic and Superconducting Devices**

**Abstract:** We present a hardware platform combining integrated photonics with superconducting electronics for large-scale “super” neuromorphic computing. It is widely recognized that neural networks are effective at providing solutions to problems that are difficult to solve with conventional computational architectures and algorithms. Today, implementation of complex neural networks

in dedicated hardware is an active field both in industry and academia. We believe a new approach to is required to implement neuromorphic hardware roughly equivalent to the brain in numbers of neurons and level of interconnectivity. I will describe our progress towards building a superconducting optoelectronic network of devices that uses semiconductor devices and “photons” for communications and “superconducting electronics” for local computation to implement a spiking neural network that has the potential to be scaled to billions of neurons each directly connected to ~10,000 other neurons.

**Bio:** Dr. Sae Woo Nam attended the Massachusetts Institute of Technology, where he received a degree in Physics and a degree in Electrical Engineering in 1991. He did his graduate studies at Stanford University where he received two degrees in physics: M.S. (1998) and Ph.D. (1998). His thesis research focused on the development of large cryogenic detectors for direct detection of dark matter particles using superconducting transition-edge sensors for the Cryogenic Dark Matter Search experiment (CDMS). Following his degree, he was awarded an NRC Postdoctoral Fellowship at NIST to continue work on advanced applications of superconducting transition-edge sensor (TES) based detectors. The applications have included development of a high-energy resolution x-ray detector system which is being commercialized and the development of an advanced detector readout scheme that will be used in next generation ground-based sub-mm telescopes (e.g. SCUBA2). He was hired full time at NIST in 2001 to continue this and other advanced metrology work. He has been involved (both at Stanford and NIST) with the first demonstration of using TES sensors to directly detect optical photons, the first use of a TES optical photon sensor for astronomical observations, and the first use of TES detectors for photon number resolving detection in weak pulses of light at telecommunication and optical wavelengths. Recently, he has participated in the development of a superconducting qubit based on large area Josephson junctions.

Dr. Sae Woo Nam received a 2002 PECASE (Presidential Early Career Award for Scientists and Engineers) for work on advanced photon detectors and contributions to the field of primary thermometry using Johnson noise. Dr. Nam was also recognized in 2003 as one of the “Brilliant 10” by Popular Science magazine.

# Distinguished Speakers



**Dr. Keiichi Tanabe**  
President of Superconducting  
Sensing Technology  
Research Association  
(SUSTERA)

## **Evolution of HTS Josephson junctions and their application at ISTEK and SUSTERA**

The evolution of HTS Josephson junction technology and its application during the last over twenty years is reviewed, mostly focusing on that at ISTEK and SUSTERA. The fabrication technology of oxide multilayer and ramp-edge Josephson junctions was much advanced during the decade from 1995 to 2005 to develop HTS single flux quantum (SFQ) devices. Although the development of SFQ devices resulted in only demonstration of small-scale circuits and a sampler system mainly due to a rather large critical current spread of HTS Josephson junctions, the developed multilayer and the junction technology was applied to fabrication of multilayer HTS SQUIDs with high resistance to external magnetic field. Using these HTS SQUIDs, a variety of systems, in particular, those for field use such as TEM systems for exploration or monitoring of natural resources and a nondestructive testing system for infrastructure have been developed and demonstrated. HTS SQUIDs can be now stably operated in various fields, for example, on the ground, in a borehole, and on an expressway. The application field of HTS SQUIDs is expected to further expand in the near future.



**Arnold Silver**  
Retired TRW Technical  
Fellow

## **The History of SQUIDs Abstract**

The SQUID in its various forms has been a mainstay in many application arenas for more than 50 years. This presentation will concentrate on the unique discovery and development of SQUIDs at the Ford Motor Company in the 1960's from a first-person perspective.

The presentation will include:

Discussion of critical prior developments that led to the first realization of macroscopic quantum interference in superconductors

Experiments leading to the development of dc, rf, and resistive SQUIDs

Experimental technologies available at that time (in contrast to today)

Innovative improvement and expansion of SQUID technology since the 1960's



**Oleg Mukhanov**  
CTO, SeeQC, Inc.

## Single Flux Quantum Logic for Digital Applications

It took about twenty years for superconducting single flux quantum (SFQ) digital electronics to progress from the invention, initial proof-principle experiments to the first application system of a practical significance. Rapid Single Flux quantum (RSFQ) logic was introduced in mid-80s as an alternative to then dominant superconducting latching logic and became the main digital and mixed-signal technology by mid-90s. In search for the practical applications, it went through multitudes of projects and attempts to solve real-world problems and find application niches to compete with omnipotent CMOS in heyday of Moore's law. By mid-00s, this was successfully achieved for mixed-signal applications by riding on the superior RSFQ clock speed, quantum properties of superconducting Josephson circuits, and finding a solution for interfacing cryogenic low-power, fast RSFQ electronics with higher power, much slower room-temperature electronic environment. In recent years, CMOS started to lose its unquestionable application luster opening new opportunities for superconducting electronics. Achieving the highest energy-efficiency for high-end computing such as supercomputers and data centers became the priority. This triggered the development of several post-RSFQ logic families with significantly higher energy efficiency. The advent of quantum computing and quantum sensors opened a new application field in a classical infrastructure electronics capable of operating at cryogenic temperatures in a close proximity to quantum circuits. Here, the inherent strengths of SFQ logic including high-speed, low-power, and cryogenic operation offer a significant advantage over other technologies.



# Invited Speakers

**Steve Anlage**

University of Maryland

**Peter Beerel**

USC

**Jim Booth**

National Institute of Standards and  
Technology

**Mustafa Celik**

Hypres

**Olivia Chen**

Yokohama National University

**Sherry Cho**

Stanford Linear Accelerator SLAC

**Jia Du**

Commonwealth Scientific and Industrial  
Research Organisation

**Eric Fried**

Rigetti

**Francesco Giazotto**

NEST Istituto Nanoscienze-CNR & Scuola  
Normale Superiore

**Antonio Corcoles**

IBM

**Mutsuo Hidaka**

AIST

**Sebastian Kempf**

Heidelberg

**Dieter Koelle**

University of Tübingen

**Rainer Körber**

PTB Germany

**Eric Ladizinsky**

D-Wave Systems

**Ed Leonard**

Northrop Grumman

**Thomas Orllepp**

CiS

**Kevin Osborn**

LPS

**Jie Ren**

Shanghai Institute of Microsystem and  
Information Technology

**Joel Strand**

Northrop Grumman

**Hiroataka Terai**

National Institute of Information and  
Communications Technology

**Heqing Wang**

SIMIT

**Paul Warburton**

University College London

**Dag Winkler**

Chalmers

**Emma Wollman**

Jet Propulsion Laboratory

**PeiHeng Wu**

Nanjing University

**Qikun Xue**

Tsinghua University

**Jonilyn Yoder**

MIT Lincoln Labs

# Social Events



## **Welcome Reception at The Riverside Convention Center**

In the Plaza

Sunday, July 28<sup>th</sup>

19:00 – 22:00



## **March Field Air Museum Reception**

In Hangar 2

Monday, July 29<sup>th</sup>

19:00 – 22:00



## **ISEC Banquet Dinner at The Mission Inn Hotel & Spa**

In the Galleria & Atrio

Wednesday, July 31<sup>st</sup>

19:00 – 22:00

# Technical Schedule: Sunday, July 28

14:00 - 17:00

**Registration**

**Room:** Concourse 201

18:00 - 20:00

**Welcome Reception**

**Room:** Riverside Convention Center – Plaza

# Technical Schedule: Monday, July 29

8:00 - 17:30

## Registration

Room: Concourse 201

9:00 - 10:00

## Keynote Speaker: John Martinis

Room: Raincross Ballroom

10:00 - 12:00

## Quantum

Room: Raincross Ballroom

Session Chair: John Clarke (UC Berkeley, USA)

## INVITED: High Coherence Quantum Annealing and Fast, High-Fidelity Flux Qubit Readout

Joel Strand (Northrop Grumman Corporation, USA)

## Assessing the Influence of Broadband Instrumentation Noise on Parametrically Modulated Superconducting Qubits

Eric Schuyler Fried (Rigetti Computing, USA)

Prasahnt Sivarajah (Rigetti Computing, USA)

## Error mitigation techniques for quantum computation with noisy superconducting qubits

Antonio Corcoles (IBM, USA)

## INVITED: TBD

Eric Ladizinsky (D-Wave Systems)

12:00 - 14:00

## Lunch and Posters

Room: Exhibit Hall C&D

14:00 - 16:00

## SQUIDs

Room: Raincross Ballroom

Session Chair: John Spargo (Northrop Grumman Corporation, USA)

## DISTINGUISHED: The History of SQUIDs Abstract

Arnold Silver (Retired TRW Technical Fellow)

## Fully Integrated High Tc DC SQUID Magnetometers for Advanced Geophysical Application

Leonie Lina Kaczmarek (Leibniz IPHT, Germany)

Rob IJsselsteijn (Supracon AG, Germany)

Vyacheslav Zakosarenko (Leibniz IPHT & Supracon AG, Korea)

Andreas Chwala (Leibniz IPHT, Germany)

Matthias Schmelz (Leibniz IPHT, Germany)

Matthias Meyer (Supracon AG, Germany)

Ronny Stolz (Leibniz IPHT, Germany)

### **Improving high-Tc SQUID magnetometers for on-scalp MEG with inductively coupled flux transformers**

Silvia Ruffieux and Christoph Pfeiffer (Chalmers University of Technology, Sweden)  
Maxim Chukharkin (Chalmers Industriteknik, Sweden)  
Alexei Kalaboukhov (Chalmers University of Technology, Sweden)  
Minshu Xie (Chalmers University of Technology, Sweden)  
Edoardo Trbaldo (Chalmers University of Technology, Sweden)  
Floriana Lombardi (Chalmers University of Technology, Sweden)  
Thilo Bauch (Chalmers University of Technology, Sweden)  
Justin Schneiderman (Sahlgrenska Academy, University of Gothenburg, Sweden)  
Dag RW Winkler (Chalmers University of Technology, Sweden)

### **Magnetoresistance of Step Edge YBCO SQUID arrays**

Marcio C de Andrade (NIWC Pacific, USA)  
Michael O'Brien (NIWC Pacific, USA)  
Susan Berggren (NIWC Pacific, USA)  
Milton Torikachvili (San Diego State University, USA)  
Kyle Sundqvist (San Diego State University, USA)  
Shannon Kasa (NIWC Pacific, USA)

