

The logo for the Electronic Components and Technology Conference (ECTC) is a white diamond shape with the letters 'ECTC' inside. It is set against a dark blue background with glowing orange and white circuit traces and light points.

The 2024 IEEE 74th Electronic Components and Technology Conference

May 28 – 31, 2024

2024 Conference Program & Exhibitor Listings

Gaylord Rockies Resort & Convention Center
Denver, Colorado, USA



Sponsored by



For more information visit www.ECTC.net

WELCOME TO THE 74th ECTC FROM THE GENERAL CHAIR AND PROGRAM CHAIR

On behalf of the Program and Executive Committee, it is our pleasure to welcome you to IEEE's 74th Electronic Components and Technology Conference (ECTC), which is held at the Gaylord Rockies Resort & Convention Center, Denver, Colorado, from May 28 to 31, 2024.

The IEEE Electronics Packaging Society (EPS) sponsors this premier international conference annually. ECTC serves as a global gathering for all major players in the microelectronic packaging industry. This includes semiconductor and electronics manufacturers, design houses, semiconductor foundries, outsourced semiconductor assembly/testing (OSAT) service providers, substrate producers, equipment manufacturers, material suppliers, research institutions, universities, and investors. The ECTC 2023 conference was a fully in-person event that attracted over 1,600 attendees. ECTC 2024 is another exclusively in-person conference.

At the 74th ECTC, approximately 375 technical papers are scheduled to be presented by authors from many countries across 36 oral sessions and 5 interactive presentation sessions. Key topics include advancements in packaging technologies, heterogeneous integration, systems design (Sessions 1, 7), and next-generation substrate manufacturing (Session 13). Reliability aspects will cover advanced substrates, high-density packages, and harsh environment reliability (Sessions 4, 16, 29, 35). Topics in assembly and manufacturing technology include 3D integration, bonding, and die bond/board-level reliability (Sessions 10, 23, 27). Topics about RF, high speed components and systems include antenna-in-package design, signal integrity, and chiplet interconnect validation (Sessions 18, 22, 26). Emerging technologies topics include digital healthcare, AI, quantum computing, and additive manufacturing for printed electronics (Sessions 5, 11, 17). Interconnection technology sessions cover topics like die-to-wafer hybrid bonding, ultra-fine pitch technologies, and copper hybrid bonding (Sessions 2, 8, 14, 32). Materials and processing topics include advanced processes for chip stacking, hybrid bonding materials, polymer packaging innovations, and fine-pitch materials/processes (Sessions 9, 15, 21, 33). Thermal/mechanical simulation and characterization topics include reliability simulations, AI in modeling, advances in flex and redistribution layer technologies, process/hybrid bonding modeling, and thermal management solutions (Sessions 6, 12, 24, 30, 36). Photonics topics include co-packaged optics, optical interconnections, and photonics integration, materials, and processes (Sessions 3, 28, 34). Interactive presentations (Sessions 37-41) include innovations in bonding, power delivery systems, optimization algorithms, packaging for specific semiconductor devices, and reliability assessments. The 74th ECTC offers a platform for exploring cutting-edge microelectronic packaging advancements, fostering innovation, and addressing critical challenges.

The ECTC this year presents seven special sessions with industry experts, including five on Tuesday, each lasting 90 minutes. One session, chaired by Przemyslaw Gromala (Robert Bosch GmbH) and Erik Jung (Fraunhofer IZM), delves into Industry-Government Co-Investments for the Advanced Electronics Sector globally. Another, chaired by Ran Tao (NIST) and Benson Chan (Binghamton University), focuses on advancing metrology for next generation microelectronics. An afternoon session on Thermal Management for AI, chaired by Zhi Yang (Groq)

and Sevket Yuruker (Tesla), explores innovative solutions for power-hungry AI/ML applications. Following that, an RF Packaging session above 100 GHz, chaired by Maciej Wojnowski (Infineon Technologies AG) and Ivan Ndip (Fraunhofer IZM/Brandenburg University of Technology), is scheduled. Additionally, a Young Professionals Networking Event on May 28, 2024, from 7:00 p.m. to 7:45 p.m., chaired by Aakrati Jain (IBM), and an IEEE EPS Seminar on Substrates for Chiplets from 7:45 p.m. to 9:15 p.m., chaired by Takashi Hisada and Yasumitsu Orii (Rapidus Corporation), are scheduled for Tuesday.

On the morning of Wednesday, May 29, 2024, ECTC's keynote presentation on "Petascale photonic chip connectivity for energy-efficient AI computing" is scheduled, presented by Prof. Keren Bergman (Columbia University) and invited by Karlheinz Bock (TU Dresden), the conference's General Chair. Additionally, a Diversity and Career Growth Panel and Reception on May 29, 2024, from 6:30 p.m. to 7:30 p.m., chaired by Cristina Amon (University of Toronto) for ITherm and Vidya Jarayam (Intel) for ECTC. A Plenary Session, styled as a start-up pitch competition on the Future of Semiconductor Industry, is planned for Thursday, May 30, 2024, from 8:00 a.m. to 9:15 a.m., chaired by Rozalia Beica (LQDX) and Farhang Yazdani (BroadPak). A panel session on Workforce Challenges in Education and Workforce Development in the New Chips Economy, organized by the IEEE EPS President, includes chairs Patrick Thompson (Texas Instruments), Mark Poliks (Binghamton University), Jeff Suhling (Auburn University), and Kitty Pearsall (Boss Precision Inc.), and is planned for Friday, May 31, from 8:00 a.m. to 9:15 a.m..

Supplementing the technical program, ECTC also offers Professional Development Courses (PDCs) and ECTC Exhibits. Co-located with the IEEE ITherm Conference, the 74th ECTC offers 16 CEU-approved PDCs, organized by Kitty Pearsall (Boss Precision Inc.) and Jeffrey Suhling (Auburn University). The PDCs take place on Tuesday, May 28th and are taught by distinguished experts in their respective fields.

The Exhibits at ECTC run from Wednesday May 29th to Thursday May 30th and showcase the latest technologies and products offered by leading companies in the electronic components, materials, packaging, and services fields. More than one hundred exhibiting companies are present Wednesday and Thursday starting at 9 a.m. ECTC also offers attendees numerous opportunities for networking and discussion with colleagues during coffee breaks, daily luncheons, and nightly receptions.

Whether you are an engineer, a manager, a student, or an executive, ECTC offers something unique for everyone in the microelectronics packaging and components industry. We invite you to make your plans now to join us for the 74th ECTC and to be a part of all the exciting technical and professional opportunities.

We want to thank our sponsors, exhibitors, authors, speakers, PDC instructors, session chairs, and program committee members, as well as all the volunteers who help make the 74th ECTC a success. We look forward to meeting you at the Gaylord Rockies Resort & Convention Center, Denver, Colorado.



Michael Mayer
74th ECTC Program Chair
mmayer@uwaterloo.ca



Karlheinz Bock
74th ECTC General Chair
karlheinz.bock@tu-dresden.de

WELCOME FROM ECTC SPONSORING ORGANIZATION



On behalf of the IEEE Electronics Packaging Society, I am delighted to welcome you to the 74th Electronic Components and Technology Conference – the world’s premier event for electronics packaging. Starting 74 years ago, ECTC continues to grow, innovate, and serve our community with an exciting technical program detailing the latest advances in electronics packaging. Building upon the outstanding event held in 2023 and the very positive

feedback from attendees and sponsors, we expect attendance at ECTC 2024 to well exceed 1,500 packaging professionals. This is a fantastic achievement. Our conference portfolio continues to find innovative ways to grow and serve our community. Together with ECTC and our Asia-Pacific flagship conference EPTC, to be held in December, EPS expects to reach similar well attended in-person conferences world-wide in 2024. These achievements would not be

possible without the dedication and commitment of our conference organizers and volunteers. I would like to express my sincere thanks to the ECTC Executive and Program Committees, members of the EPS Board of Governors, volunteers from the EPS Society, and the ECTC and EPS staff for their outstanding efforts in bringing you this year’s exciting event. We are fortunate to have such an enthusiastic team that keeps finding new ways to serve the electronic packaging community. May I also thank our authors, presenters, and sponsors for their contributions to this year’s event. It is very rewarding to see the significant benefits that events such as ECTC have on the Electronics Packaging Society, our industry, and our members. In addition to conferences, EPS has been implementing its exciting plans for membership, chapters, publications, education, and technology to provide a unique service to our members worldwide. You can find more information about these activities at the EPS website. Finally, may I thank you for attending this year’s ECTC. Enjoy the conference, and I look forward to meeting you again at one of our future events.

Patrick Thompson, EPS President 2024 – 2026

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Conference organizers reserve the right to cancel or change this program without prior notice.

CONFERENCE POLICIES AND GUIDELINES

Badges

Conference attendees **MUST** wear the official conference badge to be admitted to all training courses, sessions, seminars, meals, exhibits and interactive presentation areas, and all conference sponsored social functions.

Medical Services

For emergency medical services, locate any hotel phone, whether in your room or elsewhere in the hotel, and follow its directions for emergencies. If no phone can be located, please locate the nearest hotel staff or ECTC staff for assistance with your emergency. The closest available hotel staff person may be at the front desk.

Personal Property

The hotel’s safety deposit box is available for storing your valuables; particularly cash and jewelry. If there is a mini-safe in your room, you should consider using it.

Smoking Policy

Please follow hotel policies and signs regarding this. Smoking is **NOT** permitted at any ECTC activities including, but not limited to, functions, events, sessions, seminars, meals, exhibits and interactive presentation areas, and all conference social functions. Thank you for your consideration and cooperation.

REGISTRATION AND GENERAL INFORMATION

REGISTRATION LOCATION AND HOURS

The ECTC Registration Desk is located in The Gaylord Rockies Resort & Convention Center in the Rockies Square area, behind the Convention Center Coffee Shop (lobby level).

Monday, May 27, 2024 – 3:00 p.m. - 6:00 p.m.

Tuesday, May 28, 2024 – 6:45 a.m. - 7:45 p.m.*

(From 6:45 a.m. – 8:15 a.m. registration is for morning session PDC and Special Session Attendees)*

Wednesday, May 29, 2024 – 6:45 a.m. - 4:00 p.m.

Thursday, May 30, 2024 – 7:30 a.m. - 4:00 p.m.

Friday, May 31, 2024 – 7:30 a.m. - 12:00 p.m.

On Tuesday, May 28th light morning refreshments will be provided from 6:45 a.m. – 7:30 a.m. Come pick up your registration materials EARLY and grab a bite to eat before our PDCs and Special Sessions start!

***The above schedule for Tuesday will be vigorously enforced to prevent attendees from being late for their courses and sessions. Please make sure to take advantage of the 6:45 a.m. start time as registration becomes very congested prior to the start of the morning program.**

DOOR REGISTRATION FEES

[Door Registration with Proceedings Download](#)

IEEE Members

| | |
|---|--------|
| JOINT Registration (full ECTC + IThERM conference) | \$1665 |
| IEEE Member Full Registration | \$1265 |
| IEEE Member Speaker / Session Chair Full Registration | \$1135 |
| IEEE Member One Day | \$835 |
| IEEE Member Speaker / Session Chair One Day | \$735 |

Non-Members

| | |
|--|--------|
| JOINT Registration (full ECTC + IThERM conference) | \$1995 |
| Non-Member Full Registration | \$1530 |
| Non-Member Speaker / Session Chair Full Registration | \$1135 |
| Non-Member One Day | \$835 |
| Non-Member Speaker / Session Chair One Day | \$735 |

Student \$455

Student Speaker \$455

Tuesday Professional Development Courses

IEEE Members

| | |
|---|-------|
| Tuesday AM or PM Course with Luncheon | \$440 |
| Tuesday All-Day (2 Courses) with Luncheon | \$625 |

Non-Members

| | |
|---|-------|
| Tuesday AM or PM Course with Luncheon | \$490 |
| Tuesday All-Day (2 Courses) with Luncheon | \$675 |
| Tuesday Student All-Day (2 Courses) with Luncheon | \$150 |

Extra Luncheon Tickets for Each Day \$100

PROFESSIONAL DEVELOPMENT COURSE INSTRUCTORS AND PROCTORS BREAKFAST

7:00 a.m. Tuesday

Room Location: Summit 10 & 11

PDC Instructors and Proctors are required to attend a briefing breakfast.

SESSION CHAIRS AND SPEAKERS BREAKFAST

7:00 a.m. Wednesday thru Friday

Room Location: Crest 3-5

Session Chairs and speakers are requested to attend a complimentary continental breakfast with briefing on the morning of their sessions/ presentations. During the breakfast, presentations are transferred to the conference PC.

SPEAKER PREP ROOM

7:00 a.m. – 5:00 p.m., Tuesday – Friday

Room Location: Valley 3

Speakers should prepare and review their digital presentations within the allotted times above.

It is extremely important to assure that your presentation, presentation software and computer work flawlessly with the digital projector provided.

GENERAL INFORMATION

Hotel Concierge

The Hotel Concierge, located in the hotel lobby, can direct you to various types of entertainment or restaurants, or give suggestions for that special night out. The Concierge can help to make your visit and conference experience a memorable one!

Conference Wi-Fi

Attendees can access the internet via a shared conference Wi-Fi connection included in the registration. Please note, this connection is intended for light use e.g. for the conference app or email. It is not intended for video streaming, video meetings, large file downloads, and other high bandwidth uses.

Press Room

Press Interviews will be scheduled on an as-requested basis. To coordinate an interview with conference leadership or presenting technical experts please contact ECTC Publicity Chair, Eric Perfecto, at eperfecto@gmail.com or (845) 475-1290.

LUNCHEONS

Room Location: Aurora A & C

ECTC offers a daily luncheon from Tuesday to Friday for all attendees registered for the full conference. Lunch tickets, found in your registration badge holder, must be presented for entrance into the lunch room. Lost lunch tickets will cost \$100 to replace. Please come and enjoy lunchtime with other attendees and colleagues in the industry!

Lunch times vary for each day:

Tuesday: 12:00 Noon – 1:15 p.m.

Wednesday: 12:45 p.m. – 1:45 p.m.

Thursday: 12:45 p.m. – 1:45 p.m.

Sponsored by: The IEEE Electronics Packaging Society

Friday: 12:45 p.m. – 1:45 p.m.

Don't miss out on this lunch! We will be raffling off several prizes including a hotel stay, free conference registrations, and many other industry gadgets!

General Chair's Speakers Reception

Tuesday, May 28, 2024 • 6:00 p.m. – 7:00 p.m.
(by invitation only)

ECTC Student Reception

Tuesday, May 28, 2024 • 5:00 p.m. – 6:00 p.m.
Location: Summit Foyer



Hosted by Texas Instruments, Inc.

Students, have you ever wondered what career opportunities exist at Texas Instruments and in the industry, and how you could use your technical skills and innovative talent? If so, you are invited to attend the ECTC Student Reception, where you will have the opportunity to talk to industry professionals about what helped them succeed in their first job search and reach their current positions. During this reception, you can enjoy good food while networking with industry leaders and achievers. Don't miss your opportunity to interact with people who you might not have the chance to meet otherwise! You will also be able to submit your resumes to our sponsoring partners.

Exhibition Reception

Wednesday, May 29, 2024 • 5:30 p.m. – 6:30 p.m.
Location: Aurora 1
Open to all conference attendees.

74th ECTC Gala Reception

Thursday, May 30, 2024 • 6:30 p.m.
Location: Outside on the Front Range Lawn (Lower Level)



Sponsored by Koh Young Technologies, Inc.

Open to all conference attendees.

EPS Worldwide Chapter Officer Meeting

Please attend in person if you are an officer of EPS Chapter or EPS student Chapter.

(Online by invitation)

Thursday May 30, 2024 • 7:00 a.m. – 8:00 a.m.
Room: Summit 3

Chapter Program Director: Toni Mattila
Reg 1-7 and 9: Annette Teng
Reg 8: Steffen Kroehnert
Reg 10: Andrew Tay

All EPS Worldwide Chapter Officers are invited to sit together for lunch to meet each other. Look for table with Chapter Signage.



ECTC Mobile App

ECTC is pleased to announce that a free mobile app "Whova" is available again this year. The app provides information on schedules for our technical program and PDCs as well as exhibitors, sponsors, and venue maps. The app also features tools to set your schedule, so you don't miss presentations important to you, social interaction functions, and the ability to provide ratings on presentations that are used in selecting candidates for best paper awards. The app is available for iOS and Android devices from their respective app stores by searching "Whova". After downloading the Whova app please log in using the email address you used to register for ECTC, and the ECTC content will appear automatically. Alternatively, a generic app invitation code will be made available onsite at the conference for attendees.

IEEE Transactions on Components, Packaging, and Manufacturing Technology



If you are an author of a 74th ECTC paper, consider submitting an updated version of your conference paper after the conference as a journal manuscript to be peer reviewed by IEEE Transactions on Components, Packaging, and Manufacturing Technology. An updated version adds more significance and can include more references, discussions, or results that are still unpublished. For more details, see under "Papers Presented at Conferences" on <https://eps.ieee.org/publications/ieee-transactions-on-cpmt/information-and-resources-for-authors.html>

74th ECTC CONFERENCE OVERVIEW

2024 ECTC Special Session on Industry-Government Co-Investments

Exploring the Impact of Industry-Government Co-Investments for the Advanced Electronics Sector in North America, Asia and Europe

Tuesday, May 28, 2024, 8:30 a.m. – 10:00 a.m. • Aurora B

Chairs: Przemyslaw Gromala, Robert Bosch GmbH, and Erik Jung, Fraunhofer IZM



Essential to the global economy and innovation landscape, the semiconductor and microelectronics packaging industries are seeing government led investment programs. The introduction of the CHIPS and Science Act (Creating Helpful Incentives to Produce Semiconductors for America) in the United States has been inspiring

similar programs, e.g. in Europe the European Chips Act. Speakers in this special session discuss programs and co-investments for the United States, Europe, India and East Asia, including job creation, supply chain resilience, and enhanced technological innovation. We will examine the prospects of global collaborations and partnerships between national semiconductor and microelectronic packaging centers and industry leaders. The session will also discuss mechanisms for knowledge exchange, joint research initiatives, and mutually beneficial outcomes.

Elisabeth Steimetz, EPoS, Europe; Rao Tummala, Advisor to the Government of India; Eric Lin, CHIPS Research and Development Program, USA; David Lynch, CMC Microsystems, Canada; Kwang-Seong Choi, Electronics and Telecommunications Research Institute, Korea

2024 ECTC Special Session on Metrology

Challenges and Opportunities in Advancing Metrology for Next-Generation Microelectronics

Tuesday, May 28, 2024, 10:30 a.m. – 12:00 p.m. • Aurora B

**Chairs: Ran Tao, NIST, and Benson Chan, Binghamton University
Moderator: Jan Vardaman, TechSearch International**



Metrology plays a pivotal role in semiconductor research and manufacturing and is critical to the success of this industry. Advancements in measurement science, material characterization,

instrumentation, testing, and manufacturing capabilities are critically needed to drive product innovation and ensure quality, yield, and manufacturing efficiency. During the panel discussion, experts will share their insights on the metrology challenges and opportunities that today's semiconductor industry is facing across every segment of the supply chain, with a focus on advanced semiconductor packaging for next-generation microelectronics (e.g., heterogeneous integration, wafer level packaging, hybrid bonding, etc.).

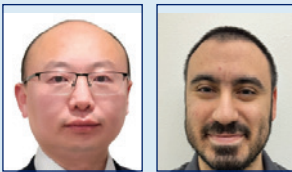
Paul Hale, NIST; Gaurang Choksi, Intel Corporation; Zhihua Zou, TSMC; CP Hung, ASE; Chet Lenox, KLA Corporation

2024 ECTC Special Session on Thermal Management for AI

Efficient and Innovative Thermal Management for Power Hungry AI/ML Applications: Challenges and Opportunities

Tuesday, May 28, 2024, 1:30 p.m. – 3:00 p.m. • Aurora B

Chairs: Zhi Yang, Groq and Sevket Yuruker, Tesla



The rapid advancement of artificial intelligence (AI) and machine learning (ML) technologies has led to the proliferation of high-power AI/ML applications in various domains, such as autonomous vehicles, high performance computing and natural language processing. However, this growth is accompanied by

escalating thermal challenges that can critically impact the performance, reliability, and lifespan of entire systems. The non-uniform distribution of heat sources on AI/ML hardware further complicates cooling strategies. Moreover, the reliance on traditional thermal management techniques may prove inadequate in addressing emergent challenges.

To address these challenges, several industry and academia experts are discussing the current status and opportunities for innovative thermal management developments/methodologies in this special session.

Ki Wook Jung, Samsung; Igor Arsovski, Groq; Mudasir Ahmad, Google; Tiwei Wei, Purdue University; Christopher Ortiz, Ansys

2024 ECTC Special Session on RF Packaging for above 100 GHz

RF Packaging for Communication and Sensing Applications above 100 GHz – Technologies, Design Challenges and Emerging Solutions

Tuesday, May 28, 2024, 3:30 p.m. – 5:00 p.m. • Aurora B

Chairs: Maciej Wojnowski, Infineon Technologies AG, and Ivan Ndip, Fraunhofer IZM/Brandenburg University of Technology



In this session, experts from industry and academia will present the latest developments in RF packaging for communication and radar sensing applications above 100 GHz. The panel will begin with a presentation of emerging applications, resulting challenges and opportunities for RF packaging. The experts will share the latest developments in RF packaging materials and technologies.

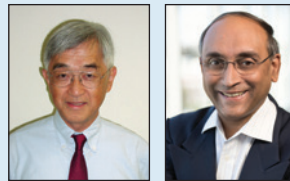
Emerging RF system integration platforms will be presented, stressing the importance of material characterization and modeling as well as co-design and co-simulation techniques. The panel will conclude with examples of recent R&D results for novel D-band waveguide interfaces in packages for 6G data links over plastic microwave fiber (PMF), antennas-in-package (AiP) and phased array front-end AiP modules.

Swaminathan Sankaran, Texas Instruments; Martin Letz, Schott AG; Alberto Valdes-Garcia, IBM Research; Madhavan Swaminathan, Penn State University; Uwe Maass, Fraunhofer IZM

2024 ECTC Heterogeneous Integration Roadmap (HIR) Workshop

Tuesday, May 28, 2024, 8:00 a.m. – 5:00 p.m. • Aurora D

Chairs: William Chen, ASE, and Ravi Mahajan, Intel



Heterogeneous Integration uses packaging technology to integrate dissimilar chips, devices or components with different materials and functions, and from different fabless design houses, foundries, wafer materials, feature sizes and companies into a system or subsystem. In this workshop, 23 Technical working groups present on their areas of expertise. This workshop is a full-day event. Schedule:

8:00 a.m. – 8:30 a.m. Welcome & Agenda Review

8:30 a.m. – 10:00 a.m. Challenges and Innovations in Thermal Engineering from Fan-out to 2.5D and 3D Stacking

10:30 a.m. – 12:00 p.m. Engineering Chiplets for the AI Era

1:30 p.m. – 3:00 p.m. CHIPS & Science Act Roundtable Chat

3:30 p.m. – 5:00 p.m. Packaging Challenges and Innovation for Future Communication Systems

2024 ECTC Young Professionals Networking Event

2024 Young Professionals Meetup

Tuesday, May 28, 2024, 7:00 p.m. – 7:45 p.m. • Aurora D

Chairs: Aakrati Jain, IBM, Rui Chen, Eastern Michigan University, and Zhangming Zhou, Auburn University



Join us for an invaluable opportunity to connect with industry leaders and fellow emerging talents! Tailored specifically for young professionals, including current graduate students, this event is crafted with your needs in

mind. Engage in dynamic interactions with senior EPS members and professionals through a series of active and engaging activities. Seize the chance to delve deeper into packaging-related topics, pose career questions, and connect with industry professionals for a valuable learning experience.