### **Development of Metallic Contaminant Detection System Using High-Tc RF SQUIDs for Li-ion Battery Slurry**

Saburo Tanaka (Toyohashi University of Technology, Japan)  
Masaru Sagawa (Toyohashi University of Technology, Japan)  
Kanji Hayashi (Toyohashi University of Technology, Japan)  
Takeyoshi Ohtani (Toyohashi University of Technology, Japan)

### **Grooved Dayem Bridges as novel cuprate HTS weak links for SQUID applications**

Edoardo Trbaldo(Chalmers University of Technology, Sweden)  
Christoph Pfeiffer (Chalmers University of Technology, Sweden)  
Eric Andersson (Chalmers University of Technology, Sweden)  
Riccardo Arpaia (Chalmers University of Technology, Sweden)  
Alexei Kalaboukhov (Chalmers University of Technology, Sweden)  
Dag RW Winkler (Chalmers University of Technology, Sweden)  
Floriana Lombardi (Chalmers University of Technology, Sweden)  
Thilo Bauch (Chalmers University of Technology, Sweden)

### **YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-δ</sub> Nano-SQUIDs Fabricated by Focused Helium Ion Beam Direct Writing**

Hao Li (University of California, Riverside, USA)  
Han Cai (University of California, Riverside, USA)  
Ethan Cho (University of California, Riverside, USA)  
Shane A Cybart (University of California Riverside, USA)

### **INVITED: YBCO and Nb nanoSQUIDs for the investigation of magnetization reversal of individual magnetic nanoparticles**

Dieter Koelle (Universität Tübingen, Germany)

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16:00 - 17:00

#### **Posters**

**Room:** Exhibit Hall C&D

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### **1. Magnetic Josephson junctions for adiabatic superconductor logics**

Igor Soloviev (Lomonosov Moscow State University, Russia)

## **2. A Statistical Static Timing Analysis Tool for Superconducting Single-Flux-Quantum Circuits**

Bo Zhang (University of Southern California, USA)  
Fangzhou Wang (University of Southern California, USA)  
Sandeep Gupta (University of Southern California, USA)  
Massoud Pedram (University of Southern California, USA)

## **3. Reducing the Maximum Length of Connections in Single Flux Quantum Circuits During Routing**

Ting-Ru Lin (University of Southern California, USA)  
Massoud Pedram (University of Southern California, USA)

## **4. Design and Implementation of Compact Register Files Using Adiabatic Quantum Flux Parametron Logic**

Tomohiro Tamura (Japan, Japan)  
Naoki Takeuchi (Japan, Japan)  
Christopher L Ayala (Japan, Japan)  
Yuki Yamanashi (Japan, Japan)  
Nobuyuki Yoshikawa (Yokohama National University, Japan)

## **5. Investigation of the effects of $1/f$ noise on superconducting circuits**

Yuske Tsuna (Yokohama National University, Japan)  
Yuki Yamanashi (Yokohama National University, Japan)  
Nobuyuki Yoshikawa (Yokohama National University, Japan)

## **6. AQFPTX: Adiabatic Quantum-Flux-Parametron Timing eXtraction Tool**

Christopher L Ayala (Yokohama National University, Japan)  
Olivia Chen (Yokohama National University, Japan)  
Nobuyuki Yoshikawa (Yokohama National University, Japan)

## **7. Optimization of Al and Nb etching parameters in fabrication of Nb/Al-AIOx/Nb superconducting integrated circuit**

Wanning Xu (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)  
Yu Wu (Shanghai Institute of Microsystem and Information Technology & ShanghaiTech University, P.R. China)  
Hua Jin (Shanghai Institute of Microsystem and Information Technology, P.R. China)  
Liliang Ying (Shanghai Institute of Microsystem and Information Technology, P.R. China)  
Jie Ren (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Science, P.R. China)  
Wei Peng (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)  
Zhen Wang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

## **8. A New Graphical Interface Software for simulating Josephson-based superconducting digital circuits**

Sasan Razmkhah (Université Savoie Mont Blanc & CNRS, France)  
Pascal Febvre (Université Savoie Mont Blanc, France)

## **9. A Novel RSFQ Design of Full Adder as Single Stage Gate**

Haolin Cong (University of Southern California, USA)  
Naveen K Katam (University of Southern California, USA)  
Massoud Pedram (University of Southern California, USA)

## **10. Study of Inductive and Capacitive Coupling Pulse Transfer Circuits for RSFQ Serial Biasing**

Haolin Cong (University of Southern California, USA)

### **11. SFQ Circuit Design Method and Tools with Application to Engineering Education**

Luyolo Radebe (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

Lieze Schindler (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

Coenrad Fourie (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

### **12. Design of Datapath Circuits for a Bit-Parallel 8-bit RSFQ Microprocessor**

Pei-Yao Qu (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Guang-Ming Tang (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Xiaochun Ye (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Dongrui Fan (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Zhimin Zhang (Institute of Computing Technology, Chinese Academy of Science, P.R. China)

Ninghui Sun (Doctor, P.R. China)

Xi-Zhu Peng (University of Electronic Science and Technology, P.R. China)

### **13. Improved Transmission Line Parameter Calculation through TCAD Process Modeling for Superconductor Integrated Circuit Interconnects**

Heinrich Herbst (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

Paul Le Roux (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

Kyle Jackman (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

Coenrad Fourie (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

### **14. Theoretical and Experimental Characterization of Fundamental Superconducting Flux Qubit in Quantum Machine Learning**

Daisuke Saida (MDR Inc., Japan)

Yuki Yamanashi (Yokohama National University, Japan)

Narii Watase (MDR Inc., Japan)

### **15. Determining Microwave Dissipation of Josephson Junction with Resonance Activation at Bifurcation Regime**

Hengjie Chen (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences & University of Chinese Academy of Sciences, P.R. China)

### **16. Superconductivity for power applications and sensing from an electric power supply perspective**

Robert Ross (Technical University Delft & IWO - Institute for Science and Development, The Netherlands)

### **17. Fabrication and Characteristics of NbN SQIF based on NbN/AlN/NbN Josephson junctions**

Huiwu Wang (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Qiyu Zhang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

Xin Tang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

Zhen Wang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

### **18. Computational Analysis of Defect Signals of All-Round Pipe Inspection using HTS-SQUID-based Guided Wave Testing**

Azuma Yuki (Kindai University, Japan)

Hatsukade Yoshimi (Kindai University, Japan)

### **19. Multispectral superconducting nanowire single photon detector**

Hao Li (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, P.R. China)

Heqing Wang (SIMIT, CAS, P.R. China)

Lixing You (SIMIT, CAS, P.R. China)

Peng Hu (SIMIT, CAS, P.R. China)

Weijun Zhang (SIMIT, CAS, P.R. China)

Zhen Wang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

Xiaoming Xie (Shanghai Institute of Microsystem and Information Technology, P.R. China)

### **20. Helium-ion-irradiated NbN superconducting nanowire single-photon detector**

Weijun Zhang (SIMIT, CAS, P.R. China)

Xingqu Sun (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Lixing You (SIMIT, CAS, P.R. China)

Hao Huang (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Xin Ou (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Guangzhao Xu (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Hao Li (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, P.R. China)

Zhen Wang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

Xiaoming Xie (Shanghai Institute of Microsystem and Information Technology, P.R. China)

### **21. Fabrication and testing of 1024-pixel NbTiN Superconducting Nanowire Single-photon Detector Array**

Masahiro Yabuno (National Institute of Information and Communications Technology, Japan)

Shigeyuki Miyajima (National Institute of Information and Communications Technology, Japan)

Shigehito Miki (National Institute of Information and Communications Technology, Japan)

Hiroataka Terai (National Institute of Information and Communications Technology, Japan)

### **22. Scalable readout circuits for superconducting nanowire single-photon detectors using adiabatic quantum-flux-parametron and rapid single-flux-quantum logic families**

Naoki Takeuchi (Yokohama National University, Japan)

Fumihito China (National Institute of Information and Communications Technology, Japan)

Shigehito Miki (National Institute of Information and Communications Technology, Japan)

Shigeyuki Miyajima (National Institute of Information and Communications Technology, Japan)

Masahiro Yabuno (National Institute of Information and Communications Technology, Japan)

Nobuyuki Yoshikawa (Yokohama National University, Japan)

Hiroataka Terai (NICT, Japan)

### **23. Superconducting nanowire single photon detectors for the spectrum range up to 2 $\mu\text{m}$**

Hui Zhou (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, P.R. China)

Lixing You (SIMIT, CAS, P.R. China)

Yiming Pan (Shanghai Institute of Microsystem and Information Technology, P.R. China)



#### **24. Measurement of inductance and penetration depth in epitaxial NbN films**

Xin Tang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

Huiwu Wang (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Qiyu Zhang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

Jie Ren (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Science, P.R. China)

Wei Peng (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

Zhen Wang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

#### **25. Energy relaxation process in superconducting NbN films**

Mariia Sidorova (Humboldt University, Germany)

Alexei Semenov (DLR Institute of Planetary Research, Germany)

Heinz-Wilhelm Huebers (DLR Institute of Planetary Research, Germany)

Xiaofu Zhang (Physics Institute, University of Zürich, Switzerland)

Gregory Goltsman (Moscow State Pedagogical University, Germany)

Andreas Schilling (Physics Institute, University of Zürich, Switzerland)

Maria Moshkova (Moscow State University of Education, Russia)

Natalia Kaurova (Moscow State University of Education, Russia)

#### **26. Characterize the thermal boundary resistance of NbN and WSi nanowires**

Shi Chen (Nanjing University & Research Institute of Superconducting Electronics, P.R. China)

Qingyuan Zhao (Nanjing University, P.R. China)

Kai Zheng (RISE, Nanjing University, P.R. China)

Lin Kang (Nanjing University, P.R. China)

Lindong Kong (RISE, Nanjing University, P.R. China)

Haiyangbo Lu (RISE, Nanjing University, P.R. China)

Lin Kang (Nanjing University, P.R. China)

#### **27. Effect of self-induced flux in parallel arrays of Josephson junctions**

Denis G Crété (Unité Mixte de Physique CNRS/THALES & THALES REsearch & Technology, France)

Yves Lemaître (Unité Mixte de Physique CNRS/THALES, France)