2024 IEEE EPS Seminar on Substrates for Chiplets

Substrate-Scaling Challenges in Chiplet Integration

Tuesday, May 28, 2024, 7:45 p.m. – 9:15 p.m. • Aurora A

Chairs: Takashi Hisada, Rapidus Corporation, and Yasumitsu Orii, Rapidus Corporation



Chiplet is driving performance scaling and cost efficiency of advanced semiconductor systems. There are difficult challenges for the substrates in chiplet integration such as very large size of the substrates, fine line and space ground rule with multiple layers, mechanical stress, reliability, and complexity of design.

The EPS Seminar organized by TC6 (High-Density Substrate and Board) will discuss technical and business challenges of chiplet on large substrates. We will have 7 panelists, and each panelist will give a short talk presenting insights on technology trends, technical challenges, application requirements, recent technical updates and more covering package form factors, design tools, materials, manufacturing tools, and assembly processes for advanced chiplet integration, followed by a panel discussion.

Gang Duan, Intel; Kinya Ichikawa, TSMC; Kenneth Larsen, Synopsys; Masahisa Ose, Resonac; Harish Penmethsa, AMAT; Yu-Po Wang, SPIL; Rozalia Beica, LQDX

2024 ECTC Keynote

Petascale Photonic Chip Connectivity for Energy Efficient AI Computing

Wednesday, May 29, 2024, 8:00 a.m. - 9:15 a.m. • Aurora A

Prof. Keren Bergman, Columbia University



High-performance data centers are increasingly bottlenecked by the energy and communications costs of interconnecting numerous compute and memory resources. Current systems face a gap of nearly two orders of magnitude between on-chip, intra-socket, communication capacities, and the capacities of links transporting data over longer distances. The per bit energy cost of data movement dominates that of data processing, as does density,

throughput, and latency. Integrated silicon photonics offer the opportunity of optical connectivity that delivers high off-chip communication bandwidth densities with low power consumption. To realize these benefits deeply embedded packaging of photonics with the compute and memory is critical. This talk will cover these multi-chip packaging challenges as well as approaches for leveraging dense wavelength-division multiplexing photonic IO that can scale to realize Petabit/s chip escape bandwidths with sub-picojoule/bit energy consumption.

2024 ECTC/iTherm Diversity and Career Growth Panel and Reception

Effective Practices to Attract, Promote and Retain a Diverse Workforce

Wednesday, May 29, 2024, 6:30 p.m. – 7:30 p.m. • Aurora A

Chairs: Cristina Amon, University of Toronto / iTherm, and Vidya Jarayam, Intel / ECTC



Semiconductor, electronic packaging and energy-related companies are planning to grow their workforces to meet the current and expected demands due to policy incentives and domestic investments, including the CHIPS Act. To achieve business and economic success, we will need to attract a broader group of students to the

relevant fields and expand beyond the traditional pool of candidates to include women and underrepresented minorities from rural candidates to veterans and mid-career retrainees. This panel will focus on how best practices in Diversity, Equity and Inclusion have been implemented and can be used to attract students and hire, develop, promote and retain employees within organizations to meet their goals.

The panelists will introduce some of the challenges faced by women, minorities, and underrepresented groups, as well as share their organization's strategies for professional development, promotion, retention, and success. This will be followed by an interactive Q&A with the audience.

After the panel session, a social and networking reception will be held. All ECTC and iTherm attendees are invited to join in on this engaging discussion and the reception afterwards.

Ramona Prioleau, CHIPS; Margaret Kindling, SEMI Foundation; Allyson Stewart, Marvell Inc.; Al Ortega, Villanova University; Tina Herrera, NREL; Ravi Mahajan, Intel

2024 ECTC Plenary Session on Future of Semiconductor Industry

The Future of Semiconductor Industry. Emerging Start-ups and Material Innovations in Advanced Packaging

Thursday, May 30, 2024, 8:00 a.m. – 9:15 a.m. • Aurora A

Chairs: Rozalia Beica, LQDX, and Farhang Yazdani, BroadPak; Chair of Jury Panel: Jean-Christophe Eloy, Yole Group



Styled as a start-up competition, this session looks at next generation materials and companies.

It features presentations from start-up companies and reviewed by a panel of

judges from the industry and investment community. Topics include Materials & Processes for MicroLED and System-In-Package, Thermal Management, Dielectrics & Metallization for High End IC Substrates.

Victor Chiriac, Global Cooling Technology Group; Mohsen Asad, Hyperlume; Wayne Rickard, Terecircuits; Tristan El Bouayadi, Thintronics

2024 IEEE EPS President's Panel Session on Workforce

Challenges in Education and Workforce Development in the New Chips Economy

Friday, May 31, 2024, 8:00 a.m. – 9:15 a.m. • Aurora A

Chairs: Patrick Thompson, Texas Instruments; Mark Poliks, Binghamton University; Jeff Suhling, Auburn University; Kitty Pearsall, Boss Precision Inc.



The semiconductor and packaging industries are currently experiencing unparalleled growth, driven by demand in areas such as AI, transportation electrification, digital manufacturing, data centers, mobile devices, hybrid flexible electronics, virtual reality, and photonics and MEMS. This expansion has prompted substantial global investments in new fabs and packaging infrastructure, supported by government spending in North America, Europe, and Asia.

However, the parallel surge in demand for skilled labor poses a considerable challenge, with estimates indicating a threefold increase in headcount required over the next five

years. The industry is seeking individuals with multidisciplinary education, ranging from technician degrees to Ph.D. degrees. The panel will explore workforce needs, industry perspectives on student preparation, global approaches to electronics packaging education, and innovative strategies to attract students to the semiconductor packaging field.

John Oakley, Semiconductor Research Corporation; Toni Mattila, Business Finland; Robert Geer, SUNY Polytechnic University; Wenhui Zhu, Central South University; Jim Wieser, Texas Instruments

**PROFESSIONAL DEVELOPMENT COURSES
TUESDAY, MAY 28, 2024**

| Morning Courses 8:00 a.m. – 12:00 Noon | Afternoon Courses 1:30 p.m. – 5:30 p.m. |
|---|--|
| Summit 5 1. High Reliability Soldering in Semiconductor Packaging <i>Course Leader: Ning-Cheng Lee – ShinePure Hi-Tech</i> | Summit 5 9. Additive Flexible Hybrid Electronics – Manufacturing and Reliability <i>Course Leader: Pradeep Lall – Auburn University</i> |
| Summit 6 2. Photonic Technologies for Communication, Sensing, and Displays <i>Course Leader: Torsten Wipiejewski – Huawei Technologies</i> | Summit 6 10. Fundamentals of RF Design and Fabrication Processes of Fan-Out Wafer/Panel Level and Advanced RF Packages <i>Course Leaders: Ivan Ndip – Fraunhofer IZM Brandenburg University of Technology and Markus Wöhrmann – Fraunhofer IZM</i> |
| Summit 7 3. From Wafer to Panel Level Packaging <i>Course Leaders: Tanja Braun and Piotr Mackowiak – Fraunhofer IZM</i> | Summit 7 11. Advanced Packaging – Fan-Out, Chiplet, and Heterogeneous Integration <i>Course Leader: John Lau – Unimicron</i> |
| Summit 8 4. Eliminating Failure Mechanisms in Advanced Packages <i>Course Leader: Darvin Edwards – Edwards Enterprises</i> | Summit 8 12. Analysis of Fracture and Delamination in Microelectronic Packages <i>Course Leader: Andrew Tay – National University of Singapore</i> |
| Summit 9 5. Navigating Thermal and Reliability Challenges in Chip Components for Automotive High-Performance Compute Systems <i>Course Leader: Fen Chen – Automotive Reliability/Validation Consultation Services</i> | Summit 9 13. Advanced Packaging for MEMS and Sensors <i>Course Leader: Horst Theuss – Infineon Technologies AG</i> |
| Crest 3 6. Polymers for Advanced Packaging <i>Course Leader: Jeffrey Gotro – InnoCentrix, LLC</i> | Crest 3 14. Nano Materials and Polymer Composites for Electronic Packaging <i>Course Leaders: C.P. Wong – Georgia Tech and Daniel Lu – Henkel Corporation</i> |
| Crest 4 7. Flip Chip Technologies <i>Course Leader: Shengmin Wen – SiMa Technologies, Inc.</i> | Crest 4 15. Design-On-Simulation for Advanced Packaging Reliability and Life Prediction <i>Course Leaders: Kuo-Ning Chiang – National Tsing Hua University</i> |
| Crest 5 8. Reliable Integrated Thermal Packaging for Power Electronics <i>Course Leaders: Patrick McCluskey – University of Maryland and Damena Agonafer – NEIT Laboratory, University of Maryland</i> | Crest 5 16. Thermal Spreading and Contact Resistance Course Leaders: Yuri Muzychka – Memorial University of Newfoundland and Marc Hodes – Tufts University |

Refreshment Breaks
10:00 - 10:20 a.m. & 3:00 - 3:20 p.m.
Summit and Crest Foyers

COMMITTEE MEETINGS

ASSOCIATED COMMITTEE MEMBERS ONLY

| | |
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| Tuesday May 28, 2024 9:00 p.m. – 10:30 p.m. ECTC OPTO Committee Summit 2 | 7:00 a.m. – 8:00 a.m. EPS EDMS TC Summit 10 & 11 |
| 9:00 p.m. – 10:30 p.m. ECTC Interconnect Committee Summit 3 | 7:00 a.m. – 8:00 a.m. EPS Thermal & Mechanical TC Crest 1 & 2 |
| Wednesday May 29, 2024 7:00 a.m. – 8:00 a.m. EPS Reliability TC Summit 2 | 8:00 a.m. – 9:00 a.m. EPS Conference Organizers Summit 10 & 11 |
| 7:00 a.m. – 8:00 a.m. EPS Materials & Process TC Summit 3 | 4:30 p.m. – 6:00 p.m. EPS BoG Information Session Summit 10 & 11 |
| 4:30 p.m. – 5:30 p.m. EPS Technical Committee Chairs Summit 10 & 11 | 5:30 p.m. – 6:30 p.m. ECTC 2025 Program Committee Meeting Aurora D |
| 6:00 p.m. – 7:00 p.m. ECTC Program Subcommittee Chairs & Assistant Chairs Reception (by invitation only) | 9:00 p.m. 74th ECTC Governing/Executive Committee Reception (by invitation only) |
| Thursday, May 30, 2024 7:00 a.m. – 8:00 a.m. EPS Chapter Chairs Meeting Summit 3 | Friday May 31, 2024 7:00 a.m. – 8:00 a.m. EPS RF & THz Tech. TC Summit 3 |
| 7:00 a.m. – 8:00 a.m. EPS Nanotechnology TC Summit 2 | 7:00 a.m. – 8:00 a.m. EPS Emerging Tech TC Summit 2 |
| 7:00 a.m. – 8:00 a.m. EPS High Density Substrates & Boards TC Summit 1 | 9:00 a.m. – 10:00 a.m. EPS T-CPMT SAE/AE's Summit 10 & 11 |
| | 2:15 p.m. – 5:15 p.m. ECTC Executive Committee Crest 1 & 2 |
| | 5:30 p.m. – 6:30 p.m. ECTC / EPS Steering Committee Crest 1 & 2 |

ECTC 2023 BEST PAPER AWARDS

BEST SESSION PAPER

Fine Pitch Die-to-Wafer Hybrid Bonding

Thomas Workman, Jeremy Theil, Gill Fountain, Dominik Suwito, Cyprian Uzoh, Guilian Gao, K. M. Bang, Bongsub Lee, Laura Mirkarimi – Adeia

OUTSTANDING SESSION PAPER

A New Adhesive for CoW Cu-Cu Hybrid Bonding with High Throughput and Room Temperature Pre-Bonding

Yasuhisa Kayaba, Yuzo Nakamura, Wataru Okada, Takuo Shikama, Kahori Tamura, Satoshi Inada – Mitsui Chemicals, Inc.

BEST INTERACTIVE PRESENTATION PAPER

50 nm Overlay Accuracy for Wafer-to-Wafer Bonding by High-Precision Alignment Technologies

Hajime Mitsuishi, Hiroshi Mori, Hidehiro Maeda, Mikio Ushijima, Atsushi Kamashita, Masashi Okada, Masanori Aramata, Takashi Shiomi, Shinya Sakamoto, Kishou Takahata, Tomohiro Chiba, Minoru Fukuda, Masahiro Kanbayashi, Toshimasa Shimoda, Isao Sugaya – Nikon Corporation

OUTSTANDING INTERACTIVE PRESENTATION PAPER

Optimization of the Cu Microstructure to Improve Copper-to-Copper Direct Bonding for 3D Integration

Ralf Schmidt, Christian Schwarz – Atotech (MKS Instruments)

INTEL BEST STUDENT PAPER

Thermal-Aware SoC Macro Placement and Multichip Module Design Optimization with Bayesian Optimization

Michael Molter, Elyse Rosenbaum – University of Illinois Urbana-Champaign; Rahul Kumar, Madhavan Swaminathan – Penn State University; Sonja Koller – Intel Deutschland GmbH; Nikita Ambasana – DPE, DCAI, Intel India

INTEL OUTSTANDING STUDENT PAPER

Scalable Fiber-Array-to-Chip Interconnections With Sub-Micron Alignment Accuracy

Shengtao Yu, Thomas K. Gaylord, Muhannad S. Bakir – Georgia Institute of Technology

TI BEST IP STUDENT PAPER

Simulation, Prediction, and Verification of the Corrosion Behavior of Cu-Ag Composite Sintered Paste for Power Semiconductor Die-attach Applications

Xinyue Wang, Zhoudong Yang, Pan Liu – Fudan University; Guoqi Zhang – TU Delft; Jing Zhang – Heraeus Materials Technology Shanghai Ltd.

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To sign-up for sponsorship or to get more details, please contact Alan Huffman at alan.huffman@ieee.org or +1-336-380-5124.

PROGRAM SESSIONS: WEDNESDAY, MAY 29, 9:30 A.M. - 12:35 P.M.

| Session 1: Advances in Fan-Out, Wafer-Level, and Panel-Level Packaging Technologies Enabling New Applications | Session 2: Advanced Die-to-Wafer Hybrid Bonding for Heterogeneous Integration | Session 3: Co-Packaged Optics |
|--|---|--|
| Committee: Packaging Technologies | Committee: Interconnections | Committee: Photonics |
| Aurora B | Aurora D | Crest 3-5 |
| Session Co-Chairs: Beth Keser - ZeroASIC bethk@kesers.com Steffen Kroehnert - ESPAT Consulting steffen.kroehnert@espat-consulting.com | Session Co-Chairs: Katsuyuki Sakuma - IBM Research ksakuma@us.ibm.com Tiwei Wei - Purdue University tiwei@purdue.edu | Session Co-Chairs: Richard Pitwon - Resolute Photonics richard.pitwon@resolutephotonics.com Nicolas Boyer - Ciena nboyer@ciena.com |
| 1. 9:30 AM - How to Manipulate Warpage in Fan-Out Wafer and Panel Level Packaging Tanja Braun, Ole Hölck, Marius Adler, Mattis Obst, Steve Voges, Karl-Friedrich Becker, Rolf Aschenbrenner - Fraunhofer IZM; Marcus Voitel, Marc Dreissigacker, Martin Schneider-Ramelow - Technical University Berlin | 1. 9:30 AM - Direct Die-to-Wafer Hybrid Bonding Using Plasma Diced Dies and Bond Pad Pitch Scaling Down to 2 µm Ye Lin, Pieter Bex, Koen Kennes, Jaber Derakhshandeh, Prathamesh Dhakras, Samuel Suhard, Carine Gerets, Sven Dewilde, Violeta Georgieva, Anne Jourdain, Gerald Beyer, Eric Beyne - imec | 1. 9:30 AM - High Density Integration of Silicon Photonic Chiplets for 51.2T Co-Packaged Optics Sukeshwar Kannan, Ray Chang, Hari Potluri, Sheng Zhang - Broadcom, Inc.; Jay Li, Bruce Xu, Hsi-Chang Hsu - Siliconware Precision Industries Co., Ltd. |
| 2. 9:50 AM - Advanced FO-PLP with Multi-chip for Wearable Application Jooyoung Choi, Hyungmin Kim, Jaehoon Choi, Eun Seok Choi, Hwanpil Park, Gyunghwan Oh, Seungsoo Ha, Wonkyung Choi, Dong Wook Kim - Samsung Electronics Co., Ltd. | 2. 9:50 AM - Multi-Functional Self-Assembled Monolayer for Chip-to-Chip and Chip-to-Wafer Hybrid Bonding Murugesan Mariappan, H Hashimoto, T Fukushima - Tohoku University; K Mori - T-Micro; A Kurachi, T Imori - JX Metals Corporation | 2. 9:50 AM - Ultra Low-Loss Ion-Exchange Waveguides in Optimized Alkali Glass for Co-Packaged Optics Lars Brusberg, Matthew J. Dejneka, Chukwudi A. Okoro, David J. McEnroe, Aramais R. Zakharian, Chad C. Terwilliger - Corning Research and Development Corp. |
| 3. 10:10 AM - Transcending the Reticle Limit in On-Wafer Die Integration and Advanced Packaging: Full-Wafer Patterning With High-Productivity Electron Beam Lithography Andrew Ceballos, Kenneth MacWilliams, Ted Prescop, Tsungun Byambadorj, David Lam - Multibeam Corporation; Timothy Michalka - TLM Technologies, LLC; Craig Bishop, Cliff Sandstrom, Tim Olson - Deca Technologies, Inc. | 3. 10:10 AM - 3D Heterogeneous Integration With Sub-3 µm Bond Pitch Chip-to-Wafer Hybrid Bonding Yi Shi, Haris Niazi, Michael Baker, Yuan Meng, Ashish Dhall, Xavier Brun - Intel Corporation | 3. 10:10 AM - A Surface-Mount Photonic Package With a Photonic-Wire-Bonded Glass Interposer as a Hybrid Integration Platform for Co-Packaged Optics Hiroshi Uemura, Taichi Misawa, Yasutaka Mizuno, Hajime Arai, Tetsuya Nakanishi, Keiji Tanaka, Tomomi Sano, Katsumi Uesaka - Sumitomo Electric Industries, Ltd.; Mami Miyai, Yoshikatsu Ishizuki, Taiji Sakai - FICT LIMITED; Yoichiro Kurita - Tokyo Institute of Technology |
| Refreshment Break: 10:30 a.m. - 11:15 a.m. – Exhibition Hall – Aurora 1 | | |
| 4. 11:15 AM - 600 mm x 600 mm Fan-Out Panel Level Package (FOPLP) as an Alternative to Lead-Frame-Free Quad Flat No Lead (QFN) Package Jacinta Aman Lim, Yoon Muk Park, Brett Dunlap, Jane Lee - nepes Corporation; Robin Davis - DECA | 4. 11:15 AM - Novel Three-Layer Stacking Process With Face-To-Back CoW 6 µm-Pitch Hybrid Bonding Akihiro Urata, Takahiro Kamei, Akihisa Sakamoto, Hiroataka Yoshioka, Kan Shimizu, Yoshihisa Kagawa, Hayato Iwamoto - Sony Semiconductor Solutions Corporation | 4. 11:15 AM - Development of All-Photonics-Function Embedded Package Substrate Using 2.3D RDL Interposer for Co-Packaged Optics Akihiro Noriki, Fumi Nakamura, Satoshi Suda, Takayuki Kurosu, Takeru Amano - National Institute of Advanced Industrial Science and Technology; Hiroataka Uemura, Haruhiko Kuwatsuka, Naoki Matsui, Reona Motoji, Dan Maeda, Tomoya Sugita - Kyocera Corporation |
| 5. 11:35 AM - Challenges and Analysis for Pitch 25 µm - 100 µm Mixed Micro Bumps and Interconnection in Fan-Out Embedded Bridge Die With TSV Package (FO-EB-TSV) Kuei Hsiao Kuo, Jia Han Li, Chia Shing Wu, Feng Lung Chien - Siliconware Precision Industries Co., Ltd. | 5. 11:35 AM - Dielectric Stack Optimization for Die-Level Warpage Reduction for Chip-to-Wafer Hybrid Bonding Chandra Rao Bhesetti, Dileep Kumar Mishra, Nagendra Sekhar Vasarla, Sasi Kumar Tippabhotla, Ismael Cereno Daniel, Ser Choong Chong, King Jien Chui, Srinivasa Rao Vempati - Institute of Microelectronics A*STAR | 5. 11:35 AM - Advanced 3D Packaging of 3.2Tbs Optical Engine for Co-Packaged Optics (CPO) in Hyperscale Data Center Networks Apama Prasad, Sandeep Razdan, Paul Ton, Cristiana Muzio - Cisco Systems, Inc. |
| 6. 11:55 AM - High Precision and Productivity Bridge-Die-Last Bonding Process and Its Reliability for Pillar-Suspended Bridge (PSB) Architecture Ichiro Kono, Yoshihiro Kometani, Atsushi Kuroha - AOI Electronics; Yoichiro Kurita - Tokyo Institute of Technology | 6. 11:55 AM - Low Temperature Wafer Level Hybrid Bonding Enabled by Advanced SiCN and Surface Activation Fumihiro Inoue, Junya Fuse, Sodai Ebiko, Ryosuke Sato - Yokohama National University; Atsushi Nagata, Yoshihiro Kondo - Tokyo Electron Kyushu, Ltd.; Kenichi Saito, Takuo Kawauchi - Tokyo Electron, Ltd.; Jungghwan Park, Chiwoo Ahn, Myeonghyeon Kim, Jiho Kang - SK Hynix, Inc. | 6. 11:55 AM - 3D-Printed Beam Expanding Lens for Chip to Fiber Vertical Coupling Yasutaka Mizuno, Hiroshi Uemura, Tomoya Saeki, Keiji Tanaka, Katsumi Uesaka - Sumitomo Electric Industries, Ltd. |
| 7. 12:15 PM - Vertical Fan-Out (VFO) Package With Enhanced Form Factor and Performances for Mobile Applications Kijun Sung, Kyoungtae Eun, Seowon Lee, Sungwon Yoon, Ho-Young Son, Kang-Wook Lee - SK Hynix, Inc. | 7. 12:15 PM - A Study on D2W Hybrid Cu Bonding Technology for HBM Multi-Die Stacking Hyeonmin Lee, Jihoon Kim, Hyungchul Shin, Wonil Lee, Aeni Jang, Hyuekjae Lee, Byungchan Kim, Ilhwan Kim, Dongjoon Oh, Jumyong Park, Un-Byoung Kang, Dae-Woo Kim - Samsung Electronics Co., Ltd. | 7. 12:15 PM - Characterization of QSFP and OSFP CPO ELS Modules Employing an 8-channel CWDM TOSA in Practical Air-Cooling Conditions Kohei Umetsu, Taketsugu Sawamura, Kyoko Nagai, Yuki Shiroishi, Hideyuki Nasu - Furukawa Electric Co., Ltd. |

PROGRAM SESSIONS: WEDNESDAY, MAY 29, 9:30 A.M. - 12:35 P.M.

| Session 4: Reliability of Advanced Substrates and Interconnects | Session 5: Digital Healthcare: Wearable Sensors, and Flexible Electronics | Session 6: Thermal-Mechanical Reliability Simulations |
|--|---|---|
| Committee: Applied Reliability | Committee: Emerging Technologies | Committee: Thermal/Mechanical Simulation & Characterization |
| Summit 8-9 | Summit 6-7 | Summit 4-5 |
| Session Co-Chairs: Christian Schmidt – NVIDIA Corporation christians@nvidia.com Keith Newman - AMD keith.newman@amd.com | Session Co-Chairs: Rabindra N. Das - MIT Lincoln Labs rabindra.das@ll.mit.edu Hee Seok Kim - University of Washington Tacoma heeskim@uw.edu | Session Co-Chairs: Wei Wang - Qualcomm Technologies, Inc. weiwang.cu@gmail.com Karsten Meier - TU Dresden karsten.meier@tu-dresden.de |
| 1. 9:30 AM - Reliability Assessment of Stacked-Vias With Different Configurations Through a Unit Cell-based Substrate Design Krishna Tunga, Joseph Ross, Shidong Li, Sushumna Iruvanti, Bakul Parikh - IBM Corporation | 1. 9:30 AM - Three-Dimensional Integration of a Flexible Battery and a Flexible Wireless Charger for Powering Wearables Guangqi Ouyang, Subramanian Iyer - University of California, Los Angeles | 1. 9:30 AM - Modeling and Optimization of Thermal Cycling Performance to Reduce Ratcheting-Induced Passivation Cracking in High-Voltage Power Modules Bill Chen, Yong Liu - ON Semiconductor |
| 2. 9:50 AM - Enhanced Biased HAST Reliability of Polyimide for High-Density Redistribution Layers Takumi Onuma, Daisaku Matsukawa, Takahiro Tanabe - HD MicroSystems LLC | 2. 9:50 AM - Ferrite-Based NFC Antenna and Sensor Package Module Development for Implantable Continuous Glucose Monitor Gaurav Mehrotra, Young Kim, Marko Mailand - Renesas Electronics Corporation; James Masciotti - Senseonics, Inc.; Ginger Huang, Jackson Chen, Ryan Lai - Advanced Semiconductor Engineering, Taiwan | 2. 9:50 AM - Interfacial Reliability and Predictive Models for Potted Board Assemblies in Inclined 25000 g Mechanical Shock Pradeep Lall, Aathi Pandurangan, Padmanava Choudhury, Jeff Suhling - Auburn University; Ken Blecker - US Army |
| 3. 10:10 AM - Effect of Lamination Process-Induced Residual Stress on the CTE of Advanced Prepregs Before and After Solder Reflow Process Byoung-Phil Kang - Chungbuk National University/ SIMMTECH; Jong-Yun Lee - Chungbuk National University; Jaesung Kim, Jongwoo Park, Kyu-Jin Lee - SIMMTECH; Yongrae Jang, Bongtae Han - University of Maryland | 3. 10:10 AM - Design and Development of Sustainable Low-Cost Single-Use Electrode Leads for Wearable Medical Devices Babatunde Falola, Riadh Al-Haidari, Udara Somarathna, Bryan Cabrera, Mohammed Alhendi, Mark D Poliks - Binghamton University; Nancy Stoffel - General Electric Global Research; Gurvinder Khinda, Tzu-Jen Felix Kao - General Electric Healthcare; Rafael Tudela - Tapecon, Inc. | 3. 10:10 AM - A Novel Approach to Assess Board Level Solder Joint Reliability for Flip Chip on Leadframe Package Using Finite Element Analysis Guangxu Li, Siva Gurrum, Frank Mortan, Li Jiang, Carlos Arroyo - Texas Instruments, Inc. |
| Refreshment Break: 10:30 a.m - 11:15 a.m. – Exhibition Hall – Aurora 1 | | |
| 4. 11:15 AM - Fan-Out PoP Solder Joint Reliability Investigation by System Power Cycling Chi Ko Yu, Tech Wong, Hank Hsieh, P. H. Tsao, M.Z. Lin, Liham Chu - MediaTek, Inc. | 4. 11:15 AM - Conformal Skin Patch for Dehydration Monitoring in Dementia Patients Musafargani Sikkandhar, Ramona B. Damalero, Wei Da Toh, Ming-Yuan Cheng - Institute of Microelectronics A*STAR | 4. 11:15 AM - A Robust Mesh Size Control Technology Suitable for Various Empirical Equations for Predicting Solder Joint Reliability Kuo-Ning Chiang, C. E. Lee - National Tsing Hua University; Cadmus Yuan - Feng Jia University |
| 5. 11:35 AM - Fatigue-Fracture Propensity Measurement and Competing Risk Model for FCBGA Interfaces Under Sustained Humidity and Temperature Exposure Pradeep Lall, Aathi Pandurangan, Padmanava Choudhury, Madhu Kasturi, Jeff Suhling - Auburn University | 5. 11:35 AM - Silicon-Based Membrane Pressure Sensor for Inline Monitoring of Pressure and Hermeticity of Small-Volume Bonded Packages Jannik Koch, Levin Brinkmann, Alexander Kassner, Folke Dencker, Marc Wurcz - Institute of Micro Production Technology | 5. 11:35 AM - Multi-Material Corner Singularity in Electronic Packaging: Avoiding Mesh Dependence in Analyzing Stress Yaxiong Chen, Torsten Hauck - NXP Semiconductor, Inc.; Ganesh Subbarayan - Purdue University |
| 6. 11:55 AM - Evaluation of Vapor Pressure Induced Debonding Failure in Fan-Out Package Under Reflow Condition Bo-Shuo Chen, Tz-Cheng Chiu - National Cheng Kung University; Wei-Jie Yin, Chin-Li Kao - Advanced Semiconductor Engineering, Taiwan | 6. 11:55 AM - Using Flexible Hybrid Electronics on a Miniaturized Non-invasive Bio-optical Sensor For Hemoglobin Detection Yu-Chih Lee, Kai-Lun Yu, Shu-An Tsai, Pai-Sheng Shih, Guo-Sin Huang, Tien-Chia Liu, Hung-I Lin, Jen-Chun Chen, Jen-Kuang Fang, Harrison Chang - Advanced Semiconductor Engineering, Inc.; Tzyy-Wei Fu, Sheng-Hao Tseng - National Cheng Kung University | 6. 11:55 AM - Bayesian Optimization of Large Glass Package Architecture for System-Level Reliability in High-Performance Computing Applications Emanuel Torres Surillo, Christian Molina-Mangual, Pratik Nimbalkar, Hyunggyu Park, Ramon Sosa, Vanessa Smet - Georgia Institute of Technology |
| 7. 12:15 PM - Characterization and Sensitivity Analysis of Piezoresistive Stress Sensor for Thermal and Mechanical Loads and Implementation for In-Situ Health Monitoring of Solder Bumps Adwait Inamdar, Willem van Driel, GuoQi Zhang - Delft University of Technology; Varun Thukral, Letian Zhang, Jeroen Zaal, Michiel van Soestbergen, Hanz Tuinhout - NXP Semiconductor, Inc. | 7. 12:15 PM - A Multi-Channel, Embedded, and Geometrically Optimized Filter Bank Utilizing Advanced Packaging Topologies for Miniaturized RF Modules in IoT and Wearable Systems Hani Al-Jamal, Marvin Joshi, Manos M. Tentzeris - Georgia Institute of Technology; Nick Kingsley - Teradyne | 7. 12:15 PM - Prediction of Moisture Absorption Characteristics Under Normal/ Accelerated Preconditioning Condition in Multi-Chip Packages Hyunggyu Noh, Jinsoo Bae, Keunho Rhew, Soojin Yoo, Jiyoung Lim, Yuchul Hwang, Sangwoo Pae - Samsung Electronics Co., Ltd. |

PROGRAM SESSIONS: WEDNESDAY, MAY 29, 2:00 P.M. - 5:05 P.M.

| Session 7: Heterogeneous Integration: Systems Design, Signal & Power Delivery, and Process Optimization | Session 8: Sub-Micron Scaling in Wafer-to-Wafer Hybrid Bonding | Session 9: Advanced Processes for Chip Stacking |
|---|--|---|
| Committee: Packaging Technologies | Committee: Interconnections | Committee: Materials & Processing |
| Aurora B | Aurora D | Crest 3-5 |
| Session Co-Chairs: Lihong Cao - ASE lihong.cao@aseus.com Subhash L. Shinde - Notre Dame University sshinde@nd.edu | Session Co-Chairs: Jean-Charles Souriau - CEA Leti jcsouriau@cea.fr Matthew Yao - GE Aerospace matthew.yao@ge.com | Session Co-Chairs: Qianwen Chen - IBM Research chenq@us.ibm.com Vidya Jayaram - Intel vidya.jayaram@intel.com |
| <p>1. 2:00 PM - Next Generation Large Size High Interconnect Density CoWoS-R Package Chien-Hsun Lee, C.L. Lai, M. Liu, J. Hu, S.L. Tsai, H.Y. Chen, J. Lin, C.C. Hsieh, C.K. Hsu, Kathy Yan, Shin-Puu Jeng, Jun He - Taiwan Semiconductor Manufacturing Company, Ltd.</p> | <p>1. 2:00 PM - Study of Ultra Fine 0.4 μm Pitch Wafer-to-Wafer Hybrid Bonding and Impact of Bonding Misalignment Yukako Ikegami, Takumi Onodera, Masanori Chiyozono, Akihisa Sakamoto, Kan Shimizu, Yoshihisa Kagawa, Hayato Iwamoto - Sony Semiconductor Solutions Corporation</p> | <p>1. 2:00 PM - IR Laser Release for 3D Stacked Devices: Effect of the Release Stack Structure on the Debonding Mechanism François Chancerel, John Slabbekoom, Steven Brems, Alain Phommahaxay, Eric Beyne - imec; Peter Urban, Julian Bravin, Thomas Uhrmann, Markus Wimplinger - EV Group, Inc.</p> |
| <p>2. 2:20 PM - World's First UCle Interoperability Silicon Enabling Open Standards Heterogeneous Integration Xavier Brun, Stephen Wong - Intel Corporation; Manuel Mota - Synopsys, Inc.</p> | <p>2. 2:20 PM - 3-Layer Fine Pitch Cu-Cu Hybrid Bonding Demonstrator With High Density TSV for Advanced CMOS Image Sensor Applications Stephane Nicolas, Jerzy-Javier Suarez-Berru, Nicolas Bresson, Carole Socquet-Clerc, Myriam Assous, Stephan Borel - Grenoble Alps University/CEA-LETI</p> | <p>2. 2:20 PM - High Performance 3D Package Technology for Mobile Application Processor (AP) Sun Jae Kim, Cheol Kim, Huiyeong Jang, Jongba Hong, Seongyo Kim, Yongwon Choi, Chajea Jo, Sun-Kyung Seo, Dong Kwan Kim, Dae-Woo Kim - Samsung Electronics Co., Ltd.</p> |
| <p>3. 2:40 PM - Scalable Advanced DBHi Chiplet Package Using Silicon Bridge With 30 μm-Pitch Solder Joints Akihiro Horibe, Takahito Watanabe, Chinami Marushima, Sayuri Kohara, Hiroyuki Mori - IBM Research, Tokyo; Divya Taneja, Thomas Wassick, Isabel de Sousa - IBM Infrastructure; Qianwen Chen, Eric Perfecto, Aakrati Jain, Joseph Ross - IBM Research</p> | <p>3. 2:40 PM - Scaling Cu/SiCN Wafer-to-Wafer Hybrid Bonding Down to 400 nm Interconnect Pitch Boyao Zhang, Soon-Aik Chew, Michele Stucchi, Sven Dewilde, Serena Iacovi, Liesbeth Witters, Tomas Webers, Koen Van Sever, Joeri De Vos, Andy Miller, Gerald Beyer, Eric Beyne - imec</p> | <p>3. 2:40 PM - Room Temperature Bonding of CVD Polycrystalline Diamond Wafers to Semiconductor and Piezo-Electric Single Crystalline Wafers Tadatomo Suga, Junsha Wang Suga - Meisei University; Kazuya Yamamura - Osaka University; Izumi Kataoka - IIPT Inc.</p> |
| Refreshment Break: 3:00 p.m. - 3:45 p.m. – Exhibition Hall – Aurora 1 | | |
| <p>4. 3:45 PM - Performance Evaluation of UCle-Based Die-to-Die Interface on Low-Cost 2D Packaging Technology Srujan Penta - Marvell Technology, Inc. / Georgia Institute of Technology; Ting Zheng, Eric Tremble, Aatreya Chakravarti, Anthony Sigler, Carl Benes, Wolfgang Sauter - Marvell Technology, Inc.; Zhonghao Zhang, Muhannad Bakir - Georgia Institute of Technology</p> | <p>4. 3:45 PM - Fine Pitch and Low Temperature Nanocrystalline-Nanotwinned Cu and SiCN-to-SiO₂ Wafer-to-Wafer Hybrid Bonding Wei-Lan Chiu, Ou-Hsiang Lee, Chia-Wen Chiang, Hsiang-Hung Chang, Chin-Hung Wang, Wei-Chung Lo - Industrial Technology Research Institute; James Yi-Jen Lo, Chiang-Lin Shih, Hsih-Yang Chiu - Nanya Technology Corporation</p> | <p>4. 3:45 PM - Bump-Less Interconnect With Room Temperature Pre-Bondable Adhesive and Solder for High Throughput Chip Stacking Wataru Okada, Yuza Nakamura, Yasuhisa Kayaba, Takuo Shikama, Yutaka Hisamune, Kahori Tamura, Satoshi Inada, Rikia Furusho - Mitsui Chemicals, Inc.</p> |
| <p>5. 4:05 PM - Signal & Power Integrity Optimization Utilizing Silicon Core Substrate Seann Ayers, Steven Verhaverbeke, Han-Wen Chen, Liu Jiang, El Mehdi Bazizi - Applied Materials, Inc.</p> | <p>5. 4:05 PM - Single-Grain Cu μ-Joint Formation Induced by Selective Under-Seed-Metallurgy for Hybrid Bonding Murugesan Mariappan, Hiroyuki Hashimoto, Takafumi Fukushima - Tohoku University; Kiyoharu Mori - T-Micro; Masahiro Sawa, Jinta Nampo - JCU Corporation</p> | <p>5. 4:05 PM - IR Laser Debond From Silicon Carrier Wafers With Inorganic Thin Film Release Layers for High-Density 2.5D and 3D Integration Thomas Sounart, Tushar Talukdar, Henning Braunisch, Paul Nordeen, Kimin Jun, Aleksandar Aleksov, Adel Elsherbini, Shawna Liff, Johanna Swan - Intel Corporation</p> |
| <p>6. 4:25 PM - Package Power Delivery Architecture for High Performance Computing Systems With a 1 kW IVR Operated in CCM-DCM Boundary Mode Condition Ramin Rahimzadeh Khorasani, Madhavan Swaminathan - Pennsylvania State University; Xingchen Li, Joon Woo Kim, Prahalad Murali - Georgia Institute of Technology; Rohit Sharma - Indian Institute of Technology Ropar</p> | <p>6. 4:25 PM - 0.5 μm Pitch Wafer-to-Wafer Hybrid Bonding at Low Temperatures With SiCN Bond Layer Kai Ma, Nikos Bekiaris, Sesh Ramaswami - Applied Materials, Inc.; Taotao Ding, Gernot Probst, Tobias Wernicke, Thomas Uhrmann, Markus Wimplinger - EV Group, Inc.</p> | <p>6. 4:25 PM - Backside Thinning Process Development for High-Density TSV in a 3-Layer Integration Renan Bouis, Lionel Vignoud, Jerome Dechamp, Damien Hebras, Paul Valentin, Jeremy Marchand, Stephan Borel - Grenoble Alps University/CEA-LETI; Myriam Assous - CEA-LETI</p> |
| <p>7. 4:45 PM - Study for Realization of the Next Generation High Density RDL Packaging for 2.5D Large Silicon Interposer Masaki Mizutani, Yusuke Tokuyama, Noriyuki Shiozawa, Mizuma Murakami, Hiromi Suda, Ken-Ichiro Shinoda, Ken-Ichiro Mori - Canon, Inc.; Douglas Shelton - Canon USA, Inc.</p> | <p>7. 4:45 PM - Development of Double Cantilever Beam Technique for Wafer-to-Wafer Bond Energy Measurement Guohua Wei, Matthew Gerber, Derik Rudd, Robert Sibley, Pengfei Nie, Logan Battrell, Andrew Bayless, Sam Ireland, Mark Fischer, Dan Markowitz, David Palsulich - Micron Technology, Inc.</p> | <p>7. 4:45 PM - Process Development and Characterization of Ru-Based UBM for In Bumps Integration for Quantum Computing Applications Harold Le Tulzo, Diane Bijou, Thérèse Souza, Anthony Gallegos, Jérôme Daviot - Technic France; Candice Thomas, Edouard Deschaseaux, Céline Feautrier, Jean Charbonnier, Alain Gueugnot - CEA-LETI; Jaber Derakhshandeh, Tassawar Hussain - imec</p> |

PROGRAM SESSIONS: WEDNESDAY, MAY 29, 2:00 P.M. - 5:05 P.M.

| Session 10: Novel 3D Integration and Hybrid Bonding Solutions | Session 11: Next-Generation Artificial Intelligence, Quantum Computing, and Secure Packaging | Session 12: Artificial Intelligence and Advanced Modeling Approaches |
|---|--|--|
| Committee: Assembly & Manufacturing Technology | Committee: Emerging Technologies | Committee: Thermal/Mechanical Simulation & Characterization |
| Summit 8-9 | Summit 6-7 | Summit 4-5 |
| Session Co-Chairs: Zia Karim - Yield Engineering Systems zkarim@yieldengineering.com Wenhao (Eric) Li - Intel wenhao.li@intel.com | Session Co-Chairs: Rohit Sharma - IIT Ropar rohit@iitrpr.ac.in Santosh Kudtarkar - Analog Devices santosh.kudtarkar@analog.com | Session Co-Chairs: Yong Liu - OnSemi Yong.Liu@onsemi.com KN Chiang - National Tsinghua University knchiang@pme.nthu.edu.tw |
| <p>1. 2:00 PM - Investigation of Distortion in Wafer-to-Wafer Bonding With Highly Bowed Wafers Shuo Kang, Serena Iacovo, Koen D'havé, Stefaan Van Huylbroeck, Joeri De Vos, Gerald Beyer, Eric Beyne - imec; Thomas Plach, Gernot Probst, Taotao Ding, Markus Wimplinger, Thomas Uhrmann - EV Group, Inc.</p> | <p>1. 2:00 PM - Reworkable Superconducting Qubit Package for Quantum Computing Rabindra Das, John Cummings, Thomas Hazard, Danna Rosenberg, David Conway, Shireen Wamock, Michael Gingras, Cyrus Hirjibehedin, Bethany Huffman, Steven Weber, Jonilyn Yoder, Mollie Schwartz - MIT Lincoln Laboratory</p> | <p>1. 2:00 PM - Machine-Learning Guided Strain-Relief Patterns for Maximizing Stretchability of Printed Conductors Rui Chen - Eastern Michigan University; Suresh Sitaraman - Georgia Institute of Technology</p> |
| <p>2. 2:20 PM - Development of 0.5 µm Pixel 3-Wafers Stacked CMOS Image Sensor With Through Silicon Deep Contact and In-Pixel Cu-Cu Bonding Process Do Yeon Kim - Samsung Electronics Co., Ltd.</p> | <p>2. 2:20 PM - Key Technologies and Design Aspects for Wafer Level Packaging of High Performance Computing Modules Kai Zoschke, Hermann Oppermann, Michael Schiffer, Ivan Ndiq, Karl-Friedrich Becker, Marius Adler, Alexander Gäbler, Uwe Maass - Fraunhofer IZM; Gianna Paulin - Swiss Federal Institute of Technology; Walter Kocon - GlobalFoundries, Inc.</p> | <p>2. 2:20 PM - Development of Real-Time Thermal Monitoring of GaN-based Power Inverter Modules Using Digital Twin Bin He, Gongyue Tang - Institute of Microelectronics A*STAR; Jaydeep Saha, Rahul Sadanand Bhujade, Sanjib Kumar Panda - National University of Singapore</p> |
| <p>3. 2:40 PM - Non-TCB Process Cu/SiO₂ Hybrid Bonding Using Plasma-Free Hydrophilicity Enhancement With NaOH for Chip-to-Wafer Bonding Yu-An Chen, Jia-Juen Ong, Wei-You Hsu, Shih-Chi Yang, Chih Chen - National Yang Ming Chiao Tung University; Wei-Lan Chiu, Hsiang-Hung Chang - Industrial Technology Research Institute</p> | <p>3. 2:40 PM - Fine Pitch Nb-Nb Direct Bonding for Quantum Applications Pablo Renaud, Christophe Dubarry, Nicolas Bresson, Edouard Deschaseaux, Frank Fournel, Christophe Morales, Anne-Marie Papon, Candice Thomas - Grenoble Alps University/CEA-LETI; Jean Charbonnier - CEA-LETI</p> | <p>3. 2:40 PM - Creep Parameters for Solder Interconnects by Nanoindentation Inverse-FEA Method Shidong Li, Christine Taylor, Charles Arvin - IBM Corporation</p> |
| Refreshment Break: 3:00 p.m. - 3:45 p.m. – Exhibition Hall – Aurora 1 | | |
| <p>4. 3:45 PM - A Novel Approach to Low Temperature Bonding Using Single Wafer Thermal Processing System Masha Gorchichko, Shashank Sharma, Ben Ng, Tyler Sherwood, Yoocham Jeon, Kun Li, Sarabjot Singh, Evan Iler, Raghav Sreenivasan, Sid Krishnan - Applied Materials, Inc.</p> | <p>4. 3:45 PM - Si Interposer With Cu TSVs on Cu Substrate Thermally and Electrically Anchoring Qubit Chips in Millikelvin Assembly Misato Taguchi, Takaaki Okidono, Takuji Miki, Makoto Nagata - Kobe University</p> | <p>4. 3:45 PM - Deep Convolution Neural Networks for Automatic Detection of Defects Which Impact Hybrid Bonding Yield Oliver Zhao, Dominik Suwito, Bongsub Lee, Thomas Workman, Laura Mirkarimi - Adeia</p> |
| <p>5. 4:05 PM - Moving Towards Microchannel- Based Chip Cooling Paul Semenza, Gity Samadi - SEMI; Dave Thomas - SPTS Technologies, Ltd.; Garrett Oakes, Dave Kirsch - EV Group, Inc.; Yin Hang - Meta Platforms, Inc.; Kuo-Chung Yee - Taiwan Semiconductor Manufacturing Company, Ltd.; Michael Cumbie, Paul Benning - HP Inc.; Madhusudan Iyengar - Google; Lihong Cao, William Chen - Advanced Semiconductor Engineering, Inc. (US)</p> | <p>5. 4:05 PM - Novel Approach for 3D Defect Detection and Metrology of HBMs Using Minimum Labeled Data Ziyuan Zhao, Qiyu Wei, Jie Wang, Richard Chang, Ramanpreet Pahwa - Institute for Infocomm Research A*STAR; Xulei Yang - Institute of Microelectronics A*STAR</p> | <p>5. 4:05 PM - Experimentally Validated Thermal Modeling Prediction for BEOL and BSPDN Stacks Xinyue Chang - imec/KU Leuven; Herman Oprins, Bjorn Vermeersch, Vladimir Cherman, Melina Lofrano, Seongho Park, Zsolt Tokci, Ingrid De Wolf - imec</p> |
| <p>6. 4:25 PM - Novel Inorganic IR Release Process for High Temperature W2W and D2W Integration Thomas Uhrmann, Peter Urban, Boris Považay, Michael Josef Gruber, Bernd Thallner, Markus Wimplinger - EV Group, Inc.</p> | <p>6. 4:25 PM - Design and Fabrication of 2.5D Cryogenic Interposer With Integrated Superconducting TSVs and Resonators King Jien Chui, Hongyu Li - Institute of Microelectronics A*STAR</p> | <p>6. 4:25 PM - Analysis of Mechanical Behavior of Hybrid SAC-LTS Joints Under Temperature Cycling With a Modified Garofalo Creep Model Based on Bi Concentration Souvik Chakraborty, Jeff Suhling - Auburn University; Yaxiong Chen, Gaurav Sharma, Abdullah Fahim, Torsten Hauck - NXP Semiconductor, Inc.; Ronit Das, Atif Mahmood, Peter Borgesen - Binghamton University</p> |
| <p>7. 4:45 PM - D2W Hybrid Bonding System Achieving High-Accuracy and High-Throughput With Minimal Configurations Kentaro Mihara, Takashi Hare, Hirofumi Sakai, Shimpei Aoki, Toyoharu Terada - Toray Engineering Co., Ltd.; Mariappan Murugesan, Hiroyuki Hashimoto, Hisashi Kino, Tetsu Tanaka, Takafumi Fukushima - Tohoku University; Fumihiko Inoue - Yokohama National University; Akira Uedono - University of Tsukuba</p> | <p>7. 4:45 PM - PQC-HI: PQC-enabled Chiplet Authentication and Key Exchange in Heterogeneous Integration Md Sami Ul Islam Sami, Kimia Zamiri Azar, Hadi Mardani Kamali, Farimah Farahmandi, Mark Tehranipoor - University of Florida</p> | <p>7. 4:45 PM - ILD Crack Mechanical Reliability Mitigation Yutaka Suzuki, Williamson Jaimal, Rajen Murugan - Texas Instruments, Inc.</p> |