Bruno Marcilhac (Unité Mixte de Physique CNRS/THALES, France)

Juan Trastoy (Unité Mixte de Physique CNRS/THALES, France)

Christian Ulysse (CNRS, France)

#### **28. High Selectivity In-Line Topology LTS Filter Based on Direct Synthesis Method**

Yuxing He (Yokohama National University, Japan)

Naoki Takeuchi (Yokohama National University, Japan)

Nobuyuki Yoshikawa (Yokohama National University, Japan)

#### **29. Characterization of 40 GHz and 762 GHz sources with superconducting Josephson**

##### ***cantilevers in a THz microscope***

Marco Tollkühn (TU Braunschweig, Germany)

Benedikt Hampel (TU Braunschweig, Germany)

Ilya Elenskiy (TU Braunschweig, Germany)

Meinhard Schilling (TU Braunschweig, Germany)

### **30. Study of microwave resonances induced by bias lines in shunted Josephson junctions**

Ugur Yilmaz (Université Savoie Mont Blanc, France)  
Romain Collot (Université Savoie Mont Blanc, France)  
Juergen Kunert (Leibniz IPHT, Germany)  
Ronny Stolz (Leibniz IPHT, Germany)  
Pascal Febvre (Université Savoie Mont Blanc, France)  
Sasan Razmkhah (Université Savoie Mont Blanc & CNRS, France)

### **31. Models of superconducting coplanar transmission lines**

Pascal Febvre (Université Savoie Mont Blanc, France)  
Sasan Razmkhah (Université Savoie Mont Blanc & CNRS, France)  
Kyle Jackman (Stellenbosch University, South Africa)  
Coenrad Fourie (Stellenbosch University, South Africa)

### **32. Series Arrays of Long Josephson Junctions Fabricated with a Focused Helium Ion Beam in YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7- $\delta$</sub>**

Jay C LeFebvre (University of California, Riverside, USA)  
Ethan Cho (University of California Riverside, USA)  
Shane A Cybart (University of California Riverside, USA)

### **33. Measurement of an SFQ complex event detector for complex event processing**

Kazuma Akizuki (Yokohama National University, Japan)  
Yuki Yamanashi (Yokohama National University, Japan)  
Nobuyuki Yoshikawa (Yokohama National University, Japan)

### **34. A Physics-Based TCAD Simulator for Josephson Junctions**

Pooya Jannaty (Synopsys Inc., USA)  
Amrit Poudel (Synopsys Inc., USA)  
Prasad Sarangapani (Synopsys Inc., USA)  
Lee Smith (Synopsys Inc., USA)

### **35. Characterization of Single- and Two-qubit Gates between Transmons and Capacitively Shunted Flux Qubits**

Xuexin Xu (Forschungszentrum Juelich, Germany)

### **36. Low-latency adiabatic quantum-flux-parametron using delay-line clocking**

Naoki Takeuchi (Yokohama National University, Japan)  
Mai Nozoe (Yokohama National University, Japan)  
Yuxing He (Yokohama National University, Japan)  
Nobuyuki Yoshikawa (Yokohama National University, Japan)

### **37. Inductance investigation of single layer and multilayer YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7</sub> thin films grown by reactive coevaporation**

Han Cai (University of California, Riverside, USA)  
Hao Li (University of California, Riverside, USA)  
Ethan Cho (University of California Riverside, USA)  
Jay C LeFebvre (University of California, Riverside, USA)  
Yan-Ting Wang (University of California, Riverside, USA)  
Shane A Cybart (University of California Riverside, USA)

**38. Ion Beam Induced Damage in MgB<sub>2</sub> and Co-doped Ba (FeAs)<sub>2</sub> Thin Films for Josephson Junctions**

Leila Kasaei (Temple University, USA)  
Mengjun Li (Rutgers University, USA)  
Hussein Hijazi (Rutgers University, USA)  
Ryan Thorpe (Rutgers University, USA)  
Torgny Gustafsson (Rutgers University, USA)  
Leonard Feldman (Rutgers University, USA)  
Ke Chen (Temple University, USA)  
Xiaoxing Xi (Temple University, USA)

17:00 - 18:40

**RF**

**Room:** Raincross Ballroom

*Chair: Stuart Berkowitz (Out of the Fog Research, USA)*

**INVITED: Determination of the microwave critical current density from high power measurements of YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub> resonators**

Jim Booth (NIST)

**A Wide Band Bandpass Filter Using Edge Coupled and Direct Coupled Techniques**

Eugene A Ogbodo (University of Greenwich, United Kingdom (Great Britain))  
Anthony Ani (University of Greenwich, Nigeria)  
Ezekiel Nwobi (University of Greenwich, Nigeria)

**Wideband SQUID Amplifiers for Axion Search Experiments**

Sergey Uchaikin (Institute for Basic Science, Korea & TPU, Russia)  
Andrei Matlashov (Institute for Basic Science, Korea)  
Doyu Lee (Institute for Basic Science, Korea)  
Woohyun Chung (Institute for Basic Science, Korea)  
Çağlar Kutlu (Institute for Basic Science & KAIST, Korea)  
Seon Jeong Oh (Institute for Basic Science, Korea)  
Matthias Schmelz (Leibniz IPHT, Germany)  
Vyacheslav Zakosarenko (Leibniz IPHT, Supracon AG, Germany)  
Ronny Stolz (Leibniz IPHT, Germany)  
Yannis Semertzidis (Institute for Basic Science & KAIST, Korea)

**INVITED: High-T<sub>c</sub> superconducting Josephson junction terahertz devices for wireless communications and sensing applications**

Jia Du (CSIRO, Australia)  
Xiang Gao (CSIRO, Australia)  
Ting Zhang (University of Technology Sydney, Australia)  
Y Jay Guo (University of Technology Sydney, Australia)

19:00 - 22:00

**March ARB Reception**

**Room:** March Field Museum

# Technical Schedule: Tuesday, July 30

8:00 - 17:30

**Registration**

**Room:** Concourse 201

9:00 - 10:00

**Keynote Speaker:** Nobuyuki Yoshikawa

**Room:** Raincross Ballroom

10:00 - 12:00

**Digital**

**Room:** Raincross Ballroom

*Session Chair: Deep Gupta (Hypres, USA)*

**INVITED: Fast RSFQ and ERSFQ Parallel Counters**

Mustafa Eren Çelik (HYPRES, Inc., USA)

Timur Filippov (HYPRES, Inc., USA)

Anubhav Sahu (HYPRES, Inc., USA)

Dmitri Kirichenko (HYPRES, USA)

Saad Sarwana (HYPRES, Inc., USA)

Alf Lehmann (HYPRES, Inc., USA)

Deepnarayan Gupta (HYPRES, USA)

**INVITED: Assembly and test of a hybrid SFQ-to-nTron interface circuit using flip-chip bonding**

Thomas Ortlepp (CiS Forschungsinstitut für Mikrosensorik GmbH, Germany)

Indira Kaepplinger (CiS Forschungsinstitut für Mikrosensorik GmbH, Germany)

Oliver Kieler (Physikalisch-Technische Bundesanstalt, PTB, Germany)

Emily Toomey (Massachusetts Institute of Technology, USA)

Marco Colangelo (Massachusetts Institute of Technology, USA)

Karl Berggren (Massachusetts Institute of Technology, USA)

**INVITED: Digital Coherent Control of a Superconducting Qubit**

Edward Leonard, Jr. (Northrop Grumman Mission Systems & University of Wisconsin - Madison, USA)

**INVITED: Digital Reversible Fluxon Logic for Future Computing Applications**

Kevin Osborn (The Laboratory for Physical Sciences, University of Maryland, USA)

Waltraut Wustmann (The Laboratory for Physical Sciences, University of Maryland, USA)

**INVITED: Reversible Fluxon Logic for Future Computing**

Kevin Osborn (The Laboratory for Physical Sciences, University of Maryland, USA)

Waltraut Wustmann (The Laboratory for Physical Sciences, University of Maryland, USA)

12:00 - 14:00

**Lunch and Posters**

**Room:** Exhibit Hall C&D

14:00 - 16:00

**Fabrication**

**Room:** Raincross Ballroom

**DISTINGUISHED: Evolution of HTS Josephson junctions and their application at ISTEK and SUSTERA**

Dr. Keichi Tanabe (President of Superconducting Sensing Technology Research Association (SUSTERA))

**Planar MgB<sub>2</sub> Josephson junctions and arrays made by focused helium ion beam**

Ke Chen (Temple University, USA)

**Direct-write ion beam irradiated Josephson junction devices**

Ethan Cho (University of California Riverside, USA)

Hao Li (University of California, Riverside, USA)

Shane A Cybart (University of California Riverside, USA)

**Kinetic inductive nanowire microwave coupler and applications**

Marco Colangelo (Massachusetts Institute of Technology, USA)

Di Zhu (Massachusetts Institute of Technology, USA)

Daniel Santavicca (University of North Florida, USA)

Joshua Bienfang (National Institute of Standards and Technology, USA)

Karl Berggren (Massachusetts Institute of Technology, USA)

**Ambient Temperature C-AFM Mapping of Conduction Through Aluminum Oxide**

Matt Wolak (Sandia National Laboratories, USA)

Nancy Missert (Sandia National Laboratories, USA)

**Measurement results of the superconducting-ferromagnetic transistor**

Ivan Nevirkovets (Northwestern University, USA)

Takafumi Kojima (Advanced Technology Center, National Astronomical Laboratory of Japan, Japan)

Yoshinori Uzawa (Advanced Technology Center, National Astronomical Laboratory of Japan, Japan)

Oleg Mukhanov (HYPRES, Inc., USA)

**Increasing Integration Scale of Superconductor Electronics Beyond One Million Josephson Junctions**

Sergey K Tolpygo (Lincoln Laboratory, Massachusetts Institute of Technology, USA)

Vasili Semenov (Stony Brook University, USA)

**INVITED: Focussed-ion-beams for nanofabrication of superconducting devices: Josephson arrays, nanowires and flux-tuneable r.f. resonators**

Paul A Warburton (University College London, United Kingdom (Great Britain))

16:00 - 17:00

**Posters**

**Room:** Exhibit Hall C&D

**1. Flux Trapping Experiments to Verify Simulation Models**

Kyle Jackman (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

Coenrad Fourie (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

## **2. Quality of Results of Adiabatic Quantum-Flux-Parametron Integrated Circuits Placed by the Genetic Algorithm**

Tomoyuki Tanaka (Yokohama National University, Japan)