PROGRAM SESSIONS: THURSDAY, MAY 30, 9:30 A.M. - 12:35 P.M.

| Session 13: Next-Generation Substrate Manufacturing Technologies | Session 14: Breakthrough Ultra-Fine Pitch Redistribution Layer and Solder Bumping Technologies | Session 15: Novel Materials and Process for Hybrid Bonding |
|--|---|---|
| Committee: Packaging Technologies | Committee: Interconnections | Committee: Materials & Processing |
| Aurora B | Aurora D | Crest 3-5 |
| Session Co-Chairs: Markus Leitgeb - AT&S m.leitgeb@ats.net Kuldip Johal - MKS Instruments- MSD kuldip.johal@atotech.com | Session Co-Chairs: Seung Yeop Kook - GLOBALFOUNDRIES seung-yeop.kook@globalfoundries.com Wei Zhou - Micron zhouwei@micron.com | Session Co-Chairs: Ivan Shubin - Raytheon Technologies ishubin@gmail.com Dwayne Shirley - Marvel Semiconductor shirley@ieee.org |
| 1. 9:30 AM - Development of Next-Generation Chemical Mechanical Planarization Process for Panel-Level Heterogeneous Integration Francoise Angoua, Aaditya Candadai, Daniel Rosales-Yeomans, Yosef Kornbluth, Dilan Seneviratne, Rahul Manepalli - Intel Corporation | 1. 9:30 AM - A Study on Improvement and Extension of Fine-Pitch Micro-Bump Interconnects Technology: New Metallurgy & Flux-Less Oxide-Removal Laser Assembly (FLOLA) Seok-Geun Ahn, Ju-Hyeon Oh, Gwang-Jae Jeon, Dae-Ho Lee, Seok-Hyun Lee - Samsung Electronics Co., Ltd. | 1. 9:30 AM - Towards Standardization of Hybrid Bonding Interface: In-Depth Study of Dielectrics on Direct Bonding Yi Yang, Xavier F. Brun - Intel Corporation; Marco Flores - Arizona State University; Marc Weber - Washington State University |
| 2. 9:50 AM - Dry Processes to Form Fine Features on Advanced Substrates Wen Xiao, Qin Zhong, Cindy Mora, Anindarupa Chunder, Nicholas Loo, Sik Hin Chi, Cheng Sun, Weihua Qing, Harish V Penmethsa, Craig Rosslee, Jeff Turner - Applied Materials, Inc. | 2. 9:50 AM - A Novel Copper Microporous-Assisted Bonding Method for Fine-Pitch Cu/Sn Microbump 3D Interconnects Keyu Wang, Shuhang Lyu, Tiwei Wei - Purdue University | 2. 9:50 AM - Demonstration of Low Temperature Cu-Cu Hybrid Bonding Using a Novel Thin Polymer Yasuhisa Kayaba, Takuo Shikama, Wataru Okada, Kahori Tamura, Yuzo Nakamura, Yutaka Hisamune, Rikia Furusho - Mitsui Chemicals, Inc. |
| 3. 10:10 AM - Direct Laser Patterning Using Excimer Laser on Polyimide Compositions With Low Dielectric Properties and Good Flexibility for Redistribution Layer Kanta Wataji, Akira Suwa, Junichi Fujimoto, Yasuhumi Kawasuji - Gigaphoton Inc; Takashi Yamaguchi, Taiyo Nakamura, Takashi Tazaki - Arakawa Chemical Industries, Ltd.; Masaru Sasago - ba2.so-net.ne.jp | 3. 10:10 AM - Challenges and Innovations in Dual Damascene Polymer RDL With 2 μm Pitch and Beyond Benjamin Briggs, Roger Quon, Chris Bencher, Ryan Ley, C.C. Chuang, Peng Suo, Andy Chang Bum Yong, Luisa Bozano, Jorge Fernandez, Prayundi Lianto, Niranjan Khasgiwale, Siddarth Krishnan - Applied Materials, Inc. | 3. 10:10 AM - Process Challenges in Thin Wafers Fabrication With Double Side Hybrid Bond Pads for Chip Stacking Dileep Kumar Mishra, Nagendra Sekhar Vasarla, Chandra Rao Bhesetti, Ser Choong Chong, Srinivasa Rao Vempati - Institute of Microelectronics A*STAR |
| Refreshment Break: 10:30 a.m. - 11:15 a.m. – Exhibition Hall – Aurora 1 | | |
| 4. 11:15 AM - New Power Delivery Network (PDN) Approach for Extremely Large FC-BGA With Organic Substrate Based on Over 1 mm-Thick Core Kyojin Hwang, Woobin Jung, Junghwa Kim, Heeseok Lee, Jisoo Hwang, Heejung Choi - Samsung Electronics Co., Ltd. | 4. 11:15 AM - Void Migration Kinetics in Fine Line Cu RDL Under Electric Current Stressing and the Improvement of Electromigration Reliability by Polyimide Passivation Yen-Cheng Huang, Kwang-Lung Lin - National Cheng Kung University; Min-Yan Tsai, Ting-Chun Lin, Yung-Sheng Lin - Advanced Semiconductor Engineering, Inc. (US); Chih-Pin Hung, Chen-Chao Wang - Advanced Semiconductor Engineering, Inc. | 4. 11:15 AM - Development of Low Temperature Processable Polyimides for Organic Hybrid Bonding Applications Kota Nomura, Masaya Jukei, Hitoshi Araki, Tomoyuki Honda, Yu Shoji - Toray Industries, Inc.; Takenori Fujiwara - Toray Singapore Research Center |
| 5. 11:35 AM - X-Ray Photoelectron Spectroscopy (XPS) Investigations to Monitor the Surface Chemistry During Palladium-Free Colloidal Copper Activation Ibbi Ahmet, André Beyer, Laurence J. Gregoriades, Julia Lehmann, Yvonne Welz - Atotech (MKS Instruments) | 5. 11:35 AM - Reliable Chiplet Integration on High Density Laminate (2.X D) for AI Hardware Divya Taneja, Jonathan Pouliot-Grenier, Isabel de Sousa - IBM Canada, Ltd.; Joseph Ross, Sathya Raghavan, Griselda Bonilla - IBM Research; Horiyuki Mori - IBM Research, Tokyo; Brian Quinlan Quinlan, Thomas Wassick - IBM Systems | 5. 11:35 AM - Effect of (111) Surface Ratio on the Bonding Quality of Cu-Cu Joints Huang Jian-Yuan, Chen Chih - National Yang Ming Chiao Tung University |
| 6. 11:55 AM - Development of Glass Core Substrate With the Stress Analysis, Transmission Characteristics and Reliability Koji Fujimoto, Yashuhiro Okawa, Takahiro Tai, Satoru Kuramochi - DNP Co., Ltd. | 6. 11:55 AM - Zero-Misalignment Technology Achieves 333 IO/mm/Layer on Mold Veronica Strong, Trianggono Widodo, Holly Sawyer, Carolyn Aubertine, Aleksandar Aleksov, Johanna Swan - Intel Corporation | 6. 11:55 AM - Copper Microstructure Optimization for Fine Pitch Low Temperature Cu/SiO2 Hybrid Bonding Marie Maubert, Mathilde Gottardi, Pierre-Emile Philip, Emilie Fragnaud, Gilles Romero, Arnaud Cornelis, Hadi Hijazi - Grenoble Alps University/CEA-LETI; Frank Fournel, Maria-Luisa Calvo-Mur-noz - CEA-LETI |
| 7. 12:15 PM - High Aspect Ratio (AR) Through Glass Via (TGV) Etch Performance on Glass Core Substrates for High Density 3D Advanced Packaging Applications Venugopal Govindarajulu, Coby Tao, Zia Karim, Aneelman Brar - Yield Engineering Systems; Sung Jin Kim - Absolics | 7. 12:15 PM - Additive Manufacturing of High-Density (2.5 μm L/S) Ag-Cu Stacked Interconnects on Organic Substrates Shrivani Pandiya, Serge Ecoffey, Yann Beilliard, Dominique Drouin - University of Sherbrooke; Christophe Sansregret - Centre de Collaboration MiQrolInnovation (C2MI); Isabel De Sousa - IBM Canada, Ltd. | 7. 12:15 PM - Multi-Tier Die Stacking Through Collective Die-to-Wafer Hybrid Bonding Koen Kennes, Ye Lin, Samuel Suhard, Pieter Bex, Dieter H. Cuyppers, Alain Phommahaxay, Gerald Beyer, Eric Beyne - imec; Alice Guerrero - Brewer Science, Inc.; Dennis Bumüller - SUSS MicroTec GmbH |

PROGRAM SESSIONS: THURSDAY, MAY 30, 9:30 A.M. - 12:35 P.M.

| Session 16: Reliability of High-Density and High-Power Packages | Session 17: Advanced Additive Manufacturing for Printed Electronics and Integrated Systems | Session 18: Radio Frequency Antenna-in-Package and Component Design |
|---|--|---|
| Committee: Applied Reliability | Committee: Emerging Technologies | Committee: RF, High-Speed Components & Systems |
| Summit 8-9 | Summit 6-7 | Summit 4-5 |
| Session Co-Chairs: Scott Savage - Medtronic Microelectronics scott.savage@medtronic.com Nokibul Islam - JCET Group Nokibul.ISLAM@jcetglobal.com | Session Co-Chairs: Xinpei Cao - Henkel Corporation xinpei.cao@henkel.com Tengfei Jiang - University of Central Florida Tengfei.jiang@ucf.edu | Session Co-Chairs: Amit P. Agrawal - AMD ap_agrawal@yahoo.com Sungwook Moon - Samsung sw2013.moon@samsung.com |
| 1. 9:30 AM - Structural Characterization of 2.5D System in Package Combined With High Bandwidth Memory for Enhanced Quality and Reliability Byoungdo Lee, Jinwoo Choi, Sangyong Lee, Jinwoo Park, Gyujei Lee, Kangwook Lee - SK Hynix, Inc. | 1. 9:30 AM - Embedded RF Packaging Via Ceramic 3D Printing and Printed Electronics Additive Manufacturing Abdullah Obeidat, Mohammed Abdelatty, Ashraf Umar, Zhi Dou, Firas Alshatnawi, Riadh Al-Haidari, Waleed Al-Shaibani, Mohammed Alhendy, Mark Poliks - Binghamton University; Cathleen Hoel, Jason Case, Joseph Iannotti - GE Aerospace | 1. 9:30 AM - Design and Simulation Study of 300-GHz Molded Patch Antenna in Packaging Substrate Harshpreet Singh Phull Bakshi, Rajen Murugan, Sylvester Ankamah-Kusi - Texas Instruments, Inc. |
| 2. 9:50 AM - Reliability Investigations of Advanced Photosensitive Polymer Based RDL Processes Protected by Inorganic Capping Layers Emmanuel Chery, Nelson Pinho, Eric Beyne - imec; Ritwik Bhatia, Ganesh Sundaram - Veeco | 2. 9:50 AM - A CMOS Nanosensing System for Continuous Brain Multianalyte Monitoring Yue Gu, Jesus Maldonado Vazquez, De-Shaine Murray, Hitten Zaveri, Dennis Spencer - Yale University | 2. 9:50 AM - Wideband Antennas on Thin-Film Packaging Substrates for 140 GHz 6G Applications Thi Huyen Le, Michael Phillip Kaiser, Julia-Marie Köszegi, Kavin Senthil Murugesan, Lutz Gerhold, Ivan Ndjip, Martin Schneider-Ramelow - Fraunhofer IZM; Habib Hichri - Ajinomoto Fine-Techno USA Corporation; Ryohei Oishi, Reki Nakano - Ajinomoto Co., Inc. |
| 3. 10:10 AM - Alternative Techniques for Cross-Sectioning and Quality Analysis of Solder-TIM Joints With Soft Indium Alloys Peter McClure, Daniel VanHart, Ali Davoodabadi - Universal Instruments Corp. | 3. 10:10 AM - Novel Sub-THz Antenna SoP Modules Enabled by Micrometer-Scale Metal 3D Printing for B5G/6G Applications Genaro Soto Valle Angulo, Kexin Hu, Manos M. Tentzeris - Georgia Institute of Technology | 3. 10:10 AM - Miniaturized Highly-Efficient Substrate Integrated Waveguide (SIW) Cavity Slot Antenna at 28 GHz Based on Through Fused-Silica Via (TFV) Technology Hanna Jiang, Payman Pahlavan, Yong-Kyu Yoon - University of Florida |
| Refreshment Break: 10:30 a.m. - 11:15 a.m. – Exhibition Hall – Aurora 1 | | |
| 4. 11:15 AM - Fusing Current Characterization of Various Cu RDL Designs in Wafer Level Packages JeongMin Ju, JiYeon Yoon, EunSook Sohn - Amkor Technology Korea/Amkor Technology, Inc.; Nathan Whitchurch - Amkor Technology, Inc. | 4. 11:15 AM - Direct-Write NiO RRAM Cells Jordan Howard-Jennings, Riadh Al-Haidari, Emuobosan Enakerakpo, Stephen Gonya, Mohammed Alhendy, Mark Poliks - Binghamton University; Kevin Bell, Tom Rovere - Lockheed Martin | 4. 11:15 AM - A Compact mmWave 1x4 Antenna Array Design With Shorted Parasitic Elements for 5G AIP Applications Sheng-Chi Hsieh, Cheng-Yu Ho - Advanced Semiconductor Engineering, Inc. (US) |
| 5. 11:35 AM - Electromigration Failure Mechanisms of Cu-Cu Joints at Low Stressing Temperatures Shih-Chi Yang - Department of Materials and Science Engineering; Chih Chen - National Yang Ming Chiao Tung University | 5. 11:35 AM - Micro-3D-Printed Packaging Substrates With Embedded Through Holes for Organic Interposers Nahyeon Kim, Haksoon Jung, Yongwoo Lee, Sungmin Eum, Yechan Han, Jimin Kwon - Ulsan National Institute of Science and Technology; Hyunjin Park - Korea Research Institute of Chemical Technology; Yunsik Park - Korea Electronics Technology Institute | 5. 11:35 AM - High-Performance Polymer Microwave Fiber Coupler in eWLB Package for Sub-THz Communication Vasileios Liakonis - Infineon Technologies AG/National Technical University of Athens; Yannis Papananos - National Technical University of Athens; Maciej Wojnowski, Walter Hartner - Infineon Technologies AG |
| 6. 11:55 AM - A Data-Driven Machine Learning Model for the Stress-Strain Behavior of Single Grain SAC305 Solder Joints Debabrata Mondal, Jeffrey Suhling, Elham Mirkoohi, Pradeep Lall - Auburn University | 6. 11:55 AM - A Novel Fully Additive Fabrication Approach for Creating Double-Stacked Copper Spiral Inductors Roghayeh Imani, Shailesh Chouhan, Jerker Delsing - Lulea University of Technology; Sarthak Acharya - University of Oulu | 6. 11:55 AM - RF Modelling and Characterization of TSVs and Inductive Links of Hybrid Bonded Devices Xiao Sun, Chin-Ya Su, Shih-Hung Chen, Soon Aik Chew, Boyao Zhang, Eric Beyne - imec |
| 7. 12:15 PM - BGA Electromigration Behavior and Why It Has Become the Bottleneck Riet Labie, Chinmay Nawghane, Dimitrios Tsiakos, Jan Mertens - imec; Wolfgang Sauter, Eric Tremble, Richard Graf - Marvell Technology, Inc. | 7. 12:15 PM - A Flexible Composite Heat Sink Embedded Ag Microchannels for Potential Flexible Electronic Applications Han Cai, Yongjin Wu, Yanxin Zhang, Yunna Sun, Zhuoqing Yang, Guifu Ding - Shanghai Jiao Tong University; Jiangbo Luo - Shanghai Aerospace Electronic and Communication Equipment Research Institute | 7. 12:15 PM - Terahertz Metasurfaces on Flex Using Aerosol Jet Printing and a Novel Polyene Lift-off Process Sambit Kumar Ghosh, Ethan Kepros, Yihang Chu, Bhargav Avireni, Brian Wright, Premjeet Chahal - Michigan State University |

PROGRAM SESSIONS: THURSDAY, MAY 30, 2:00 P.M. - 5:05 P.M.

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| Session 19: 3D Integration Copper-Copper Hybrid Bonding | Session 20: Novel High-Density 3D & Thru-Via Structures and Processes | Session 21: Innovations in Polymer Packaging Materials Committee: |
| Committee: Packaging Technologies | Committee: Interconnections | Committee: Materials & Processing |
| Aurora B | Aurora D | Crest 3-5 |
| Session Co-Chairs: John Knickerbocker - IBM Corporation knickerj@us.ibm.com Peng Su - Juniper Networks pensu@juniper.net | Session Co-Chairs: David Danovitch - University of Sherbrooke David.Danovitch@USherbrooke.ca Yoshihisa Kagawa - Sony Yoshihisa.Kagawa@sony.com | Session Co-Chairs: Zhanming Zhou - Qualcomm zhou.zhming@gmail.com Mark Poliks - Binghamton University mpoliks@binghamton.edu |
| 1. 2:00 PM - A Study of Low Temperature SoIC Targeting 200 nm Bond Pitch Wei-Ming Wang, C.W. Yeh, Han-Jong Chia, R.F. Tsui, Ji James Cui, Chih-Hang Tung, Kuo-Chung Yee, Douglas C.H. Yu - Taiwan Semiconductor Manufacturing Company, Ltd. | 1. 2:00 PM - Integration of Planarized Nb-Based Vias to Form a Multi-Level Superconducting Back-End-of-Line Candice Thomas, Edouard Deschaseaux, Rémi Vélard, Giovanni Romano, Jean-Philippe Michel, Norman Vivien, Richard Souil, Cassandre Beluffi, Catherine Pellissier, Jean Charbonnier - Grenoble Alps University/CEA-LETI | 1. 2:00 PM - Novel Sheet Molding Compound Technology for Wafer Level Packaging to Overcome Wafer Warpage Issue Yuki Sugiura, Daisuke Mori, Yasuhito Fujii, Takashi Yagihashi, Eiichi Nomura - Nagase ChemteX Corporation; Kenta Imamura - Nagase America LLC; Ippei Yamai - Nagase & Co., Ltd. |
| 2. 2:20 PM - Low Resistance and High Isolation HD TSV for 3-Layer CMOS Image Sensors Stéphane Borel, Myriam Assous, Rémi Velard, Jerzy-Javier Suarez-Berru, Stéphane Nicolas, Jérôme Dechamp, Renan Bouis, Lionel Vignoud, Paul Valentin, Jérémy Marchand, Antonio Roman, Messaoud Bedjaoui - Grenoble Alps University/CEA-LETI | 2. 2:20 PM - Observation of Thermal Expansion Behavior of Nanotwinned-Cu/SiO₂ & Regular-Cu/SiO₂ Hybrid Structure Via In-Situ Heating AFM Huai-En Lin, Chih Chen - National Yang Ming Chiao Tung University; Wei-Lan Chiu, Hsiang-Hung Chang - Industrial Technology Research Institute | 2. 2:20 PM - Development of UV-Curable Molding Materials With Minimum Die-Shift for FOWLP/FOPLP Markus Schindler, Severin Ringelstetter - DELO Industrial Adhesives; Mariana Pires, Mikhail Begel, Andrea Kneidinger, Markus Wimplinger, Thomas Uhrmann - EV Group, Inc. |
| 3. 2:40 PM - Integrated Hybrid Bonding System for the Next Generation Advanced 3D Packaging Raymond Hung, Gilbert See, Ying Wang, Chang Bum Yong, Ke Zheng, Yauloong Chong, Avi Shantaram, Ruiping Wang, Arvind Sundarajan - Applied Materials, Inc.; Nithyananda Hedge, Setfan Schmid, Manfred Glantschnig - Besi NL | 3. 2:40 PM - 3D Interconnects for Quantum Computing Jaber Derakhshandeh - imec | 3. 2:40 PM - Temperature-Dependent Dielectric Characterization of Low Loss Thin Film Polymers up to Sub-THz Bands Kavin Senthil Murugesan, Jens Schneider, Michael Kaiser, Julia-Marie Köszegi, Lutz Gerhold, Ivan Ndip, Martin Schneider-Ramelow - Fraunhofer IZM; Habib Hichri, Ryohei Oishi, Reki Nakano - Ajinomoto Fine-Techno USA Corporation |
| Refreshment Break: 3:00 p.m. - 3:45 p.m. – Exhibition Hall – Aurora 1 | | |
| 4. 3:45 PM - Process Development and Performance Benefits of 0.64-0.36 µm Pitch Hybrid Bonding on Intel Process Tushar Talukdar, Adel Elsherbini, Kimin Jun, Brandon Rawlings, Richard Vreeland, William Brezinski, Haris Niazi, Siyan Dong, Yi Shi, Pilin Liu, Xavier Brun, Johanna Swan - Intel Corporation | 4. 3:45 PM - Laser Micro Drilling of Around 3 Microns into Ajinomoto Build-up Film Toshio Otsu, Shuntaro Tani, Hiroharu Tamaru, Yohei Kobayashi - University of Tokyo; Shoko Nagayama, Ryo Miyamoto - Ajinomoto Fine-Techno Co., Inc.; George Okada - Spectronix Corp., Ltd.; Naoyuki Nakamura, Junichi Nishimae - Mitsubishi Electric Corporation | 4. 3:45 PM - Low-Temperature Polymer Hybrid Bonding with Nanoparticulated Cu and Photosensitive Acrylic Adhesive Hirokatsu Sakamoto, Tadashi Teranishi, Rumi Nagai, Ryo Itaya, Akihiko Happoya - Daicel Corporation; Hideaki Tamate - T-Micro; Takafumi Fukushima - Tohoku University |
| 5. 4:05 PM - Methodologies for Characterization of W2W Bonding Strength Mario Gonzalez, Kris Vanstreels, Oguzhan Orkut Okudur, Serena Iacova, Eric Beyne - imec | 5. 4:05 PM - Thermo-Mechanical Reliability Analysis and Raman Spectroscopy Characterization of Sub-micron Through Silicon Vias (TSVs) for Backside Power Delivery in 3D Interconnects Shuhang Lyu, Thomas Beechem, Tiwei Wei - Purdue University | 5. 4:05 PM - Development of New Concept Photo Imageable Dielectric Materials for Next Generation Advanced Packaging Kazuki Sato, Kazuaki Ebisawa, Makiko Irie, Yiyang Zhan, Atsushi Kubo - Tokyo Ohka Kogyo Co., Ltd. |
| 6. 4:25 PM - 3.5D Advanced Packaging Enabling Heterogenous Integration of HPC and AI Accelerators Chandra Sekhar Mandalapu, Chintan Buch, Priyal Shah, Roden Topacio, Patrick Cheng, Liwei Wang, Raja Swaminathan, Alan Smith, John Wu, Kaushik Mysore, Arsalan Alam - Advanced Micro Devices, Inc. | 6. 4:25 PM - Organic Interposers Using Zero-Misalignment-Via Technology and Silicon Wafer Carriers for Large Area Wafer-Level Package Applications Alekdandar Aleksov, Tushar Talukdar, Veronica Strong, Holly Sawyer, Carolyn Aubertine, Johanna Swan, Thomas Sounart - Intel Corporation | 6. 4:25 PM - Development of Thick-Core Substrate Material for Cutting-Edge IC Packaging Tomo Mugurma, Tom Shin - Panasonic Industrial Devices Sales Company of America; Masafumi Honma, Teppei Washio, Yuichi Ishikawa, Yutaka Tashiro, Hirotsuke Saito, Jun Yasumoto, Genki Takahashi, Yoshiki Okushima - Panasonic Industry Co., Ltd. |
| 7. 4:45 PM - Facile Wafer-to-Wafer Hybrid Bonding Integration at Sub 0.5 µm Pitch Hemanth Kumar Cheemalamari, San Sandra, Arvind Sundaram, Anh Tran Van Nhat, Chen Gim Guan, Chandra Rao Bhesetti, Steven Lee Hou Jang, Raju Mani, Nandini Venkataraman, King Jien Chui, Srinivasa Rao Vempati, Singh Navab - Institute of Microelectronics A*STAR | 7. 4:45 PM - Bendability Enhancement and Miniaturization of Through-X Via (TXV) Based on Flexible Fan-Out Wafer-Level Packaging With Additive Tiny Cu Pillar Assembly Atsushi Shinoda, Chang Liu, Akihiro Tominaga, Hisashi Kino, Tetsu Tanaka, Takafumi Fukushima - Tohoku University | 7. 4:45 PM - Development of Magnetic Molding Compound for Low Pressure Molding Inductors With Both Good Magnetic Properties and High Reliability Hiroki Sonokawa, Yoshinori Endo, Mika Tanaka, Takashi Inagaki, Teruo Ito - Resonac Corporation |

PROGRAM SESSIONS: THURSDAY, MAY 30, 2:00 P.M. - 5:05 P.M.

| | | |
|--|---|--|
| <p>Session 22: Signal & Power Integrity for Advanced Packages and Systems</p> | <p>Session 23: Novel Bonding Technology for Advanced Assembly Substrates and Integration</p> | <p>Session 24: Advances on Flex and Redistribution Layer Technologies and Warpage</p> |
| <p>Committee: RF, High-Speed Components & Systems</p> | <p>Committee: Assembly & Manufacturing Technology</p> | <p>Committee: Thermal/Mechanical Simulation & Characterization</p> |
| <p>Summit 8-9</p> | <p>Summit 6-7</p> | <p>Summit 4-5</p> |
| <p>Session Co-Chairs: Hideki Sasaki - Rapidus hideki.sasaki@rapidus.co.jp Srikrishna Sitaraman - Marvell srikrishna.sitaraman@gmail.com</p> | <p>Session Co-Chairs: Valerie Oberson - IBM voberson@ca.ibm.com Pascale Gagnon - IBM pgagnon@ca.ibm.com</p> | <p>Session Co-Chairs: Ning Ye - Western Digital ning.ye@wdc.com Rui Chen - Eastern Michigan University rchen7@emich.edu</p> |
| <p>1. 2:00 PM - High Bandwidth and Energy Efficient Electrical-Optical System Integration Using COUPE Technology Chih-Hsin Lu, Chia-Chia Lin, Tzu-Chun Tang, Chung-Yi Lin, Jay Chang, Chung-Hao Tsai, Harry Hsia, J.C. Twu, C.S. Liu, Gene Wu, Kuo-Chung Yee, Douglas Yu - Taiwan Semiconductor Manufacturing Company, Ltd.</p> | <p>1. 2:00 PM - Advanced Thermocompression Bonding on High Density Fan-Out Embedded Bridge Technology for HPC/AI/ML Applications Wiwu Wudjud, Lihong Cao - Advanced Semiconductor Engineering, Inc. (US); ShuYu Lin, Yungshun Chang, Jean Yen, Reno Liao, Leo H.S. Cheng, Yi-Hsien Wu, Simon Y.L. Huang, Ivan R.C. Chen, ChengYu Lee, Joey C.I. Huang - Advanced Semiconductor Engineering, Inc.</p> | <p>1. 2:00 PM - Accurate Prediction of Solder Stresses/Strains in Multi-Layered Electronics Packages During Temperature Cycling Xuejun Fan, Mukunda Khanal, Jiang Zhou - Lamar University</p> |
| <p>2. 2:20 PM - High Frequency Assessment of Djordjevic-Sarkar Model for Low Loss Package Dielectrics Cemil Geyik, Michael Hill, Zhichao Zhang, Kemal Aygun - Intel Corporation</p> | <p>2. 2:20 PM - Various Defect Mechanism Analysis for Optimization of Vacuum Fluxless Solder Reflow Performance Using 10 µm or Below Microbumps Lei Jing, Alvin Lin, Xinxuan Tan, Anderson Chen, Vladimir Kudriavtsev, Lucky Murugesu, Zia Karim - Yield Engineering Systems</p> | <p>2. 2:20 PM - Comparison of Sustainable and Non-Sustainable Ink Process-Performance Interactions for Additively Printed Circuits Pradeep Lall, Ved Soni, Sabina Bimali, Daniel Karakitie - Auburn University; Scott Miller - NextFlex</p> |
| <p>3. 2:40 PM - System Level Analysis and Design Optimization of Back-Side Power Delivery Network for Advanced Nodes Kyunghwan Song, Sungwook Moon, Minseok Kang, Yongho Lee, Duhyoung Ahn, Hyeonjin Kim - Samsung</p> | <p>3. 2:40 PM - Chip-on-Wafer (CoW) Technology Utilizing Laser-Assisted Bonding With Compression (LABC) for Bump Counts Exceeding 500,000 at a 20 µm Pitch Kwang-Seong Choi, Jiho Joo, Gwang-Mun Choi, Jungho Shin, Chanmi Lee, Ki-Seok Jang, Jin-Hyuk Oh, Ho-Gyeong Yun, Seok Hwan Moon, Ji Eun Jung, Gaeun Lee, Yong-Sung Eom - Electronics and Telecommunications Research Institute</p> | <p>3. 2:40 PM - Simulation and Metrological Applications for RDL Patterning Development of Glass Substrate Chang-Chun Lee - National Tsing Hua University; Jui-Chang Chuang - National Tsing Hua University/Industrial Technology Research Institute; Chen-Tsai Yang, Chung-I Li - Industrial Technology Research Institute; Shih-Hsien Lee, Shih-Hao Kuo - Applied Materials, Inc.</p> |
| <p>Refreshment Break: 3:00 p.m. - 3:45 p.m. – Exhibition Hall – Aurora 1</p> | | |
| <p>4. 3:45 PM - PDN Impedance Optimization of AR/VR Systems: A Trade-off in VRM Bandwidth and Board Decoupling Wendem Beyene, Ling Jiang, Koichi Yamaguchi, Xiaoping Liu, Ashkan Hashemi - Meta Platforms, Inc.</p> | <p>4. 3:45 PM - Novel Molded FCBGA Package Platform for Highly Reliable Automotive Applications Inrack Kim, Nari Kim, Gayoung Shin - Amkor Technology Korea; Youngdo Kweon - Amkor Technology, Inc.</p> | <p>4. 3:45 PM - Monitoring of Wafer Thinning Induced In-Die Mechanical Stress With Embedded Sensors for Heterogeneous Integration Alberto Piadena, Michele Quarantelli, Sharad Saxena, Christopher Hess, Larg Weiland, Rakesh Vallishayee, Yuan Yu, Tomasz Brozek, Andrzej Strojwas - PDF Solutions</p> |
| <p>5. 4:05 PM - Physical-Based Verification of High-Speed Channel Crosstalk and Correlation with BER Measurements Po-Wei Chiu, Chao-Chin Lee, Guan-Yu Lin, Jinsung Youn, Youngsoo Lee, Hong Shi, Alan Fang, Santiago Asuncion - Advanced Micro Devices, Inc.</p> | <p>5. 4:05 PM - Study of Fabrication and Reliability for 120 mm x 120 mm Extremely Large Advanced 2.5D Package Kazue Hirano, Dongchul Kang, Masaki Takahashi, Takahiro Iseki, Kosuke Murai, Sadaaki Katoh - Resonac Corporation</p> | <p>5. 4:05 PM - Investigation of Mechanical Reliability of Flexible/Stretchable Electronic Materials Using Multi-Axial Stretch Techniques Kaushik Godbole, Benjamin Stewart, Suresh Sitaraman - Georgia Institute of Technology; Nicholas Ginga - University of Alabama in Huntsville</p> |
| <p>6. 4:25 PM - An Energy Efficient DDR5 I/O Performance Boost in Clamshell Configuration by Charge Pumping From Non-Target Device Ryuichi Oikawa - Renesas Electronics Corporation</p> | <p>6. 4:25 PM - Thin Substrate Bonding Partia Naghibi - HRL Laboratories, LLC</p> | <p>6. 4:25 PM - Optimized Simulation Methodology of Warpage and Localized Stress Hotspot Prediction for Assembly Risk Assessment Zhi Yang, Igor Arsovski, Clint Harames, Jim Miller - Groq; Krishna Mellachervu - ANSYS, Inc.</p> |
| <p>7. 4:45 PM - Signal Integrity Analysis and Design Optimization Using Neural Networks Juhitha Konduru, José Schutt-Ainé - University of Illinois; Oleg Mikulchenko, Loke Yip Foo - Intel Corporation</p> | <p>7. 4:45 PM - High-Throughput Characterization of Nanoscale Topography for Hybrid Bonding by Optical Interferometry Bongsub Lee, Oliver Zhao, Arianna Avellan, Suhail Sadiq, Gill Fountain, Dominik Suwita, Guilian Gao, Laura Mirkarimi - Adeia</p> | <p>7. 4:45 PM - Analyzing the Influence of RDL Stack-Up on Wafer Warpage in FOWLP Through Experimental and Numerical Investigations Saskia Huber, Philipp Scheibe, Sükrücan Mutlu, Olaf Wittler, Martin Schneider-Ramelow - Fraunhofer IZM</p> |

PROGRAM SESSIONS: FRIDAY, MAY 31, 9:30 A.M. - 12:35 P.M.

| Session 25: High-Performance Computing, Design Challenges, and Solutions | Session 26: Chiplet Interconnect Design and Validation | Session 27: Advanced Die Bond and Board Level Reliability |
|---|---|---|
| Committee: Packaging Technologies | Committees: Interconnections and RF, High-Speed Components & Systems | Committees: Materials & Processing and Assembly & Manufacturing Technology |
| Aurora B | Aurora D | Crest 3-5 |
| Session Co-Chairs: Eric Tremble - Marvell etremble@marvell.com Young-Gon Kim - Renesas Electronics America young.kim.jg@renesas.com | Session Co-Chairs: Gang Duan - Intel gang.duan@intel.com Jaemin Shin - Qualcomm jaemins@qti.qualcomm.com | Session Co-Chairs: Jason Rouse - Taiyo America jrouse@taiyo-america.com Omkar Gupte - AMD Omkar.Gupte@amd.com |
| 1. 9:30 AM - An Energy-Efficient Si-Integrated Micro-Cooler for High Power and Power-Density Computing Applications Yu-Jen Lien, Cheng-Chieh Hsieh, Terry Ku, Li Wang, Po-Ju Chen, Kcyee Yee, C. H. Douglas Yu - Taiwan Semiconductor Manufacturing Company, Ltd. | 1. 9:30 AM - Impact of Pitch Scaling on 3D Die-to-Die Interconnects Nicolas Pantano, Michele Stucchi, Geert Van Der Plas, Eric Beyne - imec | 1. 9:30 AM - Impact of Chip-Package Parameters on the Thermomechanical Reliability of High Thermal Die Attach Materials in RF, Power, and Automotive Applications A R Nazmus Sakib, Ruther Ricon - Renesas Electronics America; Jake Eom, Yoshitsugu Kawashima, Kosuke Azuma, Ganesh Tharumalingam, Young Kim - Renesas Electronics Corporation |
| 2. 9:50 AM - High Power Thermal Test Vehicle With 2-Phase Cooling for AI Datacenters, 5G RAN, and EDGE Compute Nodes Yang Liu, Nagesh Basavanahally, Mark Earnshaw, Todd Salamon, Rick Papazian, Ting-Chen Hu, Mark Cappuzzo, Rose Kopf, David Apigo, Bob Farah - Nokia Bell Labs | 2. 9:50 AM - A 32 Gb/s Full Duplex Bi-Directional Transceiver With Crosstalk Cancellation for Chiplet Interconnections Jae-Woo Park, Jung-Hoon Chun - Sungkyunkwan University; Nicolas Pantano, Geert Van Der Plas, Eric Beyne - imec | 2. 9:50 AM - The Challenges of High-Temperature Lead-Free Solder Paste for Power Discrete Applications Hongwen Zhang, Kyle Aserian, David Hu, Tyler Richmond, Leo Hu - Indium Corporation; Bo Chen, Kaiyuan Zhu, Mary Jane R. Alin - Alpha and Omega Semiconductor Ltd. |
| 3. 10:10 AM - Block Level and Package Level Thermal Assessment for Back Side Power Delivery Network Melina Lofrano, Herman Oprins, Vladimir Cherman, Liesbeth Witters, Anne Jourdain, Geert Van der Plas, Eric Beyne - imec | 3. 10:10 AM - Modeling and Analysis of Heterogeneously Integrated Chiplet-to-Chiplet Communication Link in 2.5D Advanced Packaging Haofeng Sun, Bobi Shi, Thong Nguyen, Jose Schutt-Aine - University of Illinois | 3. 10:10 AM - Reliability Analysis of Cu Sintered Die-Attach for SiC Power Devices: Mechanical, Electrical, and Thermal Evaluation Xu Liu, Shaogang Wang, Dong Hu, Paddy French, Guoqi Zhang - Delft University of Technology; Chenshan Gao, Qianming Huang, Huaiyu Ye - Southern University of Science and Technology |
| Refreshment Break: 10:30 a.m. - 11:15 a.m. – Aurora, Crest, and Summit Foyers | | |
| 4. 11:15 AM - CoaxMIL 2.0 – Next Generation Coaxial Magnetic Integrated Inductors for Higher Efficiency Fully Integrated Voltage Regulator Beomseok Choi, Jaeil Baek, Brandon Marin, Shuren Qu, Siddharth Kulasekaran, Jose Chavarria, Leigh Wojewoda, Kaladhar Radhakrishnan - Intel Corporation | 4. 11:15 AM - Signal, Power and Thermal Co-Optimization Methodology for FPGA Advanced Package Wei Liu, Guang Chen, Brian Wang, Jenny Xiaohong Jiang, Ed Milligan - Intel Corporation | 4. 11:15 AM - Complex Board Via Structure Induced Uneven Stress/Strain Impact on Interconnect Stability: SAC305, Full and Hybrid LTS Comparison Tae-Kyu Lee, Yujin Park, Gnyaneshwar Ramakrishna - Cisco Systems, Inc.; Jonghyun Nam, Daljin Yoon, Heera Roh - SK Hynix, Inc. |
| 5. 11:35 AM - Integrated Design Ecosystem for Chiplets Heterogeneous Integration and Chip-to-Chip Interconnects in Advanced Packaging Technology Lihong Cao - Advanced Semiconductor Engineering, Inc. (US); Chen-Chao Wang, Chih-Yi Huang, Hung-Chun Kuo - ASE Corporate R&D Center | 5. 11:35 AM - An Advanced Packaging Figure of Merit (AP-FoM) for Benchmarking of Heterogeneous Integration Technologies Chuei-Tang Wang, Shu-An Shang, Yu-Ming Hsiao, Ming-Ji Lii, Kam Heng Lee, Jun He - Taiwan Semiconductor Manufacturing Company, Ltd. | 5. 11:35 AM - Mitigating Solder Beading in Non-Eutectic Low-Temperature Solder: Mechanism and Solution Lip Teng Saw, Mutharasu Devarajan - Western Digital Corporation; Puumaraj A/L Nadarajah, Chye Yang Soo - Western Digital |
| 6. 11:55 AM - Thermal and Mechanical Simulations of 3D Packages With Custom High Bandwidth Memory (HBM) Kamalika Chatterjee, Yan Li, Pouya Asrar, WooPoung Kim - Samsung Semiconductor, Inc. | 6. 11:55 AM - Signal Integrity Designs at Organic Interposer CoWoS-R for HBM3-9.2Gbps High Speed Interconnection of 2.5D-IC Chiplets Integration Sheng-Fan Yang, Wei-Chiao Wang, Yi-Tzeng Lin, Chih-Chiang Hung, Hao-Yu Tung, Justin Hsieh - Global Unichip Corporation | 6. 11:55 AM - Enabling Socketable BGAs With Eutectic-Forming Bi-Based Coatings on Sn Spheres: A Closer Look at the Bi Deposition Process Jaewon Lee, Vanessa Smet - Georgia Institute of Technology |
| 7. 12:15 PM - A Novel DC-DC Converter Module Using the Integrated Package Solution (iPaS) Substrate for Next Generation High Performance Computing (HPC) Applications Shuhei Yamada, Nobuyoshi Adachi, Kazuki Itoyama, Tatsuya Kitamura, Koshi Himeda, Atsushi Yamamoto - Murata Manufacturing Co., Ltd.; Keito Yonemori - Murata Electronics North America, Inc. | 7. 12:15 PM - Effective Interface Simulation Approach Based on Peak Distortion Analysis for UCIe IPs Joonhyun Kim, Seungki Nam, Sungwook Moon, Taeyun Kim, Sangin You, Chanmin Jo, Yongho Lee - Samsung Electronics Co., Ltd. | 7. 12:15 PM - Develop New Solder Alloy for High Reliability Device Albert T. Wu, Wei Ting Lin - National Central University; Watson Tseng, Chang-Meng Wang - Shenmao Technology, Inc. |

PROGRAM SESSIONS: FRIDAY, MAY 31, 9:30 A.M. - 12:35 P.M.

| Session 28: Optical Interconnections | Session 29: Reliability in Harsh Environments Including Automotive | Session 30: Process and Hybrid Bonding Modeling and Characterization |
|--|--|---|
| Committee: Photonics | Committee: Applied Reliability | Committee: Thermal/Mechanical Simulation & Characterization |
| Summit 8-9 | Summit 6-7 | Summit 4-5 |
| Session Co-Chairs: Ping Zhou - LDX Optronics pzhou@ldxoptronics.com Masao Tokunari - IBM tokunari@jp.ibm.com | Session Co-Chairs: Varughese Mathew - NXP Semiconductors varughese.mathew@nxp.com Tae-Kyu Lee - Cisco Systems taeklee@cisco.com | Session Co-Chairs: Pradeep Lall - Auburn University lall@auburn.edu Xuejun Fan - Lamar University xuejun.fan@lamar.edu |
| 1. 9:30 AM - Fiber Array Attach for Co-Packaged Optics: High-Volume Production Process Control and Performance Paul Gond-Charton, Sebastien Gouin, Steve Pellerin, Louis-Michel Collin, Michelle Sevigny, Patrick Jacques, Elaine Cyr - IBM Canada, Ltd. | 1. 9:30 AM - Transitioning From Warpage "Control" to Warpage "Design": A Paradigm Shift Sukrut Prashant Phansalkar, Bongtae Han - University of Maryland | 1. 9:30 AM - Modeling of Copper Hybrid Bonding Anneal Joshua Hooge, Chris Netzband - Tokyo Electron, Ltd. |
| 2. 9:50 AM - Photonic Building Blocks for Board-Level Disaggregation in Hyperscale Systems Richard Pitwon - Resolute Photonics, Ltd.; Bernard Lee, Tiger Ninomiya, Michael O'Farrell - Senko Advance Components | 2. 9:50 AM - Under Bump Metallization and the Stability of Solder Interconnect Assembly under Thermal and Electrical Load: Refreshed Understanding Hariram Mohanram - University of Texas, Arlington; Choong Un Kim - United Test and Assembly Center, Ltd.; Patrick Thompson, Qiao Chen, Sylvester Kusi - Texas Instruments, Inc. | 2. 9:50 AM - Investigating Sintering Mechanism of 100 nm Ag Nanoparticles via In-Situ SEM Observation and Phase Field Simulation Xiao Hu, Dong Hu, Willem Van Driel, Guoqi Zhang - Delft University of Technology; René Poelma - Nexperia; Jianlin Huang - Ampleon B.V. |
| 3. 10:10 AM - Interfacing Silicon Photonics for CPO Geert Van Steenberge, Jef Van Asch, Viktor Geudens, Toon De Baere, Nele De Moerlooze, Jeroen Missinne - imec/ Ghent University; Joris Van Campenhout - imec | 3. 10:10 AM - Additively Printed In-Mold Electronics Circuits and Sensors and Process-Performance Interactions for Automotive Applications Pradeep Lall, Hyesoo Jang, Ved Soni, Fatahi Musa, Md Golam Sarwar - Auburn University; Scott Miller - NextFlex | 3. 10:10 AM - Elucidating the Mechanism of Four Corner Voids in Chip-on-Wafer Hybrid Bonding Takaaki Hirano, Tatsumasa Hiratsuka, Hirota Yoshioka, Naaki Ogawa, Suguru Saito, Shoji Kobayashi, Yoshiya Hagimoto, Hayato Iwamoto - Sony Semiconductor Solutions Corporation |
| Refreshment Break: 10:30 a.m. - 11:15 a.m. – Aurora, Crest, and Summit Foyers | | |
| 4. 11:15 AM - High Power Performance Assessment of Low-Loss Spot Size Converter based on Self-Aligned Passive Fiber Attach Process Arpan Dasgupta, Jae Kyu Cho, Yusheng Bian, Takako Hirokawa, Zahidur Chowdhury, Farid Barakat, John Garant, Yarong Lin, Thomas Houghton, Arman Najafi, Ryan Sporer, Michelle Zhang - GlobalFoundries, Inc. | 4. 11:15 AM - Enhancing Cu Wire-Bonding Reliability by a Cu-Selective Passivation Coating Dinesh Kumar Kumaravel, Logan Estridge, Kevin Antony Jesu Durai, Khanh Tran, Oliver Chyan - University of North Texas; John Alptekin - Texas Instruments, Inc.; Varughese Mathew - NXP Semiconductor, Inc. | 4. 11:15 AM - Fan-Out Embedded Bridge Structure for Co-Packaged Optics Characterization and Evaluation Vito Lin, Teryn Shih, Andrew Kang, Yu-Po Wang - Siliconware Precision Industries Co., Ltd. |
| 5. 11:35 AM - A Compact, High Performance Passive Optical Network Transceiver Integration Approach Mark Eamshaw, Cris Bolle, Robert Farah, Rose Kopf, Mark Cappuzzo, Tzu-Yung Huang, Cuong Tran, Tam Huynh - Nokia Bell Labs | 5. 11:35 AM - High Acceleration Dynamic Methodology for Board-Level Shock Solder Joint Reliability Approach Min-Cheng Yu, Nan-Yi Wu, Wu-Lung Wang, Hsin-Chih Shih, Wei-Hong Lai, Chin-Li Kao, Chen-Chao Wang - Advanced Semiconductor Engineering, Inc.; CP Hung - Advanced Semiconductor Engineering, Inc. (US) | 5. 11:35 AM - Advanced Atomic-Scale Insights Into the Chemical Mechanical Polishing Process With Ceria Abrasives Using Molecular Dynamics and Neural Network Potential Yoshishige Okuno, Teruo Hirakawa, Fukiko Ota, Hiromu Kubo, Yuuto Kurata, Akihiro Orita, Satoyuki Nomura - Resonac Corporation |
| 6. 11:55 AM - Characterization of 224 Gbps/lambda Interconnects in Co-Packaged Optics for Hyperscale Data Centers and AI/ML Clusters Jiaqi Wu, Teck Guan Lim, Sajay Bhuvanendran Nair Gourikutty, Surya Bhattacharya - Institute of Microelectronics A*STAR; Xin Li, Jason Tsung-Yang Liow - Rain Tree Photonics Pte. Ltd. | 6. 11:55 AM - Thermomechanical Degradation of Sintered Copper Under High-Temperature Thermal Shock Paul Paret, Sreekant Narumanchi - National Renewable Energy Laboratory; Sri Krishna Bhogaraju - CuNex GmbH; Dirk Busse, Alexander Dahlbüding - Budatec GmbH; Gordon Elger - Technical University of Applied Science Ingolstadt | 6. 11:55 AM - Finite Element Modeling for Wafer-to-Wafer Direct Bonding Behaviors and Alignment Prediction Kyungmin Baek, Min-soo Han, Il Young Han, Jung Shin Lee, Jaeuk Sim, Joongha Lee, Daeho Min, Kyeongbin Lim - Samsung Electronics Co., Ltd.; Minwoo Daniel Rhee - Samsung |
| 7. 12:15 PM - Hybrid Integrated Chip-Scale Laser Systems Based on Automated Assembly Xiaolei Zhao, Taylor Levaur, Lance Sweatt, Md. Arefin Islam, Lin Zhu - Clemson University | 7. 12:15 PM - Solder Reaction with Cu Alloy C7025 and Its Effect on Solder Joint Reliability Kejun Zeng, Venu Chauhan, Lance Wright - Texas Instruments, Inc. | 7. 12:15 PM - Measurement of the Interfacial Strength of Thin Metal Film by Laser Spallation Method for Advanced Wafer Level Package Young-Min Ju, Jin-Young Kim, Hui-Jin Um, Se-Min Lee, Dukyong Kim, Woong-Kyoo Yoo, Seung Hwan Lee, Hak-Sung Kim - Hanyang University; Daewoong Lee, Yeontaek Hwang - SK Hynix, Inc. |