Christopher L Ayala (Yokohama National University, Japan)

Olivia Chen (Yokohama National University, Japan)

Ro Saito (Graduate School of Environment and Information Sciences, Yokohama National University, Japan)

Nobuyuki Yoshikawa (Yokohama National University, Japan)

## **3. Layout versus Schematic with Design/Magnetic Rule Checking for Superconducting Integrated Circuit Layouts**

Ruben van Staden (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

Johannes A. Delpoort (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

Johannes Coetzee (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

Coenrad Fourie (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

## **4. Layout Strategies for Connecting Multiple Superconducting Ground Layers with Via**

### ***Stitching***

Kyle Jackman (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

Coenrad Fourie (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

## **5. A 16-bit Bit-Slice Shifter for 64-bit RSFQ Microprocessors**

Wei Xuan (State Key Laboratory of Computer Architecture, Institute of Computing Technology, Chinese Academy of Sciences)

Guang-Ming Tang (State Key Laboratory of Computer Architecture, Institute of Computing Technology, Chinese Academy of Sciences)

Pei-Yao Qu (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Zhimin Tang (State Key Laboratory of Computer Architecture, Institute of Computing Technology, Chinese Academy of Sciences)

Xiaochun Ye (State Key Laboratory of Computer Architecture, Institute of Computing Technology, Chinese Academy of Sciences)

Dongrui Fan (State Key Laboratory of Computer Architecture, Institute of Computing Technology, Chinese Academy of Sciences)

Zhimin Zhang (State Key Laboratory of Computer Architecture, Institute of Computing Technology, Chinese Academy of Sciences)

Ninghui Sun (State Key Laboratory of Computer Architecture, Institute of Computing Technology, Chinese Academy of Sciences)

## **6. An 8-bit Bit-Slice TEA-Cryptographic Accelerator for 64-bit RSFQ Secure Coprocessors**

Pei-Shi Yu (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)  
Guang-Ming Tang (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Xiaochun Ye (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Dongrui Fan (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Zhimin Zhang (Institute of Computing Technology, Chinese Academy of Science, P.R. China)

Ninghui Sun (Doctor, P.R. China)

## **7. A Novel Simulation Method for RSFQ logic circuits**

Kuo-Zhong Zhang (The Institute of Computing Technology of the Chinese Academy of Sciences, P.R. China)

Guang-Ming Tang (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Zhimin Zhang (Institute of Computing Technology, Chinese Academy of Science, P.R. China)

Xiaochun Ye (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Dongrui Fan (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Ninghui Sun (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

## **8. Logic Design of an 8-bit RSFQ microprocessor**

Jia-Hong Yang (Institute of Computing Technology, Chinese Academy of Sciences & School of Information and Telecommunication Engineering, Beijing University of Posts and Telecommunications, P.R. China)

Guang-Ming Tang (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Pei-Yao Qu (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Xiaochun Ye (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Dongrui Fan (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Zhimin Zhang (Institute of Computing Technology, Chinese Academy of Science, P.R. China)

Ninghui Sun (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

## **9. Demonstration and energy evaluation of an 8-bit carry look-ahead adder using adiabatic quantum-flux-parametron logic**

Taiki Yamae (Yokohama National University, Japan)

Naoki Takeuchi (Yokohama National University, Japan)

Christopher L Ayala (Yokohama National University, Japan)

Hideo Suzuki (Yokohama National University, Japan)

Nobuyuki Yoshikawa (Yokohama National University, Japan)

### **10. An 8-bit Bit-Slice RSFQ AES Cryptographic Accelerator**

Yan Zhou (Institute of Computing Technology, Chinese Academy of Sciences & GuiZhou University, P.R. China)

Guang-Ming Tang (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Pei-Shi Yu (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Xiaochun Ye (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Dongrui Fan (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Zhimin Zhang (Institute of Computing Technology, Chinese Academy of Science, P.R. China)

Ninghui Sun (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

### **11. Conversion Method of Netlists Consisting of Conventional Logic Gates to RSFQ Logic Circuits Using the Characteristics of Pulse Logic**

Nobutaka Kito (Chukyo University, Japan)

Kazuyoshi Takagi (Mie University, Japan)

Naofumi Takagi (Kyoto University, Japan)

### **12. An Automated Place and Route Methodology for Asynchronous SFQ Circuit Design**

Sagnik Nath (Rensselaer Polytechnic Institute, USA)

Kurt English (Rensselaer Polytechnic Institute, USA)

Alexander Derrickson (Rensselaer Polytechnic Institute, USA)

Andrew Haslam (Herrick Technology Laboratories, USA)

John McDonald (Rensselaer Polytechnic Institute, USA)

### **13. Simulating the Fabrication of Nb/Al-O/Nb Josephson Junction for Superconductive Electronics Applications**

Nimesh Pokhrel (University of Florida, USA)

Thomas Weingartner (University of Florida, USA)

Erin Patrick (University of Florida, USA)

Mark Law (University of Florida, USA)

Robert Burwell (University of Florida, USA)

### **14. Simulation and Measurement of the Vacuum Rabi Coupling in a 3D Transmon System**

Jinsu Son (Chungbuk National University, Korea)

Gahyun Choi (UNIST, Korea)

Taewan Noh (KRISS, Korea)

Jisoo Choi (Korea University Sejong Campus, Korea)

Gwanyeol Park (Korea University Sejong Campus, Korea)

Joonyoung Lee (University of Science and Technology, Korea)

Byeongwon Kang (Chungbuk National University, Korea)

Kibog Park (UNIST, Korea)

Gwan-Woo Lee (Korea University Sejong Campus, Korea)

Soon-Gul Lee (Korea University Sejong Campus, Korea)

Woon Song (Korea Research Institute of Standards and Science, Korea)

Yonuk Chong (Korea Research Institute of Standards and Science, Korea)



### **15. Wide Range Quasi Linear SQUID Amplifier with Hysteretic Flux-to-Voltage Characteristics**

Yongliang Wang (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Guofeng Zhang (Shanghai Institute of Microsystem and Information Technology (SIMIT), P.R. China)

Shulin Zhang (Shanghai Institute of Microsystem and Information Technology (SIMIT), P.R. China)

Xiaofeng Xu (Shanghai Institute of Microsystem and Information Technology (SIMIT), P.R. China)

Liangliang Rong (Shanghai Institute of Microsystem and Information Technology (SIMIT), P.R. China)

### **16. Bias field gradient effects of large superconducting quantum interference device (SQUID) arrays (SQAs)**

Susan Berggren (NIWC Pacific, USA)

Benjamin Taylor (NIWC Pacific, USA)

Michael O'Brien (NIWC Pacific, USA)

Marcio C de Andrade (NIWC Pacific, USA)

Anna Leese de Escobar (SPAWAR Systems Center Pacific, USA)

### **17. Improvement of low-Tc SQUID base ultra-low field magnetic resonance system**

Hui Dong (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Quan Tao (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Yongqiang Li (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Mengmeng Yu (Shanghai Institute of Microsystem and Information Technology, P.R. China)

### **18. Suppressing dark counts of multimode-fiber-coupled superconducting nanowire single-photon detector**

Chengjun Zhang (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Weijun Zhang (SIMIT, CAS, P.R. China)

Lixing You (SIMIT, CAS, P.R. China)

### **19. Evaluation of the input sensitivity of adiabatic quantum-flux-parametron for the readout of superconducting nanowire single photon detectors**

Fumihito China (National Institute of Information and Communications Technology, Japan)

Naoki Takeuchi (Yokohama National University, Japan)

Shigehito Miki (National Institute of Information and Communications Technology, Japan)

Shigeyuki Miyajima (National Institute of Information and Communications Technology, Japan)

Masahiro Yabuno (National Institute of Information and Communications Technology, Japan)

Hiroataka Terai (NICT, Japan)

### **20. Demonstration of a 64-pixel superconducting nanowire single-photon imaging sensor with single-flux-quantum signal processor**

Shigeyuki Miyajima (National Institute of Information and Communications Technology, Japan)

Masahiro Yabuno (National Institute of Information and Communications Technology, Japan)

Shigehito Miki (National Institute of Information and Communications Technology, Japan)

Hiroataka Terai (NICT, Japan)

## **21. The original seeds of superconducting phase transition during photons detection in SNSPDs**

Labao Zhang (Nanjing University, P.R. China)

Qi Chen (Nanjing University, P.R. China)

Biao Zhang (Nanjing University, P.R. China)

Qingyuan Zhao and Lin Kang (Nanjing University, P.R. China)

Jian Chen (Nanjing University & Research Institute of Superconductor Electronics, P.R. China)

Peiheng Wu (Nanjing University, P.R. China)

## **22. Nb5N6-Buffered Superconducting NbN Nanowire Single-Photon Detectors**

Xiaoqing Jia (Nanjing University, P.R. China)

Tao Xu (Nanjing University, P.R. China)

Xiaoying Zhou (Nanjing University, P.R. China)

Jin Jin (Nanjing University, P.R. China)

Xuecou Tu (Nanjing University, P.R. China)

Labao Zhang (Nanjing University, P.R. China)

Qingyuan Zhao (Nanjing University, P.R. China)

Lin Kang (Nanjing University, P.R. China)

Jian Chen (Nanjing University & Research Institute of Superconductor Electronics, P.R. China)

Peiheng Wu (Nanjing University, P.R. China)

## **23. Non-linear Resonators on Superconducting Silicon**

Pierre Bonnet (Université Paris-Sud, France)

Francesca Chiodi (Université Paris-Sud, France)

Hélène le Sueur (CSNSM, CNRS & Université Paris Sud, Orsay, France)

Dominique Débarre (Université Paris-Sud, France)

## **24. A 16-pixel NbN nanowire single photon detector coupled with 300 $\mu\text{m}$ fiber**

Qi Chen (Nanjing University, P.R. China)

Labao Zhang (Nanjing University, P.R. China)

Biao Zhang (Nanjing University, P.R. China)

Lin Kang (Nanjing University, P.R. China)

Jian Chen (Nanjing University & Research Institute of Superconductor Electronics, P.R. China)

Peiheng Wu (Nanjing University, P.R. China)

## **25. Mechanical Oscillators Based on Superconducting Membranes**

Guozhu Sun (Nanjing University, P.R. China)

Junliang Jiang (Nanjing University, P.R. China)

Yongchao Li (Nanjing University, P.R. China)

Jiazheng Pan (Nanjing University, P.R. China)

Huabing Wang (Nanjing University, P.R. China)

Peiheng Wu (Nanjing University, P.R. China)

## **26: Fabrication and Characterization of Molybdenum Thin-Film Resistor for Superconducting Quantum Devices**

Tiantian Liang (Shanghai Institute of Microsystem and Information Technology of CAS, P.R. China)

Guofeng Zhang (Shanghai Institute of Microsystem and Information Technology (SIMIT), P.R. China)

Liliang Ying (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Zhang Lu (SIMIT, CAS, P.R. China)

Hua Jin (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Wei Peng (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

### **27. Substrate macrostructure and its influence on YBCO step edge Josephson junctions**

Wendy E Purches (Commonwealth Scientific and Industrial Research Organisation, Australia)

Jeina Lazar (Commonwealth Scientific and Industrial Research Organisation, Australia)

Fiona Glenn (Commonwealth Scientific and Industrial Research Organisation, Australia)

Md Uddin (Melbourne Centre for Nanofabrication, Australia)

Simon Lam (Commonwealth Scientific and Industrial Research Organisation, Australia)

Kelly Walker (Commonwealth Scientific and Industrial Research Organisation, Australia)

Avi Bendavid (Commonwealth Scientific and Industrial Research Organisation, Australia)

Fabio Isa (Commonwealth Scientific and Industrial Research Organisation, Australia)

Phil Martin (Commonwealth Scientific and Industrial Research Organisation, Australia)

Cathy Foley (Commonwealth Scientific and Industrial Research Organisation, Australia)

Emma Mitchell (Commonwealth Scientific and Industrial Research Organisation, Australia)

### **28. Design of HTS filters with narrow-band, multi-band and wide-band responses**

Bin Wei (Tsinghua University, P.R. China)

Pengyu Ma (Tsinghua University, P.R. China)

Xubo Guo (Tsinghua University, P.R. China)

### **29. Low loss crystalline silicon and hydrogenated amorphous silicon development for superconducting detector dielectric material**

Debopam Datta (California Institute of Technology, USA)

Fabien Defrance (California Institute of Technology, USA)

Andrew Beyer (Jet Propulsion Laboratory, USA)

Jack Sayers (Caltech, USA)

Sunil Golwala (Caltech, USA)

### **30. High-Frequency Properties of Y-Ba-Cu-O Josephson Junctions**

Anthony Cortez (University of California Riverside, USA)

Ethan Cho (University of California Riverside, USA)

Hao Li (University of California, Riverside, USA)

Daniel Cunnane (NASA Jet Propulsion Laboratory, USA)

Boris Karasik (NASA Jet Propulsion Laboratory, USA)

Shane A Cybart (University of California Riverside, USA)

### **31. Electronic Feedback System for Superconducting Quantum Interference Devices**

Yuchao Zhou (NASA Jet Propulsion Laboratory, USA)

Hao Li (University of California, Riverside, USA)

Shane A Cybart (University of California Riverside, USA)

### **32. Estimation of the Width of Focused Helium Ion Beam Josephson Junctions**

Yan-Ting Wang (NASA Jet Propulsion Laboratory, USA)

Ethan Cho (University of California Riverside, USA)

Hao Li (NASA Jet Propulsion Laboratory, USA)

Jay C LeFebvre (University of California, Riverside, USA)

Shane A Cybart (University of California Riverside, USA)

### **33. Ho-Ba-Cu-O Thin Films for Superconductive Electronics**

Stephen J McCoy (University of California, USA)

Ethan Cho (University of California Riverside, USA)

Hao Li (University of California, Riverside, USA)

Shane A Cybart (University of California Riverside, USA)

### **34: Self-induced flux in parallel arrays of Josephson junctions**

Denis G Cr  t   (Unit   Mixte de Physique CNRS/THALES & THALES REsearch & Technology, France)

Bruno Marcilhac (Unit   Mixte de Physique CNRS/THALES, France)

Christian Ulysse (CNRS, France)

Juan Trastoy (Unit   Mixte de Physique CNRS/THALES, France)

Yves Lema  tre (Unit   Mixte de Physique CNRS/THALES, France)

17:00 - 18:00

#### **Digital**

**Room:** Raincross Ballroom

*Chair: Samuel Benz (National Institute of Standards and Technology, USA)*

### **INVITED: Japanese activities for superconducting circuits using flip-chip configurations**

Mutsuo Hidaka (National Institute of Advanced Industrial Science and Technology, Japan)

### **Demonstration of a single-flux-quantum microprocessor operating with a Josephson-CMOS hybrid memory**

Yuki Hironaka (Yokohama National University, Japan)

Thomas Ortlepp (CiS Forschungsinstitut f  r Mikrosensorik GmbH, Germany)

Yuki Yamanashi (Yokohama National University, Japan)

Nobuyuki Yoshikawa (Yokohama National University, Japan)

### **Using Spectral Analysis of Output Data to Identify and Eliminate Noise on Control Lines**

Anthony J Przybysz (Northrop Gumman, USA)

Aaron Lee (Northrop Grumman Corporation, USA)

John Przybysz (Northrop Gumman, USA)

Alexander Marakov (Northrop Gumman, USA)

Aaron Pesetski (Northrop Grumman Corporation, USA)

### **The Josephson balanced comparator and its gray zone measurements**

Timur Filippov (HYPRES, Inc., USA)

Anubhav Sahu (HYPRES, Inc., USA)

Mustafa Eren   elik (HYPRES, Inc., USA)

Dmitri Kirichenko (HYPRES, Inc., USA)

Deepnarayan Gupta (HYPRES, USA)

### **Component Demonstration of a RISC-based AQFP MANA Processor**

Christopher L Ayala (Yokohama National University, Japan)

Tomoyuki Tanaka (Yokohama National University, Japan)

Mai Nozoe (Yokohama National University, Japan)

Naoki Takeuchi (Yokohama National University, Japan)

Nobuyuki Yoshikawa (Yokohama National University, Japan)

18:00 - 19:00

**Metrology**

**Room:** Raincross Ballroom

**Optical pulse-drive and on-chip power splitter for the pulse-driven AC Josephson Voltage Standard**

Oliver Kieler (Physikalisch-Technische Bundesanstalt, PTB, Germany)

Bjornar Karlsen (Justervesenet (JV), Kjeller, The Netherlands)

Per Ohlkers (University of South-Eastern Norway (USN), Horten, The Netherlands)

Eivind Bardalen (University of South-Eastern Norway (USN), Horten, Norway)

Muhammad Nadeem Akram (University of South-Eastern Norway (USN), Horten, Norway)

Ralf Behr (National Physical Laboratory (NPL), Teddington, United Kingdom (Great Britain))

Hao Tian (Physikalisch-Technische Bundesanstalt, PTB, Germany)

Jane Ireland (National Physical Laboratory (NPL), Teddington, United Kingdom (Great Britain))

Jonathan Williams (National Physical Laboratory (NPL), Teddington, United Kingdom (Great Britain))

Helge Malmbekk (Justervesenet (JV), Kjeller, Norway)

Luis Palafox (Physikalisch-Technische Bundesanstalt, PTB, Germany)

Rolf Gerdau (Physikalisch-Technische Bundesanstalt, PTB, Germany)

Ruediger Wendisch (Physikalisch-Technische Bundesanstalt, PTB, Germany)

Johannes Kohlmann (Physikalisch-Technische Bundesanstalt, PTB, Germany)

**Development and Applications of a Four-Volt Josephson Arbitrary Waveform Synthesizer**

Nathan E Flowers-Jacobs (NIST, USA)

Alain Rüfenacht (NIST, USA)

Anna Fox (NIST, USA)

Steve Waltman (NIST, USA)

Robert Schwall (NIST, USA)

Justus Brevik (NIST, USA)

Paul Dresselhaus and Samuel Benz (NIST, USA)

**Development of Programmable Integrated Quantum Voltage Noise Source**

Chiharu Urano (National Institute of Advanced Industrial Science and Technology, Japan)

Tomoya Irimatsugawa (National Institute of Advanced Industrial Science and Technology, Japan)

Takahiro Yamada (National Institute of Advanced Industrial Science and Technology, Japan)

# Technical Schedule: Wednesday, July 31

8:00 - 17:30

**Registration**

**Room:** Concourse 201

9:00 - 10:00

**Keynote Speaker:** SaeWoo Nam

**Room:** Raincross Ballroom

10:00 - 12:00

**Detectors**

**Room:** Raincross Ballroom

**INVITED: Single-photon camera with a superconducting nanowire single-photon detector array and cryogenic digital signal processing**

Hirokata Terai (NICT, Japan)

Masahiro Yabuno (National Institute of Information and Communications Technology, Japan)

Shigeyuki Miyajima (National Institute of Information and Communications Technology, Japan)

Shigehito Miki (National Institute of Information and Communications Technology, Japan)

Fumihito China (National Institute of Information and Communications Technology, Japan)

Naoki Takeuchi (Yokohama National University, Japan)

Nobuyuki Yoshikawa (Yokohama National University, Japan)

**INVITED: Superconducting nanowire single photon detector toward dual-wavelength satellite laser ranging**

Heqing Wang (SIMIT, CAS, P.R. China)

Hao Li (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, P.R. China)

Peng Hu (SIMIT, CAS, P.R. China)

Lixing You (SIMIT, CAS, P.R. China)

Weijun Zhang (SIMIT, CAS, P.R. China)

Xiaoming Xie (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Zhen Wang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

Yong Wang (SIMIT, CAS, P.R. China)

Hui Zhou (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, P.R. China)

Xiaoyan Yang (SIMIT, CAS, P.R. China)

Zhang Lu (SIMIT, CAS, P.R. China)

**Superconducting Nanowires as a Platform for Artificial Neurons**

Emily Toomey (Massachusetts Institute of Technology, USA)

Ken Segall (Colgate University, USA)

Karl Berggren (Massachusetts Institute of Technology, USA)

**INVITED: Development of superconducting nanowire single photon detector arrays for current and future deep-space optical communication links**

Emma E. Wollman (JPL)  
Jason P. Allmaras (JPL)  
Andrew D. Beyer (JPL)  
Marcus C. Runyan (JPL)  
Ryan M. Briggs (JPL)  
Boris Korzh (JPL)  
Matthew D. Shaw (JPL)

12:00 - 14:00

**Lunch and Posters**

**Room:** Exhibit Hall C&D

**Digital**

**Room:** Raincross Ballroom

*Session Chair: John Przybysz (Northrop Gumman, USA)*

**DISTINGUISHED: Single Flux Quantum Logic for Digital Applications**

Oleg Mukhanov (CTO, SeeQC, Inc.)