PROGRAM SESSIONS: FRIDAY, MAY 31, 2:00 P.M. - 5:05 P.M.

| Session 31: Advances in Flip Chip and Chip Scale Packages | Session 32: Advancement in Copper Hybrid Bonding Technologies Common to Multiple Applications | Session 33: Fine-Pitch Materials and Processes |
|--|--|--|
| Committee: Packaging Technologies | Committee: Interconnections | Committee: Materials & Processing |
| Aurora B | Aurora D | Crest 3-5 |
| Session Co-Chairs: Luu Nguyen - Psi Quantum lnyuen@psiquantum.com Glenn Ning Ge - TetraMem greene.ge@gmail.com | Session Co-Chairs: Thom Gregorich - Infinera tmgregorich@gmail.com Vempati Srinivasa Rao - IME A-star vempati@ime.a-star.edu.sg | Session Co-Chairs: Praveen Pandojirao-S - Johnson & Johnson praveen@its.jnj.com Bo Song - HP Inc. bo.song@hp.com |
| 1. 2:00 PM - New Double Sided Molded Package Platform Development With Open Cavity Mold on One Side and Exposed Die Mold on the Other Side MiKyeong Choi, HoSeung Seo, SeMin Gim, GyeongCheol Lee, JungHoon Na, GaHyeong Hwang, WonBae Bang, KiDong Sim, WonChul Do, KyungRak Park - Amkor Technology Korea; Ted Adlam, Jeff Davis - Amkor Technology, Inc | 1. 2:00 PM - A Microstructural Investigation of Sub-1 μm Copper Bonding Contact Structures in Die-to-Wafer Hybrid Bonding Sari Al Zerey, Junghyun Cho - State University of New York at Binghamton; Roy Yu, Katsuyuki Sakuma - IBM Research | 1. 2:00 PM - The Patterned Photosensitive Dielectric Organic Material/Cu Simultaneous RDL Based on Process Design Assisted by Deep Learning Toshiaki Tanaka, Masaaki Yasuda, Takeyasu Saito, Masaru Sasago, Yoshihiko Hirai - Osaka Metropolitan University; Hideaki Nishizawa - Dai Laboratory, Inc.; Toshiro Doi - Dai Laboratory Inc.; Mitsuru Ozono, Hiroaki Kimura, Hisatoshi Hirai - Advanced Industrial Science and Technology, Kyushu Center; Seiji Takahashi, Yoichi Minami - Lithotech Japan Corp. |
| 2. 2:20 PM - Package Miniaturization and Wiring Impedance Reduction for High-Bandwidth Memory Devices With Vertical Wire Bonding Keita Mochizuki, Hiroyuki Wakioka, Tsutomu Fujita, Masatoshi Shomura, Takeori Maeda, Toshihiko Ohda, Yoshitaka Muto, Eiji Takano, Masahiro Inohara - KIOXIA Corporation | 2. 2:20 PM - Low-Temperature Cu-Cu Bonding Using <111>-Oriented and Nanocrystalline Hybrid Surface Grains Chen-Ning Li, Jia-Juen Ong, Shih-Chi Yang, Chih Chen - National Yang Ming Chiao Tung University; Wei-Lan Chiu, Hsiang-Hung Chang - Industrial Technology Research Institute | 2. 2:20 PM - Novel Negative-Tone Dry Film Resist and Process for Fine Pitch Copper Wiring With L/S = 1.5/1.5 μm on Build-Up Substrate Kei Togasaki, Natsuki Toda, Kensuke Yoshihara, Yusuke Kaguchi, Kanako Funai, Hitoshi Onozeki, Kenichi Iwashita - Resonac Corporation |
| 3. 2:40 PM - Ultra-Thin Double Side SiP Technology With Embedded Trace Substrate Chehan (Jerry) Li, Jesus Mennen Belonio, Jon Gutierrez, Humi (Shih-Wen) Tang, Jessie (Yu-Shan) Wei - Renesas Electronics Corporation | 3. 2:40 PM - Copper Microstructure Effect on Electromigration Investigated by In Situ SEM EBSD Technique Yaqian Zhang, Sten Vollebregt, Guoqi Zhang - Delft University of Technology | 3. 2:40 PM - 20 μm Pitch Cu-to-Cu Flip-Chip Interconnects Through Cu Nanoparticles Sintering Xinrui Ji, Leiming Du, Henk van Zeijl, Guoqi Zhang - Delft University of Technology; Jaber Derakhshandeh, Eric Beyne - imec |
| Refreshment Break: 3:00 p.m. - 3:45 p.m. – Aurora, Crest, and Summit Foyers | | |
| 4. 3:45 PM - High Accuracy Selective Patterning for EMI Shielding of 5G AiP Ming-Hung Chen, Huei-Pin Chien, Yi-Chun Chou, Yu-Shuan Tsai, Kuan-Lin Kuo, Jei-Chieh Kao - Advanced Semiconductor Engineering, Inc. (US) | 4. 3:45 PM - Achieving Sub-nm Copper Recess Controllability for Advanced 3D Integration: An Experimental and Atomic-Scale Simulation Study on Wet Atomic Layer Etching Process Seung Ho Hahn, Wooyoung Kim, Bumki Moon, Minwoo Rhee - Samsung Electronics Co., Ltd.-Mechatronics Research; Kyeongbin Lim - Samsung Electronics Co., Ltd. | 4. 3:45 PM - Ultra High Density RDL Patterning of High-Resolution Dielectrics by Maskless Exposure Technology for High Performance Computing and Artificial Intelligence Ksenija Varga, Thomas Uhrmann, Roman Holly, Tobias Zenger - EV Group, Inc.; Dimitri Janssen, Niels Van Herck, Mario Reybroeck, Marieke Vandewyvere, Stefan Vandoooster - Fujifilm Electronic Materials Europe; Sanjay Malik - Fujifilm Electronic Materials |
| 5. 4:05 PM - Analysis of Thin Flip Chip Chip-Scale Package Warpage Causes and Variations Chee S Foong, Nishant Lakhera, Trent Uehling - NXP Semiconductor, Inc.; Amirul Afripin - NXP Malaysia Sdn. Bhd. | 5. 4:05 PM - Quantifying the Electrical Impact of Bonding Misalignment for 0.5 μm Pitch Hybrid Bonding Structures Kevin Ryan, Christopher Netzband, Andrew Tuchman, Scott Lefevre, Ilseok Son, Hirokazu Aizawa, Kaoru Maekawa - TEL Technology Center, America, LLC; Nathan Ip - Tokyo Electron America, Inc. | 5. 4:05 PM - Novel Photo Imageable Film for RDL Application Meiten Koh, Kazuyoshi Yoneda, Kazutaka Nakada, Yuna Kawata, Yusuke Naka, Mitsuya Uchida - Taiyo Ink Mfg. Co., Ltd. |
| 6. 4:25 PM - Large Package Body Size Scaling With Two Novel Technologies: Multi Ball BGA and Liquid Metal Interconnect Xiao Lu - Intel Corporation | 6. 4:25 PM - Liquid Surface Tension-Driven Chip Self-Assembly Technology With Cu-Cu Hybrid Bonding for High-Precision and High-Throughput 3D Stacking of DRAM Zehua Du, Tetsu Tanaka, Takafumi Fukushima - Tohoku University; Hiroshi Kikuchi, Hayato Hishinuma - YAMAHA ROBOTICS HOLDINGS CO., LTD. | 6. 4:25 PM - Cu Nanowire Fine-Pitch Joints for Next Gen Heterogeneous Chiplet Integration Steffen Bickel, Iuliana Panchenko, Manuela Junghaehnel - Fraunhofer IZM; Olav Birlem, Sebastian Quednau - Nanowired GmbH |
| 7. 4:45 PM - A Study About Direct Laser Reflow for Forming Stable and Reliable C4 Bump Interfaces on Semiconductor Substrates for Flip Chip Applications Matthias Fetteke, Anne Fisch, Alexander Frick, Georg Friedrich, Thorsten Teutsch - Pac Tech GmbH | 7. 4:45 PM - Wafer-On-Wafer-On-Wafer (WoWoW) Integration Having Large-Scale High Reliability Fine 1 μm Pitch Face-To-Back (F2B) Cu-Cu Connections and Fine 6 μm Pitch TSVs Masaki Haneda, Yukako Ikegami, Kengo Kotoo, Kan Shimizu, Yoshihisa Kagawa, Hayato Iwamoto - Sony Semiconductor Solutions Corporation | 7. 4:45 PM - High-Planarity, Ultra-Low-Temperature-Curable Photosensitive Polyimide for Heterogeneous Integration Atsutaro Yoshizawa, Akira Asada, Daisaku Matsukawa, Takahiro Tanabe - HD Microsystems LLC |

PROGRAM SESSIONS: FRIDAY, MAY 31, 2:00 P.M. - 5:05 P.M.

| Session 34: Photonics Integration, Materials, and Processes | Session 35: Reliability and Current Stressing of Solder Interconnections | Session 36: Thermal Management and Cooling Solutions |
|---|---|--|
| Committee: Photonics | Committee: Applied Reliability | Committee: Thermal/Mechanical Simulation & Characterization |
| Summit 8-9 | Summit 6-7 | Summit 4-5 |
| Session Co-Chairs: Takaaki Ishigure - Keio University ishigure@appi.keio.ac.jp Mark Earnshaw - Nokia mark.earnshaw@nokia-bell-labs.com | Session Co-Chairs: Paul Tiner - Texas Instruments p-tiner@ti.com Pei-Haw Tsao - Mediatek ph.tsao@mediatek.com | Session Co-Chairs: Patrick McCluskey - University of Maryland mcclupa@umd.edu Chris Bailey - Arizona State University christopher.j.bailey@asu.edu |
| <p>1. 2:00 PM - Packaged Tunable Single Mode III-V Laser Hybrid Integrated on a Silicon Photonic Integrated Chip Using Photonic Wire Bonding</p> <p>Venkatesh Deenadayalan, Eric Thomson, Mario Gminelli, Stefan Preble - Rochester Institute of Technology; George T. Nelson, Peter McGarvey - AIM Photonics; Justin Bickford - US Army Research Lab; Matthew Mitchell, Lukas Chrostowski, Sudip Shekhar - Dream Photonics; Juned N. Kemal, Sebastian Tobias Skacel - Vanguard Automation</p> | <p>1. 2:00 PM - Electromigration in Eutectic Tin-Bismuth Bottom-Terminated-Component Solder Joints</p> <p>Prabjit Singh, Lary Palmer, Mehdi Hamid, Thomas Wassiac - IBM Corporation; Raiyo Aspandiar, Brian Franco - Intel Corporation; Haley Fu - iNEMI; Richard Coyle - Nokia Corporation; Vasu Vasudvan - Dell, Inc; Aileen Allen - HP Inc; Keith Howell - Nihon Superior Co.; Kei Muryayama - Shinko Electric Industries Co., Ltd.</p> | <p>1. 2:00 PM - Electrical-Thermal Analysis of TSV Embedded Microfluidic Pin-Fin Heatsink in 3D IC for High Heat Dissipation With High Bandwidth Density and Low Latency</p> <p>Euichul Chung, Geyu Yan, Erik W. Masselink, Muhannad S. Bakir - Georgia Institute of Technology</p> |
| <p>2. 2:20 PM - Collective Die-to-Wafer Assembly Process for Optically Interconnected System-on-Wafer</p> <p>Koen Kennes, Anton Dvoretzkii, Arnita Podpod, Pengfei Xu, Junwen He, Guy Lepage, Negin Golshani, Rafal Magdziak, Yoojin Ban, Filippo Ferraro, Andy Miller, Joris Van Campenhout - imec</p> | <p>2. 2:20 PM - Impact of Current Induced Joule Heating Variation on Long-Term Low Melting Temperature Solder Joint Stability</p> <p>Tae-Kyu Lee, Yujin Park, Gryaneshwar Ramakrishna - Cisco Systems, Inc.; Young-Woo Lee, Hui-Joong Kim, Seul-Gi Lee - MK Electron Co., Ltd.; Pushkar Gothe, Choong-Un Kim - University of Texas, Arlington</p> | <p>2. 2:20 PM - Thermal Mitigation Strategy for Backside Power Delivery Network</p> <p>Feifan Xie, Tiwei Wei - Purdue University; Rongmei Chen - Peking University</p> |
| <p>3. 2:40 PM - A Compact Wafer-Level Heterogeneously Integrated Scalable Optical Transceiver for Data Centers</p> <p>Sjay Bhuvanendran Nair Gourikutty, Jiaqi Wu, Teck Guan Lim, Lai Yee Chia, Ser Choong Chong, Surya Bhattacharya - Institute of Microelectronics A*STAR; Liang Ding, Ronson Tan, Nagarajan Radhakrishnan - Marvell Semiconductor, Inc.; Xiaoguang Tu, Wanjun Wang, Chee-Keong Tan - Marvell Asia Pte Ltd</p> | <p>3. 2:40 PM - Reliability Concerns Due to Changes in the Microstructure and Electrical Resistance of Low Temperature, SnBi-Based Solder Joints During Current Stressing</p> <p>Eric Cotts, Sitaram Panta, Eric Cotts, Babak Arfaei, Faramarz Hadian - State University of New York at Binghamton</p> | <p>3. 2:40 PM - Thermal Management of 6-in-1 SiC Power Module With Double-Sided Impingement Cooling</p> <p>Yong Han, Gongyue Tang - Institute of Microelectronics A*STAR</p> |
| Refreshment Break: 3:00 p.m. - 3:45 p.m. – Aurora, Crest, and Summit Foyers | | |
| <p>4. 3:45 PM - Scalable Fabrication of 3D Optical Redistribution for Co-Packaged Optics Using an Originally-Developed Nanoimprint Stepper</p> <p>Fumi Nakamura, Kenta Suzuki, Akihiro Noriki, Satoshi Suda, Takayuki Kurosu, Takeru Amano - National Institute of Advanced Industrial Science and Technology</p> | <p>4. 3:45 PM - The Effect of Extended Dwell Time on Thermal Cycling Performance of Hybrid Low Temperature Solder Joints</p> <p>Richard Coyle, Chloe Feng, Richard Popowich - Nokia Bell Labs; Martin Anselm - Rochester Institute of Technology</p> | <p>4. 3:45 PM - Thermal Performance of an Indium-Silver Alloy Metal TIM for a Large Body Lidded FCBGA After EOL and Long-term Reliability Tests</p> <p>SangHyuk Kim, EunSook Sohn, KyungRok Park - Amkor Technology Korea; YoungDo Kweon - Amkor Technology, Inc.</p> |
| <p>5. 4:05 PM - Laser Attach Process Development and Material Selection</p> <p>Alexander Janta, Pascale Gagnon, Eric Turcotte, Elaine Cyr, Jason Zheng - IBM Corporation</p> | <p>5. 4:05 PM - Correlation of Mechanical and Microstructural Evolutions in Lead Free Solders Subjected to Various Thermal Exposures</p> <p>Mohammad Al Ahsan, S M Kamrul Hasan, Souvik Chakraborty, Jeffrey Suhling, Pradeep Lall - Auburn University</p> | <p>5. 4:05 PM - AI-Driven Cold Plate Design and Optimization</p> <p>Yue Wu, Eric Chu, Fiona Shiau, Nathan Ai, Albert Zeng, Hoa Pham - Cadence Design Systems</p> |
| <p>6. 4:25 PM - Ultra-Compact Computing at the Edge Involving Unobtrusively Small Sub-Millimeter Heterogeneous Integration Packaging</p> <p>Frank Libsch, Steve Bedell, Cyril Cabral, Arun Paidimarri, Chitra Subramanian, Seiji Munetoh - IBM Research</p> | <p>6. 4:25 PM - Pad Cratering and Pin Pull Strength for Large BGA and Connectors — How Are They Correlated?</p> <p>Dongji Xie, Joe Hai, Vivienne Zou, Zhongming Wu, Minghong Jian - Nvidia Corporation</p> | <p>6. 4:25 PM - Heat Dissipation Measurement in Flip-Chip Package Using Microfabricated Temperature Sensors on Lid</p> <p>Arsène Guédon, Nizar Bouguerra, Étienne Paradis, Dominique Drouin - University of Sherbrooke; Éric Duchesne, Stéphanie Allard - IBM Canada, Ltd.; Héliene Frémont - University of Bordeaux</p> |
| <p>7. 4:45 PM - Sintering for High Power Optoelectronic Devices</p> <p>Gordon Elger, Nihesh Mohan, Alberto Siligardi, Hamza Bin Aqeel, Hannes Schwan, Rocky Kumar Saha, Fabian Steinberger - Technical University of Applied Science Ingolstadt; Sri Krishna Bhogaraju, Rohan Ghosh - CuNex GmbH; Holger Klassen, Klaus Müller - ams OSRAM Group</p> | <p>7. 4:45 PM - Board Level Drop Reliability of Hybrid Solder Joints With Controlled Bismuth Mixing Ratio for Carbon Neutrality</p> <p>Seahwan Kim, Jaejun Yoon, Taejoon Noh, Seung Boo Jung - Sungkyunkwan University; Kyung Deuk Min - Samsung Electronics Co., Ltd.</p> | <p>7. 4:45 PM - Innovative Two-Phase Immersion Cooling Solutions for High-Power Advanced Packages</p> <p>Sumit Shama, Aqbal Ahmad, Chi-Chuan Wang - National Yang Ming Chiao Tung University; ICheng Huang, Ying-Xu Lu, Hung-Hsien Huang, Chen-Chao Wang, Chih-Pin Hung - Advanced Semiconductor Engineering, Inc. (US)</p> |

Wednesday May 29th

Session 37: Thermo-mechanical Stress and Reliability Analysis for Materials in Future Packaging

Time: 10:00 AM - 12:00 PM

Committee: Interactive Presentations

Aurora A-C Corridor

Session Co-Chairs:

Mark Poliks - Binghamton University
mpoliks@binghamton.edu

Jeffrey Lee - Integrated Service Technology Inc.
jeffrey_lee@istgroup.com

Joshua Dillon - Marvell
jdillon@marvell.com

Venkata Mokkapati - AT&S
v.mokkapati@ats.net

1. Investigating the Adhesion Between Glass Core and Polymer Buildup Films

Preeya Kuray, Yoji Nakajima, Junko Konishi - AGC, Inc.

2. Long-Term Reliability Analysis of Crystal Oscillator Under Immersion Cooling With Various Coolants

Yangfan Zhong, Dan Liu, Fangzhi Wen, Honghao Cao - Alibaba Group; Tina Bao, Kai Wang - Intel Corporation

3. Impact of Bi-Content on the High Strain Rate Properties of SnAgCu Solders Under Sustained High-Temperature Operation

Pradeep Lall, Vishal Mehta, Mrinmoy Saha, Jeff Suhling - Auburn University; David Locker - US Army

4. Bond-Line Thickness Prediction for Thermal Interface Material Under Usage Conditions

Yangyang Lai, Jiefeng Xu, Karthik Deo, Jonghwan Ha, Junbo Yang, Seungbae Park - Binghamton University

5. Cu/Dielectric Hybrid Bonding Among Glass and Si

Hemanth Kumar Cheemalamarri, Arvind Sundaram, Anh Tran Van Nhat, Chen Gim Guan, Jae Ok Yoo, Vempati Srinivasa Rao, Navab Singh - Institute of Microelectronics A*STAR

6. Multiphysics Overlay Modeling of Monolithic 3D Fusion and Hybrid Bonding Processes

Christian Mülhstatter, Lukas Koller, Markus Wimplinger, Viorel Dragoi - EV Group, Inc.

7. Mitigating Cracking From RDL Stress in Glass Substrates With Low-CTE Electrodeposited Copper-Graphene Composites

Christian Molina-Mangual, Emanuel Torres-Surillo, Nithin Nedumthakady, Vanessa Smet - Georgia Institute of Technology

8. A Predictive Methodology for BGA Solder Joint Formation and Assembly Defects

Matt Bond, Mudasar Ahmad, Jin Kim, Sue Teng, Nima Shahidi, Yingshi Tang - Google

9. High-Performance Thermal and Electrical Characteristics of Via-Last (BBCube) Process in Multi-Layer 3D Integration

Norio Chujo - Hitachi, Ltd.; Hiroyuki Ryoson, Koji Sakui, Shinji Sugatani, Masao Taguchi, Takayuki Ohba - Tokyo Institute of Technology

10. Embedded Liquid Cooling of High-Power Microelectronics Using Liquid Metal

Huicheng Feng, Bin He, Gongyue Tang, Xiaowu Zhang, Boon Long Lau, Jason Au, Javier Ong, Ming Ching Jong, King Jien Chui - Institute of Microelectronics A*STAR

11. A Development of Sensorized Ear Model for New Behind-The-Ear (BTE) Hearing Aid

Maria Ramona Ninfa Bautista Damalerio, Wei Da Toh, Ruiqi Lin, Ming-Yuan Cheng - Institute of Microelectronics A*STAR

12. Electrical Characterization and Reliability Studies of Nano-TSV

Ya-Ching Tseng, Daniel Lau, Simon Chun Kiat Goh, King Jien Chui - Institute of Microelectronics A*STAR

13. A Simulation-Led Board Level Reliability Assessment of High Speed Printed Circuit Boards for Advanced Networking Applications

Omar Ahmed, Leif Hutchinson, Peng Su, Bernard Glasauer - Juniper Networks; Vishnu Shukla, Andrea Molina, Tengfei Jiang - University of Central Florida

14. Thermal Resistance Prediction Model for IC Packaging Optimization and Design Cycle Reduction

Guan-Wei Chen, Chung-Hsiang Hsu, Hung-Kai Wang, Yan-Cheng Lin - National Cheng Kung University; Tang-Yuan Chen, Chen-Chao Wang - Advanced Semiconductor Engineering, Inc.