**Impulse-driven high-speed matrix memory based on  $\pi$ -shifted Josephson junctions**

Akira Fujimaki (Nagoya University, Japan)  
Yuto Takeshita (Nagoya University, Japan)  
Tomohiro Kamiya (Nagoya University, Japan)  
Daiki Hasegawa (Nagoya University, Japan)  
Kyosuke Sano (Nagoya University, Japan)  
Masamitsu Tanaka (Nagoya University, Japan)  
Taro Yamashita (Nagoya University, Japan)

**Demonstration of an Energy-Efficient, Gate-Level-Pipelined 100 TOPS/W Arithmetic Logic Unit Based on Low-Voltage Rapid Single-Flux-Quantum Logic**

Ikki Nagaoka (Nagoya University, Japan)  
Masamitsu Tanaka (Nagoya University, Japan)  
Kyosuke Sano (Nagoya University, Japan)  
Taro Yamashita (Nagoya University, Japan)  
Koji Inoue (Kyushu University Japan, Japan)  
Akira Fujimaki (Nagoya University, Japan)

**Measurement of Single-Flux-Quantum Floating-Point Divider Based on Goldschmidt's Algorithm**

Yuki Yamanashi (Yokohama National University, Japan)  
Sanada Akiyoshi (Yokohama National University, Japan)  
Nobuyuki Yoshikawa (Yokohama National University, Japan)

15:00 - 16:00

**Reversible**

**Room:** Raincross Ballroom

**Experimental designs of reversible logic gates using fluxon polarity**

Liuqi Yu (The Laboratory for Physical Sciences, University of Maryland, USA)  
Waltraut Wustmann (The Laboratory for Physical Sciences, University of Maryland, USA)  
Kevin Osborn (The Laboratory for Physical Sciences, University of Maryland, USA)

**Semi-automated design of functional elements for a new approach to digital superconducting electronics: Methodology and preliminary results**

Michael P. Frank (Sandia National Laboratories, USA)  
Rupert Murray Lewis (Sandia National Laboratories, USA)  
Nancy Missert (Sandia National Laboratories, USA)  
M. David Henry (Sandia National Laboratories, USA)  
Matt Wolak (Sandia National Laboratories, USA)

**A flip-flop and a decoder for reversible quantum-flux-parametron register files**

Taiki Yamae (Yokohama National University, Japan)  
Naoki Takeuchi (Yokohama National University, Japan)  
Yuki Yamanashi (Yokohama National University, Japan)  
Nobuyuki Yoshikawa (Yokohama National University, Japan)

**INVITED: Design and implementation of a bitonic sorter based DCNN using adiabatic superconducting logic**

Olivia Chen (Yokohama National University, Japan)  
Tomoyuki Tanaka (Yokohama National University, Japan)  
Ruizhe Cai (Northeastern University, USA)  
Yanzhi Wang (Northeastern University, USA)  
Nobuyuki Yoshikawa (Yokohama National University, Japan)

16:00 - 17:00

**Posters**

**Room:** Exhibit Hall C&D

**1. Design and Implementation of a Single Flux Quantum Logic Based Memory Controller for Josephson-CMOS Hybrid Memory Systems**

Ali Bozbey (TOBB University of Economics and Technology, Turkey)  
Seda Demirhan (TOBB University of Economics and Technology, Turkey)

**2. Implementation of Neuro-inspired Arithmetic and Logic Circuits by Using Josephson Junction Based Artificial Neurons**

Ali Bozbey (TOBB University of Economics and Technology, Turkey)  
Mustafa Karamuftuoglu (TOBB University of Economics and Technology, Turkey)  
Murat Ozbayoglu (TOBB University of Economics and Technology, Turkey)

**3. Placement and Routing Methods Based on Mixed Wiring of JTLs and PTLs for RSFQ circuits**

Takashi Dejima (Kyoto University, Japan)  
Kazuyoshi Takagi (Mie University, Japan)  
Naofumi Takagi (Kyoto University, Japan)

**4. Fabrication and Characterization of Josephson Junction arrays for voltage standard**

Wenhui Cao (National Institute of Metrology, P.R. China)  
Jinjin Li (National Institute of Metrology, P.R. China)



## **5. Design of Spiking Neuro Network with Josephson Junctions for Superconducting Artificial Microprocessors**

Cuicui Zhang (Institute of Computing Technology of the Chinese Academy of Sciences, P.R. China)

Guang-Ming Tang (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Xiaochun Ye (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Dongrui Fan (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

Zhimin Zhang (Institute of Computing Technology, Chinese Academy of Science, P.R. China)

Ninghui Sun (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

## **6. Material Optimization for Superconducting Magnetic Memory**

Alexander E Madden (Michigan State University, USA)

Joshua Willard (Michigan State University, USA)

Ben Byrd (Michigan State University, USA)

Reza Loloee (Michigan State University, USA)

Norman Birge (Michigan State University, USA)

## **7. Design of SFQ Dynamic AND Gate Array for Time-Resolving Photon Detection System using SNSPDs**

Hiroaki Myoren (Saitama University, Japan)

Ryotaro Kamiya (Saitama University, Japan)

Masato Naruse (Saitama University, Japan)

Tohru Taino (Saitama University, Japan)

Jian Chen (Nanjing University & Research Institute of Superconductor Electronics, P.R. China)

Peiheng Wu (Nanjing University, P.R. China)

## **8. Design of a hardware random number generator using Josephson oscillation and SFQ logic circuits**

Takeshi Onomi (Fukuoka Institute of Technology, Japan)

## **9. Modelling asynchronous ballistic reversible computing (ABRC) primitive elements using superconducting circuits**

Rupert Murray Lewis (Sandia National Laboratories, USA)

Michael P. Frank (Sandia National Laboratories, USA)

M. David Henry (Sandia National Laboratories, USA)

Matt Wolak (Sandia National Laboratories, USA)

Nancy Missert (Sandia National Laboratories, USA)

## **10. Numerical analysis of low-power logic family based on half flux quantum using $\pi$ -shifted Josephson junctions**

Masamitsu Tanaka (Nagoya University, Japan)

Tomohiro Kamiya (Nagoya University, Japan)

Yuto Takeshita (Nagoya University, Japan)

Yuta Yoshinmoto (Nagoya University, Japan)

Daiki Hasegawa (Nagoya University, Japan)

Kyosuke Sano (Nagoya University, Japan)

Taro Yamashita (Nagoya University, Japan)

Akira Fujimaki (Nagoya University, Japan)

### **11. Spin-triplet Josephson junctions for cryogenic memory**

Victor Aguilar (Michigan State University, USA)

Joseph Glick (Michigan State University, USA)

Alexander E Madden (Michigan State University, USA)

Reza Loloee (Michigan State University, USA)

William Pratt (Michigan State University, USA)

Norman Birge (Michigan State University, USA)

### **12. Investigation of magnetic flux trapping in superconductor integrated circuits: Effects of residual magnetic field and cooling rate**

Yuri Polyakov (Stony Brook University, USA)

Vasilii Semenov (Stony Brook University, USA)

Sergey K Tolpygo (Lincoln Laboratory, Massachusetts Institute of Technology, USA)

### **13. Hybrid Optimization Algorithm for SFQ logic cells**

Paul Le Roux (Stellenbosch University, South Africa)

Coenrad Fourie (Stellenbosch University, South Africa)

### **14. A Clock Synthesis Algorithm for Hierarchical Chains of Homogeneous Clover-Leaves Clock Networks for Single Flux Quantum Logic Circuits**

Soheil Nazari (University of Southern California, USA)

Shahsavani (University of Southern California, USA)

Ramy N. Tadros (University of Southern California, USA)

Peter A. Beerel (University of Southern California, USA)

Massoud Pedram (University of Southern California, USA)

### **15. A Timing-Aware Clock Tree Topology Generation Algorithm for Single Flux Quantum Logic Circuits**

Soheil Nazari Shahsavani (University of Southern California, USA)

Bo Zhang (University of Southern California, USA)

Massoud Pedram (University of Southern California, USA)

### **16. Initial Numerical Simulation of the Thermodynamic Behaviour of a Superconductor Circuit**

Bernard H Venter (Stellenbosch University, South Africa)

Coenrad Fourie (Stellenbosch University, South Africa)

### **17. Josephson Parametric Amplifier in Readout of a Superconducting Qubit**

Yapeng Lu (Nanjing University, P.R. China)

Weiwei Xu (Nanjing University, P.R. China)

Yongchao Li (Nanjing University, P.R. China)

Jiazheng Pan (Nanjing University, P.R. China)

Tao Hua (Nanjing University, P.R. China)

Jianxin Shi (Nanjing University, P.R. China)

Guozhu Sun (Nanjing University, P.R. China)

### **18. Development of inductive microwave nanoSQUIDs for Quantum Technology Applications**

Tom Godfrey (University College London & Nation Physical Laboratory (UK), United Kingdom (Great Britain))

### **19. Portable Solid Nitrogen Cooling System for High Transition Temperature Superconductive Electronics**

Ji Wang (University of California, Riverside, USA)

Hao Li (University of California, Riverside, USA)

Ethan Cho (University of California Riverside, USA)

Jay C LeFebvre (University of California, Riverside, USA)

Shane A Cybart (University of California Riverside, USA)

## **20. Removal of geomagnetic field variation in TEM survey using LT SQUID as B sensor**

Yifeng Pei (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, P.R. China)

## **21. Hybrid Time/Code-Division-Multiplexed SQUID readout for Athena X-IFU**

Carl S Dawson (Stanford University, USA)

Saptarshi Chaudhuri (Stanford University, USA)

Hsiao-Mei Sherry Cho (SLAC National Accelerator Laboratory, USA)

Kent Irwin (Stanford University, USA)

Dale Li (SLAC National Accelerator Laboratory, USA)

Charles Titus (Stanford University, USA)

Ed Denison (National Institute of Standards and Technology, USA)

William Doriese (National Institute of Standards and Technology, USA)

Malcolm Durkin (National Institute of Standards and Technology, USA)

Gene Hilton (National Institute of Standards and Technology, USA)

Carl Reintsema (National Institute of Standards and Technology, USA)

Robert Stevens (National Institute of Standards and Technology, USA)

Daniel Swetz (National Institute of Standards and Technology, USA)

Joel Ullom (National Institute of Standards and Technology, USA)

Leila Vale (National Institute of Standards and Technology, USA)

Simon Bandler (NASA Goddard, USA)

Betty Young (Santa Clara University, USA)

Joe Fowler (National Institute of Standards and Technology, USA)

Kelsey Morgan (National Institute of Standards and Technology, USA)

## **22. Noise Contribution to Switching Current Distributions in NbN Nanowires**

Ashley Qu (Massachusetts Institute of Technology, USA)

Karl Berggren (Massachusetts Institute of Technology, USA)

Di Zhu (Massachusetts Institute of Technology, USA)

## **23. Terahertz Power Detectors based on Superconducting HEBs with Microwave Readout**

Jian Chen (Nanjing University & Research Institute of Superconductor Electronics, P.R. China)

Xuecou Tu (Nanjing University, P.R. China)

Runfeng Su (Nanjing University, P.R. China)

Xiaoqing Jia (Nanjing University, P.R. China)

Caihong Zhang (Nanjing University & Research Institute of Superconductor Electronics, P.R. China)

Lin Kang (Nanjing University, P.R. China)

Biaobing Jin (Nanjing University, P.R. China)

Weiwei Xu (Nanjing University, P.R. China)

Peiheng Wu (Nanjing University, P.R. China)

## **24. Heat Transfer Analysis in Multilayer Heater-Cryotrons**

Reza Baghdadi (Massachusetts Institute of Technology, USA)

Brenden Butters (MIT, USA)

Jason Allmaras (California Institute of Technology, USA)

Alexander Kozorezov (Lancaster University, United Kingdom (Great Britain))

Andrew Dane (MIT, USA)

Adam McCaughan (National Institute of Standards and Technology, USA)

Karl Berggren (Massachusetts Institute of Technology, USA)

## **25. In-Sn Bumping Design and Fabrication for High Speed Interconnects of Superconducting MCM via Laser Melting/jetting and distribution**

Gaowei Xu (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, P.R. China)

Wei Gai (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Le Luo (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

Jie Ren (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Science, P.R. China)

## **26. Sandwiched Josephson junctions with a black phosphorus barrier**

Zuyu Xu (RISE, Nanjing University, P.R. China)

Wei Chen (RISE, Nanjing University, P.R. China)

Wanghao Tian (RISE, Nanjing University, P.R. China)

Yangyang Lv (RISE, Nanjing University, P.R. China)

Xianjing Zhou (RISE, Nanjing University, P.R. China)

Jun Li (RISE, Nanjing University, P.R. China)

Guozhu Sun (Nanjing University, P.R. China)

Dieter Koelle (Universität Tübingen, Germany)

Reinhold Kleiner (Tuebingen University, Germany)

Huabing Wang (Nanjing University, P.R. China)

Peiheng Wu (Nanjing University, P.R. China)

## **27. Inductance of Superconductor Circuit Features with Sizes Down to 200 nm Fabricated in the SFQ5ee Process**

Evan B Golden (Lincoln Laboratory, Massachusetts Institute of Technology, USA)

Sergey K Tolpygo (Lincoln Laboratory, Massachusetts Institute of Technology, USA)

## **28. Magnetic Josephson junctions on Nb four-layer structure for half flux quantum circuits**

Daiki Hasegawa (Nagoya University, Japan)

Yuto Takeshita (Nagoya University, Japan)

Kyosuke Sano (Nagoya University, Japan)

Masamitsu Tanaka (Nagoya University, Japan)

Taro Yamashita (Nagoya University, Japan)

Akira Fujimaki (Nagoya University, Japan)

## **29. Design and Measurement of an HTS Tunable Resonator Based on SQUIDs Array**

Ting Zhang (University of Technology Sydney, Australia)

Xiang Gao (CSIRO, Australia)

Jia Du (CSIRO, Australia)

Y. Jay Guo (University of Technology Sydney, Australia)

## **30. Pulse-Driven High-Tc Josephson Junctions for Quantum Voltage Devices**

Adam C Weis (National Institute of Standards and Technology & University of Colorado Boulder, USA)

Nathan E Flowers-Jacobs (NIST, USA)

Ethan Cho (University of California Riverside, USA)

Hao Li (University of California, Riverside, USA)

Jay C LeFebvre (University of California, Riverside, USA)

Shane A Cybart (University of California Riverside, USA)

Horst Rogalla (NIST, USA)

Samuel Benz (National Institute of Standards and Technology, USA)

## **31. Using the Large Number Shapiro Steps of High Critical Current Josephson Junctions to Output Quantum Voltage**

Wenhui Cao (National Institute of Metrology, P.R. China)

**32. Impedance Mismatch Elimination for Improved THz Detection by Superconducting**

Josephson Junctions (Ariel University, Israel)  
Eldad Holdengreber (Ariel University, Israel)  
Moshe Mizrahi (Ariel University, Israel)  
Shmuel E. Schacham (Ariel University, Israel)  
Eliyahu Farber (Ariel University, Israel)

**33. Operation Characteristics of Current-limiting DC Circuit Breaker of the HVDC System Using EMTDC/PSCAD**

Huiseok Gu (University of Chosun, Korea)  
Hye-Won Choi (University of Chosun, Korea)  
Hyo-Sang Choi (University of Chosun, Korea)

**34. Operating characteristics of Arc-induction Type DC Circuit Breaker with Superconducting**

Sang-Yong Park (Chosun University, Korea)  
Hyo-Sang Choi (University of Chosun, Korea)  
Huiseok Gu (University of Chosun, Korea)

**35. Design, Fabrication, and Analysis of a Metal-insulation type HTS Coils for a 5 kW Wind Power Generator**

Hae-Jun Sung (Changwon National University, Korea)  
Byeong-Soo Go (Changwon National University, Korea)  
Minwon Park (Changwon National University, Korea)

**36. Design and transient performance analysis of a large-scale HTS wind generator under short-circuit conditions**

Byeong-Soo Go (Changwon National University, Korea)  
Hae-Jun Sung (Changwon National University, Korea)  
Minwon Park (Changwon National University, Korea)

**37. Design of a Novel Protection Scheme for a Tri-axial HTS Power Cable**

Minh-Chau Dinh (Changwon National University, Korea)

**38. Progress in the HTS Power Cable Projects in Korea**

Chulhyu Lee (KEPCO, Korea)  
Minwon Park (9 Sarim-dong Changwon, Gyeongnam, Korea)  
Masataka Iwakuma (Kyushu University, Japan)

**39. Analysis on Power Consumption and Accumulation Energy of bridge Type SFCL with Dual HTSC Elements using flux-coupling**

Seok-Cheol Ko (Kongju National University, Korea)  
Tae-Hee Han (University of JungWon, Korea)  
Sung-Hun Lim (Soongsil University, Korea)

**40. Peak Fault Current Limiting Characteristics of a Trigger Type SFCL using Twice Quench**

Sung-Hun Lim (Soongsil University, Korea)  
Seok-Cheol Ko (Kongju National University, Korea)  
Tae-Hee Han (University of JungWon, Korea)

**41. Fault Current Limiting Characteristics of Three-Phase Transformer Type SFCL with Twice Quench Operation**

Sung-Hun Lim (Soongsil University, Korea)  
Tae-Hee Han (University of JungWon, Korea)  
Seok-Cheol Ko (Kongju National University, Korea)

**42. Influence of Flow Rate and Heat Loss on the Temperature Profile of Ln2 in Cold Dielectric HTS Cable using Counter Flow Cooling**

Mohit Kalsia (Lovely Professional University, India)  
Raja Sekhar Dondapati (Lovely Professional University, India)

**43. Analysis on Quench Characteristics of Integrated Three-Phase Transformer Type SFCL with Double Quench Operation According to Ground-Fault Types**

Tae-Hee Han (University of JungWon, Korea)  
Seok-Cheol Ko (Kongju National University, Korea)  
Sung-Hun Lim (Soongsil University, Korea)  
Shinwon Lee (JungWon University, Korea)

**44. Characteristics of Current-limiting DC Circuit Breaker of the HVDC System Using EMTDC/PSCAD**

Huiseok Gu (University of Chosun, Korea)

**45. Computer platform for remote monitoring of distributed installations in rural areas using GISs**

Bala Biaye (Université Assane SECK de Ziguinchor, Senegal)

**46. Optimal Design of the Superconducting DC Cut-off System considering Power Burden Ratio between a Superconductor and DC Circuit Breaker**

Hye-Won Choi (University of Chosun, Korea)  
Hyo-Sang Choi (University of Chosun, Korea)  
Seon-Ho Hwang (University of Chosun, Korea)

**47. qCDC: Metastability-Resilient Synchronization FIFO for SFQ Logic**

Gourav Datta (University of Southern California, USA)  
Haolin Cong (University of Southern California, USA)  
Souvik Kundu (University of Southern California, USA)  
Peter A. Beerel (University of Southern California, USA)

17:00 - 18:00

**Quantum**

**Room:** Raincross Ballroom

**INVITED: Engineering Superconducting Quantum Systems**

Jonilyn Yoder (MIT LL)

**Control of coherent microwave transmission at single-photon level by longitudinal field modulation and observation of cavity-induced ATS effect in superconducting quantum circuits**

Xueyi Guo (Institute of Physics, Chinese Academy of Sciences, P.R. China)  
Yirong Jin (Institute of Physics, Chinese Academy of Sciences, P.R. China)  
Hui Deng (Institute of Physics, Chinese Academy of Sciences, P.R. China)  
Yuxi Liu (Institute of Microelectronics, Tsinghua University, P.R. China)  
Dongning Zheng (Institute of Physics, Chinese Academy of Sciences, P.R. China)

**Efficient Tunable Microwave Single-photon Source Based on Transmon Qubit**

Yu Zhou (RIKEN, Japan)  
Zhihui Peng (Hunan Normal University, P.R. China)  
Yuta Horiuchi (Tokyo University of Science, Japan)  
Oleg Astafiev (Royal Holloway, University of London, United Kingdom (Great Britain))  
Jaw-Shen Tsai (Tokyo University of Science, Japan)