15. Study of Stress and Warpage Estimate of FOWLP Under Hygro-Thermal Coupling Loading Condition

Yu-Wei Huang - Industrial Technology Research Institute; Ruchi A. K. Yadav, Hong-Yu Lin, Jian-Han Li, Chang-Chun Lee - National Tsing Hua University

16. Single and Multi NPU Chiplet Heterogeneous Integration Packaging Based on Fan-Out RDL Interposer With Silicon Bridge Technology

Insoo Kang, Jacinta Aman Lim - nepes Corporation

17. Thermal Transport Properties of Hybrid Bonding With Passivation

Hakjun Kim, Jae Young Hwang, Young-Chang Joo, Hyejin Jang - Seoul National University; Sangwoo Park, Sarah Eunkyung Kim - Seoul National University of Science and Technology

18. Optimization of Core Material Properties for Large Flip-Chip Ball Grid Array Substrate to Manage Both Warpage and Board Level Reliability

Hirokazu Noma, Masaki Takahashi, Nene Hatakeyama, Yuichi Yanaka, Akito Fukui, Keita Johno, Hitoshi Onozeki - Resonac Corporation

19. Embedded Cooling Method With Monolithic Dual-Layer Micro-Channel Cold Plate for High-Power Chips

Jianyu Du, Hongxu Wu, Huaiqiang Yu, Chi Zhang, Wei Wang - Peking University

20. Method to Evaluate the Adhesion Distribution on Wafers

Tatsumasa Hiratsuka, Takaaki Hirano, Kengo Kotoo, Nobutoshi Fujii, Suguru Saito, Shoji Kobayashi, Yoshiya Hagimoto, Hayato Iwamoto - Sony Semiconductor Solutions Corporation

21. Experimental and Numerical Investigation of Cu-Cu Direct Bonding Quality for 3D Integration

Sung-Hyun Oh, Hyun-Dong Lee, Jae-Uk Lee, Hoo-Jeong Lee, Eun-Ho Lee - Sungkyunkwan University; Sung-Ho Park, Won-Seob Cho, Yong-Jin Park, Alexandra Haag, Soichi Watanabe, Marco Arnold - BASF

22. Atomistic Simulation Investigation of Various Plasma Surface Activations in SiCN Dielectric Bonding

Hojin Kim, Andrew Tuchman, Yu-Hao Tsai, Toru Hisamatsu, Ilseok Son, Sitaram Arkalgud - TEL Technology Center, America, LLC

23. Reliability of Differently Shaped Solder Joints in Chip Resistor Under Drop Impact

Jonghwan Ha, Karthik Deo, Junbo Yang, Yangyang Lai, Seungbae Park - Binghamton University

24. Study of Damage Development in Under-Bump Interconnects by Thermo-Mechanical Stress in Package Interconnects

Jorge Mendoza, Choong-Un Kim - University of Texas, Arlington; Hung-Yun Lin - Texas Instruments, Inc.

25. Aging Behaviour and Environmental Impact of Under Bump Metallurgies for Wafer Level Balling

Arnaud Garnier, Laetitia Castagne, Stephane Moreau, Alexandra Fraczkiwicz, Theo Monnier, Daniel Mermier, Suzanne Guillou, Laura Vauche, Damien Saint-Patrice, Perceval Coudrain - Grenoble Alps University/CEA-LETI

26. Automated Solder Joint Failure Mode Analysis Based on Dry and Pry Image Processing

Yinan Lu, Chaolun Zheng, Andrew Huang, Hedan Zhang, Bee Chin Loke, Ning Ye, Bo Yang - Western Digital Corporation

Wednesday May 29th

Session 38: Photonics, mm-Wave Applications & Emerging Technologies

Time: 2:30 PM - 4:30 PM

Committee: Interactive Presentations

Aurora A-C Corridor

Session Co-Chairs:

Frank Libsch - IBM
libsch@us.ibm.com

Saikat Mondal - Intel
saikat.mondal@intel.com

Pavel Roy Paladhi - IBM
rpaladhi01@gmail.com

Yoichi Taira - Keio University
taira@appi.keio.ac.jp

1. Conformal Dry Electrode for ECG Monitoring

Riadh Al-Haidari, Babatunde Falola, Mohammed Alhendi, Mark Schadt, Mark Poliks - Binghamton University; Dan Balder, Andrew Stemmermann, Matthew Foster - SunRay Scientific, Inc.; Tzu-Jen Kao, Nancy Stoffel - General Electric Global Research

2. Reliability of Flexible Electronics Undergoing Vibration

Sara Lieberman, El Mehdi Abbara, Nathaniel Gee, Kankanige Udara Sandakelum Somarathna, Abhishek Navkar, Abdullah Obeidat, Zhi Dou, Mohammed Alhendi, Peter Borgesen, Mark Poliks - Binghamton University

3. Quantifying Uncertainties in the Correlation of Simulations and Measurements Using the IEEE EPS Packaging Benchmark Suite

Jonatan Aronsson - CEMWorks, Inc.; Kemal Aygun - Intel Corporation

4. Polymer Waveguides for Co-Packaged Optics

Yi Shen, Michael Gallagher, Ross Johnson, Jake Joo, Masaki Kondo, James Ryley, Rui Zhang, Zhebin Zhang - DuPont; Marika Immonen, Matthew Neely, Everett Sarauer, David Senk - TTM Technologies, Inc.

5. The Energy-Efficient 10-Chiplet AI Hyperscale NPU on Large-Scale Advanced Package

Jiwon Yoon, Hyunwoo Kim, Juhyeon Lee, Joungho Kim, Sungjin Kim - Korea Advanced Institute of Science and Technology; Youngsu Kwon, Yigyeon Kim, Minseok Choi - Electronics and Telecommunications Research Institute; Heejun Jang, Kyun Ahn, Jinhan Kim, TaeKyeong Hwang - Amkor Technology, Inc.

6. Development of Robust and Cost-Effective Electrical & Optical Interconnect Solution for High Performance Silicon Photonic Applications

Jae Kyu Cho, Takako Hirokawa, Yusheng Bian, Scott Pozder, Koushik Ramachandran, Arpan Dasgupta, Jason Kim, Zahidur Chowdhury, Norman Robson, Thomas Houghton - GlobalFoundries, Inc.

7. Low-Loss Non-Contact Interconnects Based on 3D Heterogeneous Redistribution Layer for Millimeter Wave Phased Arrays

Lichang Huang, Yunfei Cao - South China University of Technology; Yuting Tong, Sha Xu - Guangdong University of Technology; Xiaobin Xu, Jinxing Chen - Glorysky Electronic Technology Co., Ltd.

8. Thermal Performance and Reliability of Liquid Metal Alloys as Thermal Interface Materials for Computing Electronics Devices

Guangyu Fan, Jacob Wells - Indium Corporation; Michael Beam - SUNY Polytechnic Institute

9. Multi-Wideband Antenna in Package With Dual Polarizations

Mei Sun - Institute of Microelectronics A*STAR

10. Deep Reinforcement Learning-Based Power Distribution Network Design Optimization for Multi-Chiplet System

Weiyang Miao, Zhen Xie, Chuan Seng Tan - Institute of Microelectronics A*STAR/Nanyang Technological University; Mihai Dragos Rotaru - Institute of Microelectronics A*STAR

11. Novel Low Loss Polymer With High Thermal Resistance for Advanced IC Packaging

Hikaru Mizuno - JSR Micro, Inc.; Eri Mishima, Shunsuke Iizuka, Yuuichi Yashiro, Naoyuki Kawashima - JSR Corporation

12. Power Supply Design and Power Management in Complex System Design: Co-Packaged Optics-FPGA 3D SIP Module

Jugal Kishore Bhandari, Sandhya Dharavath, Venkata Ramana Pamidighantam, Mohd. Ubed, Anusha Veerandi, Rohin Kumar Yeluripati - LightSpeed Photonics Pte Ltd

13. Additively Manufactured SoP Modules for Smart Agriculture and Insect Pheromone Sensing Applications

Genaro Soto Valle Angulo, Manos M. Tentzeris - Georgia Institute of Technology; Andrew Fang - Walton High School

14. All-Cu 3D Interconnects as an Alternative to Hybrid Bonding

Tadatomu Suga, Kanji Otsuka - Meisei University

15. Additive Manufacturing of an Electronically Steerable Microstrip Leaky Wave Antenna on Thin Alumina Substrate

Ethan Kepros, Yihang Chu, Bhargav Avireni, Sambit Ghosh, Brian Wright, Premjeet Chahal - Michigan State University

16. Conductive Fabric Based RFID Wearable Textile Antennas for Product Authentication and Quality Control

Bhargav Avireni, Yihang Chu, Ethan Kepros, Sambit Kumar Ghosh, Premjeet Chahal - Michigan State University

17. Tire-Integrated Antennas for Wireless Sensors in Automotive Applications

Yihang Chu, Sambit Kumar Ghosh, Bhargav Avireni, Ethan Kepros, Premjeet Chahal - Michigan State University

18. Additively Manufactured Dissolvable Packaging for Recycle and Reuse of Chips for Sustainable Reduction of E-Waste

Dhiya Belkadi, Carl P Hahn, Hannah Lynn Houston, Sunehra Saleha, Min Sung Kim, Muhammad Mustafa Hussain - Purdue University

19. Experimental Study of Transmission Signal Performance of Sub-2-micron Fine Wiring With Novel Structure

Masaya Tanaka, Nobuyoshi Moriwaki, Satoru Kuramochi - Dai Nippon Printing Co., Ltd.

20. Comprehensive Socket Characterization and Correlation for High-Speed Interface Testing System

Varin Sriboonlue, Yeseul Jeon, Gerardo R. Luevano, Chris Ferguson, Ennai Ochoa - Qualcomm Technologies, Inc.

21. A Novel Method for LPDDR5 DRAM Jitter Measurement Through De-Embedding

Manho Lee, Chulhee Cho, Hyeonji Lee, Sehoon Park, Wonseok Hong, ByungSuk Woo, Woo-Shin Choi, Young-Chul Cho, Young-Soo Sohn, Jung-Hwan Choi - Samsung Electronics Co., Ltd.

22. An Effective Surface Roughness Extraction Method Using Particle Swarm Optimization (PSO) Algorithm and 2D Based Equations for High Speed Systems

Youngjae Lee, Kwangho Kim, Chulhee Cho, Sungjin Yoon, Hyeonji Lee, Wonji Hwang, Wooshin Choi, Young-Chul Cho, Jung-Hwan Choi, Young-Soo Sohn - Samsung Electronics Co., Ltd.

23. Ultimate Wafer-Level Lens Integration and Optimization Using Microlenses and Metalenses for High-End Active Pixel Sensor Applications

Hoi-Jin Lee, Sihun Han, Chanyeol Park, Sunyong Park, Woonphil Yang, Yitae Kim - Samsung Electronics Co., Ltd.

24. Microprinting Process Development Enabling Cost Effective, High Density and Flexible Electro-Optical Integration

Krzysztof Niewegowski, David Weyers, Akash Mistry, Karlhenz Bock - TU Dresden

25. High Bandwidth Active Flexible Connector for Signaling in Wafer-Scale Systems

Randall Irwin, Joanna Fang, Subramanian Iyer - University of California, Los Angeles

Thursday May 30th

Session 39: Bonding Process and Analysis in Next-generation Interconnects

Time: 10:00 AM - 12:00 PM

Committee: Interactive Presentations

Aurora A-C Corridor

Session Co-Chairs:

Rao Bonda - Amkor
rao.bonda@amkor.com

Karan Bhangaonkar - Intel
karan.r.bhangaonkar@intel.com

Amanpreet Kaur - Oakland University
kaur4@oakland.edu

Jin Yang - Samsung
jin1.yang@ieee.org

1. A Novel Detection Applied on Micro Defect in Bump Interface for 2.5DIC Package

Yi-Sheng Lin, Yu-Hsiang Hsiao, Cheng-Hsin Liu, Fan-Ju Hsiao - Advanced Semiconductor Engineering, Inc.

2. Hybrid Bonding Technology Chemical Mechanical Planarization Process Optimization Using Comprehensive 3D Modeling

Liu Jiang, El Mehdi Bazizi, Gregory Costrini, Prayudi Lianto, Gilbert See, Sefa Dag - Applied Materials, Inc.; Dimitrios Tsamados, Yves Saad - Synopsys, Inc.

3. Influence of Stiffener Design on Co-Packaged Optics (CPO) 2.5D Heterogeneous Packages

Karthik Arun Deo, Yangyang Lai, Jong Hwan Ha, Junbo Yang, Seungbae Park - Binghamton University

4. Adhesion Layer Influence on Thermomechanical Reliability of Electroplated Copper Through-Glass Via (TGV)

Junbo Yang, Ke Pan, Pengcheng Yin, Yangyang Lai, Seungbae Park - Binghamton University; Chukwudi Okoro - Corning, Inc.; Dhananjay Joshi, Scott Pollard - Corning Research and Development Corp.

5. A Study on the Surface Activation of Plasma Treatment for Hybrid Bonding Joint Interface

Chih-Jing Hsu, Hsu-Nan Fang, Tzu-Yu Su, Zhao-Ze Jiang, Yi-Hua Chen, Chien-Ching Chen, Yu-Bin Tsai, Che-Ming Hsu, Yuan-Feng Chiang, Jen-Chieh Kao, Yung-I Yeh - ASE Corporate R&D Center

6. Influence of Heat Treatment on the Quality of Die-to-Wafer Hybrid Bond Interconnects

Laura Wenzel, Catharina Rudolph, Adil Shehzad, Iuliana Panchenko, Manuela Jungh hnel - Fraunhofer IZM; Partha Mukhopadhyay, H. Jim Fulford - Tokyo Electron America, Inc.

7. Inverse Hybrid Bonding With Aluminum Oxide as Infill Using Atomic Layer Deposition

Rohan Sahay, Ashita Victor, Muhammad Bakir - Georgia Institute of Technology; Shreyam Natani, Dipayan Pal, Victor Wang, Chengshuan Jimmy Kuo, Andrew Kummel - University of California, San Diego

8. Intelligent Design and Demonstration of Reliable All-Cu Interconnections on High-Density Glass Substrates at 10 Micron Pitch

Ramon Sosa, Antonia Antoniou, Vanessa Smet - Georgia Institute of Technology

9. Electromigration Kinetics of SAC/SnBiAg Hybrid Solder

Minhua Lu, Evan Colgan - IBM Research

10. Simulation of Bulge-Out Mechanism Enabling Sub-0.5 μm Scaling of Hybrid Wafer-to-Wafer Bonding

Jo De Messemacker, Koen Van Sever, Yan Wen Tsau, Boyao Zhang, Kristof Croes, Eric Beyne - imec

11. Wet Cu Passivation for High Throughput Fluxless Thermal Compression Bonding of Cu-Sn bumps for Die-to-Wafer Stacking

Jens Rip, Jaber Derakhshandeh, Dieter H. Cuyppers, Eric Beyne - imec; Ryo Negishi, Itsuro Tomatsu - MEC Co., Ltd

12. Low Temperature Nanocrystalline Cu/Polymer Hybrid Bonding With Tailored CMP Process

Lee Ou-Hsiang, Hsiang-Hung Chang, Wei-Lan Chiou, Chia-Wen Chiang, Shih-cheng Yu, Ting-Yu Ke, Yu-Min Lin - Industrial Technology Research Institute; Chia-Hsin Lee, Andrew Tan - Brewer Science, Inc.

13. A Novel FOPLP Structure With Chip First & RDL First Process for Automotive Chip Application

Terry Wang, Chih Wei Lu, Eric Feng, Yu-Jhen Yang, Cheng-Yueh Chang, Pei-Pei Cheng - Industrial Technology Research Institute; Fredrick Lie - Applied Materials, Inc.; Austin Cheng - FAVITE, Inc.; Hsin-Yi Huang - Everlight Chemical Industrial Corp.; Meiten Koh - Taiyo Ink Mfg. Co., Ltd.; Aneta Wiatrowska, ukasz Witczak - XTPL SA

14. A Unified and Adaptive Continual Learning Method for Feature Segmentation of Buried Packages in 3D XRM Images

Richard Chang, Jie Wang, Namrata Thakur, Ramanpreet Pahwa, Yang Xulei - Institute for Infocomm Research A*STAR

15. Low Thermal Budget Fine-Pitch Cu/Dielectric Hybrid Bonding With Cu Microstructure Modifications

Hemanth Kumar Cheemalamarri, Anh Tran Van Nhat, Gim Guan Chen, Arvind Sundaram, Binni Varghese, Nandini Venkataraman, Vempati Srinivasa Rao, Navab Singh - Institute of Microelectronics A*STAR

16. Fundamental Study on Reflow Mechanisms of Sn and Sn Alloys for Fine Bump Pitch Scaling

Chongyang Cai, Anup Panindre, Liang He, Jung Kyu Han, Gang Duan, Rahul Manepalli - Intel Corporation

17. Advanced Photo-imageable Dielectric Film Enabling Low CTE and sub-5-Micrometer Patterning for Next Generation Build-up Layer

Taku Ogawa, Ryuichi Okuda, Fumie Hattori, Hirokazu Ito - JSR Corporation

18. Glass Panel Process Integrated Low Stress Organic Dielectric RDL Structure

Chien Kang Hsiung, Sarah Wozny, Marwin L Bernt - Applied Materials, Inc.; Terry Wang - Industrial Technology Research Institute; Kuan-Nang Chen - National Yang Ming Chiao Tung University

19. A Warpage Investigation for a Large Panel-Sized Interposer With Embedded Dies

Katsuki To, Daisuke Yamanaka, Masashi Minami, Shan Ho Tsai, Sadaaki Katoh - Resonac Corporation

20. Development of Two Different Molding Methods in 2.5D Package With 20 μm or Less Fine Bump Pitch CoW Structure

Takeshi Saito, Sadaaki Katoh, Keiko Ueno, Ryosuke Kimura, Tsai Shanho, Takahiro Iseki, Kan Donchoru - Resonac Corporation

21. Low Temperature Cu/SiO₂ Hybrid Bonding With Protruding Copper Pads

Junpeng Fang, Qian Wang, Jixun Yu, Ziqing Wang, Jian Cai - Tsinghua University; Yikang Zhou, Kai Zheng - Semiconductor Technology Innovation Center (Beijing) Corporation

22. Analysis of Vacancies in Wafer-Bonding Interface Via Positron Annihilation Lifetime Spectroscopy

Sotetsu Saito, Nobutoshi Fujii, Shunsuke Furuse, Naoki Ogawa, Suguru Saito, Yoshiya Hagimoto, Hayato Iwamoto - Sony Semiconductor Solutions Corporation

23. Annealing Effects in Sub-8 μm Pitch Die-to-Wafer Hybrid Bonding

Partha Mukhopadhyay, Andrew Tuchman, Kevin Ryan, Adam Gildea, Sitaram Arkalgud, Anton deVilliers, Jim Fulford - TEL Technology Center, America, LLC; Laura Wenzel, Catharina Rudolph - Fraunhofer IZM; Chuck Woychik, Chris Nichols - SkyWater Technology; John Allgair - BRIDG

24. 3D Interconnect Technology With Serpentine and Trapezoidal Corrugation Using a Flexible Photosensitive Dielectric to Strengthen the Bendability of FHE

Chang Liu, Jiayi Shen, Atsushi Shinoda, Han Zhang, Tetsu Tanaka, Takafumi Fukushima - Tohoku University

25. Through Dielectric Via Etching in Magnetic Neutral Loop Discharge Plasma for 3D Chiplets Interconnect

Yasuhiro Morikawa - ULVAC, Inc.

26. A Novel Plasma Etching Technology of RIE-Lag Free TSV and Dicing Processes for 3D Chiplets Interconnect

Taichi Suzuki, Kenta Doi, Yasuhiro Morikawa - ULVAC, Inc.

27. Aluminum-to-Aluminum and Aluminum-to-Copper Thermal Compression Bonding for Heterogeneous Integration of Legacy Dielets

Krutikesh Sahoo, Randall Irwin, Golam Sabbir, Vineeth Harish, Subramanian Iyer - University of California, Los Angeles

28. Directional Atmospheric Plasma De-oxidation for Ultra Small Passive Component Assembly

Khoulood Ben Harzallah, David Danovitch, Malak Kanso - University of Sherbrooke; Christian Bergeron, Marc-Olivier Pion - IBM Canada, Ltd.

29. Exploring Bonding Mechanisms of SiCN for Hybrid Bonding

Sodai Ebiko, Fumihiro Inoue - Yokohama National University; Serena Iacovo, Soon-Aik Chew, Boyao Zhang - imec; Akira Uedono - University of Tsukuba

Thursday May 30th

Session 40: Materials, Manufacturing and Assembly Techniques in Advanced Packaging Solutions

Time: 2:30 PM - 4:30 PM

Committee: Interactive Presentations

Aurora A-C Corridor

Session Co-Chairs:

Mark Eblen - Kyocera
mark.eblen@kyocera.com

Stephen Lee - NXP
stephen.lee@nxp.com

Kristina Young - Synopsis
kristina.youngfisher@gmail.com

Biao Cai - IBM
biaocai@us.ibm.com

1. Characterization of Warpage of Ultra-Low-K Dielectric Materials and Correlation With Modulus and Coefficient of Thermal Expansion

Mohanalingam Kathaperumal, Pragna Bhaskar, Austin Toro, Pratik Nimbalkar, Lila Dahal, Muhannad Bakir - Georgia Institute of Technology

2. A Highly-Reliable and Cost-Effective Approach by Reducing Flux Cleaning in Flip-Chip Processes Through Underfill Curing in a Pneumatic Ambient

Huan-Ping Su, Ming-Hua Hsu, Auger Homg - Ableprint Technology Co., Ltd.

3. 300 nm Pitch W2W HBI for CFET and 3D DRAM Through Module Co-Optimization

Tyler Sherwood, Raghav Sreenivasan, Masha Gorchichko, Amit Prakash, Raghuvver Patlolla, Sarabjot Singh, Yoocham Jeon, Jason Appell, Ryan Ley, Kun Li - Applied Materials, Inc.; David Hafner - EV Group, Inc.

4. Mechanical Characterization and Modeling of iSAC Lead-Free Solder

Golam Rakib Mazumder, Souvik Chakraborty, Mahub Alam Maruf, Mohammad Al Ahsan, Jeffrey Suhling, Pradeep Lall - Auburn University

5. Novel SiO₂ Cables With Edge Launch Connectors for High Temperature RF Measurements

Firas Alshatnawi, Ashraf Umar, Emuobosan Enakerakpo, Mohamed Abdelatty, W.T. Alshabani, Mohammed Alhend, David Shaddock, Peter Borgesen, Mark Poliks - Binghamton University

6. Modeling and 3D Additively Manufactured Inductors on Complex Shape for Extreme High Temperature Electronics

Waleed Alshabani, Ashraf Umar, Firas Alshatnawi, Emuobosan Enakerakpo, Mohamed Abdelatty, Mohammed Alhend, Mark D. Poliks - Binghamton University; David Shaddock - General Electric Company

7. Underfill Selection Guideline for Fan-Out Heterogeneous Integration Package

Wen-Yu Teng, Liang-Yih Hung, Jackson Lee, Debby Li, Carl Chen, Don-Son Jiang, Yu-Po Wang - Siliconware Precision Industries Co., Ltd.

8. Comparison of Organic and Inorganic Dielectric Hybrid Bonding With Highly <111>-Oriented Nanotwinned Cu

Pin-Syuan He, Chih Chen - National Yang Ming Chiao Tung University

9. One-step Surface Modification for Boron Nitride and its Polymer Composite of Enhanced Thermal Conductivity for Advanced Packaging Applications

Zihao Lin, Jiaxiang Li, Zhijian Sun, Kyoung-Sik Moon, Ching-Ping Wvong - Georgia Institute of Technology; Andrew Fang - Walton High School

10. Investigation on the Use of Al-Ge Eutectic Bonding in the Structural Part of a Multilayer Stacked MEMS Device

Jun Wang, Manuel Mannarino, Jakob Visker, Shuo Kang, Bivragh Majeed, Lan Peng, Gauri Karve, Luc Haspelslagh - imec; Günther Weidlinger, Tobias Wernicke, Jürgen Burggraf, Markus Wimplinger - EV Group, Inc.