**INVITED: Progress towards measurement-based topological quantum computation with Majorana zero modes**

Wolfgang Pfaff (Microsoft Quantum, The Netherlands)

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19:00 - 22:00

**Banquet Dinner**

**Room:** The Mission Inn Hotel

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# Technical Schedule: Thursday, August 1

8:30 - 17:00

**Registration**

**Room:** Concourse 201

9:00 - 10:00

**Keynote Speaker:** Dr. Ronny Stolz

**Room:** Raincross Ballroom

10:00 - 12:00

**SQUIDS**

**Room:** Raincross Ballroom

**INVITED: 7-channel on-scalp MEG-system using high-Tc SQUID magnetometers**

Dag RW Winkler (Chalmers University of Technology, Sweden)

Justin Schneiderman (Sahlgrenska Academy, University of Gothenburg, Sweden)

Alexei Kalaboukhov (Chalmers University of Technology, Sweden)

Maxim Chukharkin (Chalmers Industriteknik, Sweden)

Silvia Ruffieux (Chalmers University of Technology, Sweden)

Minshu Xie (Volvo Cars, Sweden)

Christoph Pfeiffer (Chalmers University of Technology, Sweden)

Minshu Xie (Volvo Cars, Sweden)

Edoardo Trbaldo (Chalmers University of Technology, Sweden)

Floriana Lombardi (Chalmers University of Technology, Sweden)

Thilo Bauch (Chalmers University of Technology, Sweden)

**INVITED: Ultra-sensitive SQUID systems for applications in biomagnetism and ultra-low field MRI**

Rainer Körber (Physikalisch-Technische Bundesanstalt, Germany)

Oliver KIELER (Physikalisch-Technische Bundesanstalt, PTB, Germany)

ter Hömmen (Physikalisch-Technische Bundesanstalt, Germany)

Nora Höfner (Physikalisch-Technische Bundesanstalt, Germany)

Jan-Hendrik Storm (Physikalisch-Technische Bundesanstalt, Germany)

**INVITED: Towards energy-dispersive particle detection with sub-eV energy resolution: Metallic magnetic calorimeters with direct sensor readout**

Matthäus Krantz (Kirchhoff-Institute for Physics, Heidelberg University, Germany)

Andreas Fleischmann (Kirchhoff-Institute for Physics, Heidelberg University, Germany)

Christian Enss (Kirchhoff-Institute for Physics, Heidelberg University, Germany)

Sebastian Kempf (Kirchhoff-Institute for Physics, Heidelberg University, Germany)

**Dc-SQUID readout with high dynamic range and intrinsic MHz frequency-division multiplexing capability**

Daniel Richter (Kirchhoff-Institute for Physics, Heidelberg University, Germany)

Andreas Fleischmann (Kirchhoff-Institute for Physics, Heidelberg University, Germany)

Christian Enss (Kirchhoff-Institute for Physics, Heidelberg University, Germany)

Sebastian Kempf (Kirchhoff-Institute for Physics, Heidelberg University, Germany)

**INVITED: Quantum Sensors for Ultra-light Dark Matter Detection**

Hsiao-Mei Sherry Cho (SLAC)

12:00 – 13:30

**Lunch**

**Room:** Exhibit Hall C&D



13:30 - 16:00

**Novel Devices**

**Room:** Raincross Ballroom

**INVITED: Isotropic Josephson tunneling in c-axis twist bicrystals of Bi<sub>2</sub>Sr<sub>2</sub>CaCu<sub>2</sub>O<sub>8+δ</sub>**

Qikun Xue (Tsinghua Univ.)

**Quantum interference and entanglement effects in hybrid three-terminal splitters**

Paul Seidel (University of Jena & Faculty of Physics and Astronomy, Germany)  
Mikhail Belogolovskii (G. V. Kurdyumov Institute for Metal Physics Kiev, Ukraine)  
Elena Zhitlukhina (O. O. Galkin Donetsk Institute for Physics and Engineering Kiev, Ukraine)

**Vortex inscription in YBCO thin films with a single shot femtosecond optical pulse**

Masayoshi Tonouchi (Osaka University, Japan)  
Iwao Kawayama (Osaka University, Japan)  
Hironaru Murakami (Osaka University, Japan)

**THz Microscopy of Additive Manufactured Metamaterials at 24 GHz with Josephson Cantilevers**

Benedikt Hampel (TU Braunschweig, Germany)  
Marco Tollkühn (TU Braunschweig, Germany)  
Ilya Elenskiy (TU Braunschweig, Germany)  
Meinhard Schilling (TU Braunschweig, Germany)

**Effect of SQUID loop coupling on SQUID array sensitivity**

Emma Mitchell (Commonwealth Scientific and Industrial Research Organisation, Australia)  
Karl Muller (CSIRO, Australia)  
Jörn Beyer (Physikalisch-Technische Bundesanstalt, Germany)  
Wendy E Purches (Commonwealth Scientific and Industrial Research Organisation, Australia)  
Colin Pegrum (Strathclyde University Glasgow, United Kingdom (Great Britain))  
Shane Keenan (CSIRO, Australia)  
Christopher Lewis (CSIRO, Australia)  
Alex Grancea (CSIRO, Australia)  
Philip Fairman (CSIRO, Australia)  
Jeina Lazar (Commonwealth Scientific and Industrial Research Organisation, Australia)  
Cathy Foley (Commonwealth Scientific and Industrial Research Organisation, Australia)

**Low loss and tunable superconducting terahertz metamaterial**

Caihong Zhang (Nanjing University & Research Institute of Superconductor Electronics, P.R. China)  
Jingbo Wu (Research Institute of Superconductor Electronics, Nanjing University, P.R. China)  
Biaobing Jin (Nanjing University, P.R. China)  
Jian Chen (Nanjing University & Research Institute of Superconductor Electronics, P.R. China)  
Peiheng Wu (Nanjing University, P.R. China)

### **Nonlinear behaviors in superconducting THz metamaterial**

Biaobing Jin (Nanjing University, P.R. China)

Caihong Zhang (Nanjing University & Research Institute of Superconductor Electronics, P.R. China)

Jingbo Wu (Research Institute of Superconductor Electronics, Nanjing University, P.R. China)

Jian Chen (Nanjing University & Research Institute of Superconductor Electronics, P.R. China)

Masayoshi Tonouchi (Osaka University, Japan)

Peiheng Wu (Nanjing University, P.R. China)

### **INVITED: rf SQUID Metamaterials: A Rich Nonlinear Setting for Applications**

Steven Anlage (Center for Nanophysics and Advanced Materials, USA)

16:00 - 19:00

#### **Design Tools**

**Room:** Raincross Ballroom

### **INVITED: Progress Towards an Open-Source Front-End CAD Flow for DC-Biased SFQ Logic Circuits**

Murali Annvaram (University of Southern California (USC), Ming Hsieh Department of Electrical and Computer Engineering, Los Angeles, CA)

Peter Bearel (University of Southern California (USC), Ming Hsieh Department of Electrical and Computer Engineering, Los Angeles, CA)

Sandeep Gupta (University of Southern California (USC), Ming Hsieh Department of Electrical and Computer Engineering, Los Angeles, CA)

Naveen Katam (University of Southern California (USC), Ming Hsieh Department of Electrical and Computer Engineering, Los Angeles, CA)

Shahin Nazarian (University of Southern California (USC), Ming Hsieh Department of Electrical and Computer Engineering, Los Angeles, CA)

Massoud Pedram (University of Southern California (USC), Ming Hsieh Department of Electrical and Computer Engineering, Los Angeles, CA)

### **Progress Toward VLSI-Capable EDA Tools for Superconductive Digital Electronics**

Stephen R Whiteley (Synopsys, Inc. & Whiteley Research Inc., USA)

Jamil Kawa (Synopsys, Inc., USA)

### **Reconfigurable Logic Cell for Superconducting Magnetic Field Programmable Array**

Naveen K Katam (University of Southern California, USA)

Haolin Cong (University of Southern California, USA)

Massoud Pedram (University of Southern California, USA)

### **qBSA: Logic Design of a 32-bit Block-Skewed RSFQ Arithmetic Logic Unit**

Souvik Kundu (University of Southern California, USA)

Gourav Datta (University of Southern California, USA)

Peter A. Bearel (University of Southern California, USA)

Massoud Pedram (University of Southern California, USA)

### **Timing Verification for Rapid Single-Flux-Quantum (RSFQ) Logic: New Paradigm and Models**

Fangzhou Wang (University of Southern California, USA)

Sandeep Gupta (University of Southern California, USA)

### **qEC: A Logical Equivalence Checking Framework Targeting SFQ Superconducting Circuits**

Arash Fayyazi (University of Southern California, USA)

Shahin Nazarian (University of Southern California, USA)

Massoud Pedram (University of Southern California, USA)

## **Standard Cell Layout Synthesis for Row-Based Placement and Routing of RSFQ and AQFP Logic Families**

Coenrad Fourie (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

Lieze Schindler (Department of Electrical and Electronic Engineering, Stellenbosch University, Stellenbosch, 7600, South Africa)

Christopher L Ayala (Institute of Advanced Sciences, Yokohama National University, Yokohama, 240-8501, Japan)

Tomoyuki Tanaka (Department of Electrical and Computer Engineering, Yokohama National University, Yokohama, 240-8501, Japan)

Ro Saito (Department of Electrical and Computer Engineering, Yokohama National University, Yokohama, 240-8501, Japan)

Nobuyuki Yoshikawa (Department of Electrical and Computer Engineering, Yokohama National University, Yokohama, 240-8501, Japan)

## **Optimization of Delay Time Stabilization for Single Flux Quantum Cell Library**

Xiuting Li (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Science, P.R. China)

Jie Ren (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Science, P.R. China)

Xiaoping Gao (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Ruoting Yang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Science, P.R. China)

Qi Qiao (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Liliang Ying (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Zhen Wang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)

## **INVITED: Design Tools Development for Larger-Scale and Higher-Energy-Efficient Superconducting Single Flux Quantum Circuits**

Jie Ren (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Science, P.R. China)

Ling Xin (SIMIT, P.R. China)

Lei Chen (Shanghai Institute of Microsystem And Information Technology, Chinese Academy of Sciences, P.R. China)

Huiwu Wang (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Xiaoping Gao (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Liliang Ying (Shanghai Institute of Microsystem and Information Technology, P.R. China)

Zhen Wang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, P.R. China)