11. Limits for Dicing Speed Based on Crack Stop Constructions With Different Levels of Robustness

Maria Heidenblut, Michael Goroll, Stefan Kaiser, Andreas Bauer, Kristina Hopfauf - Infineon Technologies AG

12. Vertical Stacking of Heterogeneous Chiplets of Duplexer on LNA/SOI

Tai Chong Chai, Rotaru Dragos Mihai, Xiangyu Wang, Pei Siang Sharon Lim, Lin Ji, Rathin Mandal, Raju Mani, Ming Ching Jong, Yong Liang Ye - Institute of Microelectronics A*STAR

13. Multi Chip Stacked Memory Module Development Using Chip to Wafer (C2W) Hybrid Bonding for Heterogeneous Integration Applications

Nagendra Sekhar Vasarla, Dileep Kumar Mishra, Sasi Kumar Tippabhotla, Chandra Rao Bhesetti, Ser Choong Chong, King-Jien Chui, Srinivasa Rao Vempati - Institute of Microelectronics A*STAR

14. Error Estimation in Immersion Cooling Liquid Dk-Df Extraction Using Different Methods

Saikat Mondal, Xenofon Konstantinou, Cemil Geyik, Zhichao Zhang, Kemal Aygun - Intel Corporation

15. Fluidic Self Alignment for Hybrid Bonding Using Intel Process

Feras Eid, Yi Shi, Golsa Naderi, Shashi Bhushan Sinha, Rob Jordan, Wenhao Li, Charles El Helou, Felipe Bedoya, Anandi Roy, Tayseer Mahdi, Jun-Ruey Chen, Brandon M Rawlings - Intel Corporation

16. An Advanced Remote-Plasma Assisted Ozon-Ethylene-Radical (OER) Process for Cu-SiO₂ Hybrid Bonding Yield Enhancement

Tatsunori Shino, Eitaro Toyama, Tetsuya Nishiguchi - MEIDEN NANOPROCESS INNOVATIONS, Inc.; Mariappan Murugesan, Kiyoharu Mori - NICHe; Bungo Tanaka, Takafumi Fukushima - Tohoku University

17. Influence of Temporary Rigid Carrier Structure on Warpage During Wafer/Panel Level Packaging

Yoshinori Matsuura, Joji Fujii, Vivek Dutta - Mitsui Mining & Smelting Co., Ltd.

18. Extremely Advanced Substrate as an Integrated Package Solution (iPaS) for Next Generation High Performance Computing (HPC) Applications

Tatsuya Kitamura, Takeshi Furukawa, Shuhei Yamada, Koshi Himeda, Atsushi Yamamoto - Murata Manufacturing Co., Ltd.

19. A CMP Process for Hybrid Bonding Application With Conventional / nt-Cu and SixNy / SixOy Dielectrics

Tri Widodo, Yi Shi, Xavier F Brun - Intel Corporation; Prayudi Lianto, Avery Tan, Joselyn Lie, Patrick Lim, Guan Huei See - Applied Materials, Inc.

20. Effect of Material Aging on the Reliability of an Automotive BGA Device Under Temperature Cycling Test Conditions

Abdullah Fahim, Ryan Zhang, Amar Mavinkurve, Sandeep Shantaram, Ali Rezaie Adli, Vviwat Tanwongwan, Torsten Hauck - NXP Semiconductor, Inc.

21. Overlay Challenges of Extremely Large Exposure Field, Fine Resolution Lithography Due to Alignment Solution Errors and a Solution Using Early Zone Corrections in Advanced IC Substrates

John Chang, Xin Song, Timothy Chang - Onto Innovation

22. World's Smallest, Membrane-Based Capacitive Differential Pressure Sensor- Package Structure, Material Selection, Assembly Challenges & Solutions

KM Rafidh Hassan, Gaurav Mehrotra, Hazel Caballero, Young Kim, Steven Lee - Renesas Electronics America; Karim Allidina, Tommy Tsang, Mohannad Elsayed, Hani Tawfik - MEMS Vision International, Inc.

23. Packaging Challenges and Solutions for Next Generation Low-Profile WLCS

Humi (Shih-Wen) Tang, Jerry (Che-Han) Li, Jessie (Yu-Shan) Wei, Baltazar Canete, Leo (Hsin-Hung) Huang, Jesus Mennen Belonio - Renesas Electronics Corporation

24. A Study on Novel Low Temperature Soldering Process Using Vapor phase

Youngja Kim, Woojin Choi, Seungyeop Oh, Sinyeob Lee, Sunwon Kang - Samsung Electronics Co., Ltd.

25. Numerical Study on Hybrid Discontinuous Microchannel Heat Ink Combining Manifold With Pin Fins (DMC-MPF) for High Power Electronic Device

Jiaryu Du, Lang Chen, Ran Hu, Chi Zhang, Wei Wang - Peking University; Huaqiang Yu - 26th Research Institute of China Electronics Technology Group Corporation

26. Room-Temperature Hybrid Bonding of Via-Middle TSV Wafer Fabricated by Direct Si/Cu Grinding and Residual Metal Removal

Naoya Watanabe - National Institute of Advanced Industrial Science and Technology; Hiroshi Yamamoto, Takahiko Mitsui - Okamoto Machine Tool Works, Ltd.

27. Ultra Thin Fan-Out 3D WLCSP Heterogeneous Integration Packaging

Jay Li, Zen-Wei Zhang, Sam Lin, Vito Lin, Teny Shih, Nicholas Kao - Siliconware Precision Industries Co., Ltd.; Yu-Po Wang - SPIL

28. Panel Level Plasma Etching Characteristics for Advanced Packaging

Md Ishak Khan, Wei Wei, Haobo Chen, Xiyu Hu, Nicholas Haehn, Xiaoying Guo, Leonel Arana - Intel Corporation; Kensuke Akazawa - ULVAC, Inc.

29. Development of a Reusable Smart-Catheter System for Improved Urinary Health Monitoring

Zhi Dou, W.T. AlShaibani, Erika Solano Diaz, Mohammed Alhendi, Abdullah Obeidat, Riadh Al-Haidari, Mark Schadt, Mark Poliks - Binghamton University; Kara Allanach, Daniel Wollin, Souvik Paul - CathBuddy, Inc.

30. Focal Extension – A Novel Lithography Technique in Direct-Write Laser Lithography to Enable Fine-Pitch Patterning Over Large Topography

Golam Sabbir, Subramanian Iyer - University of California, Los Angeles

Friday May 31st

Session 41: Student Posters

Time: 10:00 AM - 12:00 PM

Committee: Interactive Presentations

Aurora A-C Corridor

Session Co-Chairs:

Alan Huffman - Skywater
alan.huffman@ieee.org

Mohd. Enamul Kabir - Intel
enamul101b@yahoo.com

Ibrahim Guven - Virginia Commonwealth
iguven@vcu.edu

Jae Kyu Cho - Globalfoundries
jaekyu.cho@globalfoundries.com

1. Low Temperature Cu/SiO₂ Hybrid Bonding Using Area-Selective Metal Passivation (Interface Metal)

Technology for 3D IC and Advanced Packaging
Mu-Ping Hsu, Wen-Tsu Tsai, Chi-Yu Chen, Zhong-Jie Hong, Kuan-Neng Chen - National Yang Ming Chiao Tung University; Ou-Hsiang Lee, Tzu-Ying Kuo, Hsiang-Hung Chang - Industrial Technology Research Institute

2. Vertical Power Delivery for High Performance Computing Systems with Buck-Derived Regulators

Sriharini Krishnakumar, Inna Partin-Vaisband - University of Illinois; Mingeun Choi, Satish Kumar - Georgia Institute of Technology; Ramin Rahimzadeh Khorasani, Madhavan Swaminathan - Pennsylvania State University; Rohit Sharma - Indian Institute of Technology Ropar

3. Multi-Objective Optimization of a 1200-V Fan-Out Panel-Level SiC MOSFET Packaging with Improved Genetic and Particle Swarm Algorithms

Xuyang Yan, Wei Chen, Jing Jiang, Jiajie Fan - Fudan University; Xuejun Fan - Lamar University; Guoqi Zhang - Delft University of Technology

4. Packaging of Photonic Neural Network Accelerators

Russell Schwartz, Nicola Peserico, Hamed Dalir, Volker Sorger - University of Florida

5. Comparison of Different Copper Nitride Passivation Layers Fabrication Methodology and Optimal Growth Condition for Low Temperature Copper-to-Copper Bonding in Advanced Packaging

Chiao-Yen Wang, Tzu-Heng Hung, Kuan-Neng Chen - National Yang Ming Chiao Tung University; Ping-Jung Liu - Taiwan Semiconductor Manufacturing Company, Ltd.

6. Fabrication and Testing of In-Line Structures for Non-Destructive Study of Solder Electromigration: Applications to SnBi Low Temperature Solder

Chetan Jois, Pei-En Chou, Ganesh Subbarayan - Purdue University

7. Application of Elevated-Laser-Liquid-Phase-Epitaxy (ELLPE) Technique on Different Oriented Wafers for Monolithic 3DIC Integration

Bo-Jheng Shih, Yu-Ming Pan, Chiao-Yen Wang, Huan-Yu Chiu, Huang-Chung Cheng, Kuan-Neng Chen - National Yang Ming Chiao Tung University; Chih-Chao Yang, Chang-Hong Shen - Taiwan Semiconductor Research Institute

8. Manufacturing and Characterization of Planar Transformers as Molded Interconnect Device Technology Component for an Industrial Production

Tim Nils Bierwirth, Folke Dencker, Marc Christopher Wurz - Leibniz University Hannover; Sebastian Bengsch, Michael Werner, Christian Henne, Stefan Bur - Ensinger GmbH; Rico Wachs - Tridelta Weichferite GmbH

9. Hybrid Wiring Layers for Fine Pitch Integration

Vineeth Harish, Krutikesh Sahoo, Subramanian Iyer - CHIPS UCLA; Kai Zheng, Gilbert Park, Han-Wen Chen, Steven Verhaverbeke - Applied Materials, Inc.

10. Novel Single and Co-Ion Implantation Induced Backside Etch Stop Structures for 3D Multilayer Stacked Package

Yen-Shuo Chen, Hua-Tai Fan, Yu-Chien Ko, Fu-Hsiang Ko - National Yang Ming Chiao Tung University; Tzu-Wei Chiu - Thinchipway Co., Ltd.; Chun-Chi Chen - Taiwan Semiconductor Research Institute

11. New Method for Fluid Filling Through Silicon Vias With Silver Ink for Packaging Techniques

Zachary Nelson, Alice Mo, Luke Theogarajan - University of California, Santa Barbara

12. Electro Spray Printed Silver Films for EMI Shielding of SiP Architectures

Emma Pawliczak, Paul Chiarot - Binghamton University

13. Latency Insertion Method for Accelerated Simulation of Memristor Crossbar Array in Neuromorphic Chip

Yi Zhou, Tahsin Shameem, Zohreh Salehi, Shaloo Rakheja, Jose Schutt-Aine - University of Illinois; Hanzhi Ma, Junwei Yu, Erping Li - Zhejiang University

14. A Novel Parallel Interconnection Approach to Reduce Shading Losses on Submillimeter Concentrated Photovoltaic Technologies

Corentin Jouanneau, Thomas Bidaud, Artur Turala, David Danovitch, Gwenaelle Hamon, Maxime Damon - University of Sherbrooke

15. Fabrication and Packaging of a Heterogeneously Integrated, Flexible Quantum Dot Enabled Micro-Display

Henry Sun, Harshal Sonagara, Subramanian Iyer - University of California, Los Angeles; Lisong Xu, Kai Ding, Mingwei Zhu - Applied Materials, Inc.

16. Intense Pulsed Light Soldering of SAC305 for Flip-Chip Package

Seong-Ung Ryu, Young-Min Ju, Jong-Whi Park, Seok-Hoon Jeong, Hak-Sung Kim - Hanyang University

17. Design Space Exploration for Power Delivery Network in Next Generation 3D Heterogeneous Integration Architectures

Madison Manley, Ankit Kaul, Muhammad Bakir - Georgia Institute of Technology

18. Hybrid Interconnect Infrastructure for Inter-Chiplet Communication in Wafer-Scale Systems

Yousef Safari, Rezvan Mohammadrezaee, Dima Al Saleh, Boris Vaisband - McGill University

19. Reliability of Indium Solder Joints using Laser-Assisted Bonding (LAB) Process at Room Temperature

Ji Eun Jung, Yoon Hwan Moon, Ga-Eun Lee, Jho Joo, Gwang-Mun Choi, Chanmi Lee, Ki-seok Jang, Jin-Hyuk Oh, Yong-Sung Eom, Jung-Ho Shin, Kwang-Seong Choi - Electronics and Telecommunications Research Institute; Seung-Yoon Lee - Hanbat National University

20. Tailored Multi-Mode, High-Q Superconducting Nb Resonators: Unique Platform for Magnon-Photon Coupling

Muntasir Mahdi, Bhargav Yelamanchili, Archit Shah, Sherman Peek, Michael Hamilton - Auburn University; Yuzan Xiong, Wei Zhang - University of North Carolina; Dan-Chi Nguyen - Ewha Womans University/The University of North Carolina; Tae Hee Kim - Ewha Womans University

21. Magnetic Cores for High Conversion Ratio Package Embedded Inductors

Sai Saravanan Ambi Venkataramanan, Prahalad Murali, Mohan Kathaperumal, Mark Losego - Georgia Institute of Technology; Dustin Allen Gilbert - University of Tennessee

22. Unveiling Mechanical Stress in Lithium-Metal Batteries for Flexible Electronics: A Novel Approach With Optical Techniques and Artificial Interfaces

Mayukh Nandy, Siyang Liu, Hongbin Yu - Arizona State University

23. Creep Properties of SAC305 Solder Specimens that Mimic the Microstructures of a Micro Solder Ball: Measurement and BLR Prediction

You-Gwon Kim, Heon-Su Kim, Tae-Wan Kim, Seong-Ung Ryu, Hak-Sung Kim - Hanyang University; Yongrae Jang, Bongtae Han - University of Maryland; Jun-Hyeong Lee, Jin-Kyu Kim - DUKSAN Hi-Metal Co., Ltd.

24. RF Energy Harvesting Hybrid RFID Based Sensors for Smart Agriculture Applications

Yihang Chu, Ethan Kepros, Bhargav Avireni, Sambit Kumar Ghosh, Premjeet Chahal - Michigan State University

25. Influence of Nickel and Bismuth Addition on the Mechanical Shear Strength of SAC+ Ni, Bi Solders Under Isothermal Aging and Multiple Reflows

Jyotsna Bandayagari, Dr. Darshil Patel, Dr. Yingge Zhou - Binghamton University; Dr. Santosh Kudtarkar, Dr. Arun Raj, Dr. Shafi Sayed - Analog Devices, Inc.

26. Process Development of Manifold Microchannels Cooling for Embedded Silicon Fan-Out (MMC- eSiFO) Package

Zhou Yang, Yuchi Yang, Peijue Lyu, Jianyu Du, Lang Chen, Chi Zhang, Wei Wang - Peking University

27. Demystifying Edge Cases in Advanced IC Packaging Inspection Through Novel Explainable AI Metrics

Shajib Ghosh, Antika Roy, Md Mahfuz Al Hasan, Patrick Craig, Nitin Varshney, Sanjeev J. Koppal, Navid Asadizanjani - University of Florida

28. Effective Heat Dissipation of White Laser Diodes by Welding Metallized Phosphor-Sapphire on Ceramic Substrate With 3D Metal Dam

Zikang Yu, Jiuzhou Zhao, Qing Wang, Yang Peng, Mingxiang Chen - Huazhong University of Science and Technology

29. Impact of Non-Coplanarities on Microstructure and Properties of Sintered NP-Cu Interconnections

Ali Amimasiri, Ramon A. Sosa, Mengkun Tian, Antonia Antoniou, Vanessa Smet - Georgia Institute of Technology

Friday Refreshment Break: 9:15 a.m. - 10:00 a.m. – Aurora A-C Corridor

2024 ECTC EXHIBITION

Exhibit Hall Hours

Wednesday, May 29

9:00 a.m. - 12:30 p.m. / 2:00 p.m. - 6:30 p.m.

Thursday, May 30

9:00 a.m. - 12:30 p.m. / 2:00 p.m. - 4:00 p.m.

Aurora 1 Ballroom



2024 ECTC EXHIBITORS

Booth 323

3D Systems Packaging Research Center
+1-404-894-3662
prc.gatech.edu
791 Atlantic Dr NW
Atlanta, GA 30332
Contact: Chris White
chris.white@ien.gatech.edu

The 3D Systems Packaging Research Center (PRC) at Georgia Tech is a graduated NSF Engineering Research Center focusing on advanced packaging and system integration leading to System on Package (SoP) technologies. The center conducts research and education in all aspects of packaging that includes design, materials, process, assembly, thermal management, and integration driven by applications including areas such as high-performance computing, artificial intelligence, automotive, broadband wireless and space. The team consists of 29 faculty from five schools, 11 research/administrative staff, 50+ graduate/undergraduate students and several visiting engineers. This is enabled through collaboration with over 40 industry/govt. organizations and 14 universities.

Booth 633

Adeia
+1-408-473-2500
adeia.com
3025 Orchard Pkwy
San Jose, CA 95134
Contact: Yan Chai
yan.chai@adeia.com

Adeia invents, develops and licenses fundamental innovations that shape the way millions of people explore and experience entertainment and enhance billions of devices in an increasingly connected world. Leveraging the combination of highly experienced technologists, scientists, engineers and advanced R&D labs in San Jose, California and Raleigh, North Carolina, Adeia develops industry-leading 3D integration solutions such as hybrid bonding that meet the demand for greater functionality, higher performance and smaller size for next generation electronics.

Booth 335

AI Technology
+1-609-799-9388
aitechnology.com
70 Washington Rd
Princeton Junction, NJ 08550
Contact: Maurice LeBlon
mleblon@aitechnology.com

AI Technology, Inc. (AIT) specializes in electronic interconnection and microelectronic packaging materials, including adhesive films with low to zero interface stress for ultimate reliability and, as part of the company's line of Thermal Interface Materials (TIM), pads, greases, gels, waxes and phase change materials for unparalleled thermal

dissipation in die, component and module levels of electronic packaging. Other AIT products include Conformal Coatings to combat UV, moisture and humidity corrosion.

Booth 719

AIM Photonics
+1-518-956-7221
aimphotonics.com
257 Fuller Rd
Albany, NY 12203
Contact: Melissa Renzi
mrenzi@sunypoly.edu

As the nation's first complete end-to-end silicon photonic manufacturing ecosystem, AIM Photonics provides our members and customers with crucial technology on-ramps and access to strategic U.S. government, industry, and academic communities to help advance their innovative ideas from concept to manufacturing-ready prototypes.

Our state-of-the-art test, assembly and packaging facility in Rochester, NY is the nation's only accessible 300 mm wafer facility offering both photonic and electronic packaging capabilities. Our extensive toolset comprises all standard processes such as wafer bumping, fiber attach, wire bonding, die attach, flip chip and dicing, as well as advanced packaging and heterogeneous integration capabilities.

Booth 432

Ajinomoto Fine-techno USA
+1-408-564-7245
aft-website.com/en/
20380 Town Center Ln, Suite 105
Cupertino, CA 95014
Contact: Yuko Shibata
shibatay@ajiusa.com

Ajinomoto Fine-Techno Co., Inc. (AFT) is a subsidiary of the Ajinomoto Group responsible for the fine chemicals division. AFT delivers materials that can suit a wide range of customer needs with our four main strengths: molecular design, formulation, process development, and solutions. We have grown to play a major part in the value chains for electronics, automotive, and a variety of other products. We strive to provide the highest quality products, services, and information for our customers. Beyond our Ajinomoto Build-up film®, we've expanded our material portfolio to include molding, photo dielectric, magnetic, and optoelectronics.

Booth 411

Akrometrix
+1-404-486-0880
akrometrix.com
2700 NE Expressway, Suite 500
Atlanta, GA 30345
Contact: Paul Handler
pandler@akrometrix.com

Akrometrix is a worldwide leader of PCB &

Component thermal warpage metrology systems & test services for the electronics industries. We measure at-room-temperature warpage, thermal warpage (-50 to 300C), & thermal strain of substrates, materials and electronic components and assemblies at critical reflow temperatures. Our technologies include, Shadow Moir, Digital Fringe Projection (DFP), Digital correlation (DIC). Akrometrix equipment can provide graphical, statistical, and tabular results to prove compliance to industry standards.

Booth 720

All Flex Solutions, Inc.
+1-507-663-7162
allflexinc.com
1705 Cannon Lane
Northfield, MN 55057
Contact: Bob Burns
bburns@allflexinc.com

All Flex is a manufacturer of flexible electronic solutions that offer unique packaging options for you! All Flex provides custom combinations of dielectric materials and specialty metals that will help you create circuits offering very high speed electronic solutions. Ask us about what our solutions can do for you!

Booth 706

Amazing Cool Technology Corporation
+886-2-82261377
amazing-cool.com
6F.-4, No.736, Zhongzheng Rd,
Zhonghe Dist., New Taipei City, 23511,
Taiwan
Contact: Eric Hsu
eric.hsu@amazing-cool.com

Amazing Cool Technology combines graphene with copper with its own technology, and is the only graphene copper material in the world that can be mass-produced, and all the characteristics exceed oxygen-free copper, called "ACOOOL COPPER" that has high electrical conductivity, high thermal conductivity, corrosion resistance, oxidation resistance, high adhesion, bending resistance, improved mechanical properties, high voltage resistance, low leakage, and low temperature resistivity. ACOOL COPPER can be made into wire, plate or target; and can be used in electric vehicles, semiconductor industry, etc.

Booth 529

Amkor Technology
+1-480-821-5000
amkor.com
2045 E Innovation Circle
Tempe, AZ 85284
Contact: Christina Parsons
christina.parsons@amkor.com

Amkor Technology, Inc. is one of the world's largest providers of outsourced semiconductor packaging and test services. Founded in 1968, Amkor pioneered the outsourcing of IC packaging

and test and is now a strategic manufacturing partner for the world's leading semiconductor companies, foundries and electronics OEMs. Amkor's operational base includes production facilities, product development centers and sales and support offices located in key electronics manufacturing regions in Asia, Europe and the USA. For more information, visit amkor.com.

Booth 708
AmTECH Microelectronics
+1-408-612-8888

amtechmicro.com
485 Cochrane Circle
Morgan Hill, CA 95037
Contact: David Chavez
david.chavez@amtechmicro.com

AmTECH Microelectronics is a Silicon Valley based advanced packaging and assembly services company that specializes in low to medium volume production of high complexity products. The team comes from a design for manufacturing and process development background. AmTECH's processes include, flip chip C4, Thermocompression Bonding, Eutectic Bonding, and die attach, Au & Al wire bonding, ribbon bonding, dispense & encapsulation, silver sintering, ACF, and Surface Mount Technology (SMT). Corporate certifications include; ISO:9001, ISO:13485, and ITAR compliance.

Booth 717
AOI Electronics Co., Ltd.
+81-87-882-1131
tech.aoi-electronics.co.jp/en
455-1, Kohzai Minamimachi, Takamatsu,
Kagawa, 761-8014, Japan
Contact: Sato Matsumoto
tokyo.sales@aoi-electronics.co.jp

AOI Electronics is a leading company of Semiconductor Package, from Advanced Fan-Out Laminate Package (FOLP®) to Legacy Packages, such as DIP and QFN/DFN.

Customer can receive advantages by Chipllet integration with Pillar Suspended Bridge (PSB) as Panel Level, RF Antenna in Package (AiP), and SiP, based on Advanced packaging technologies and stable manufacturing processes. Wafer-level RDL and bumping processing are also provided as One-Stop Solution from AOI.

With reliable technology cultivated over 50 years, we propose flexible package design and optimal structure for customer needs. For more information, please visit <https://tech.aoi-electronics.co.jp/en/>.

Booth 400
Asahi Kasei Corporation
+81-366993991
asahi-kasei.com
1-1-2 Yurakucho
Chiyoda-ku, Tokyo, 100-0006, Japan
Contact: Reiko Mishima
mishima.rb@om.asahi-kasei.co.jp

Asahi Kasei is a leading chemical company developing and supplying high performance

materials to the electronics industry for years. PIMEL™ are Photosensitive Polyimide, PBO and Phenolic materials for semiconductor buffer coatings, insulation layer for redistribution layers (RDL) in semiconductor packaging. PIMEL™ has been widely used in many IC fabs / OSATs with proven track records in most semiconductor companies. Based on our technology expertise and experiences in the field, our low temperature cure polyimides have rapidly increased its applications for Wafer Level Fan-Out (WLFO) and Panel Level Fanout (PLFO), and other advanced packages for mobile, automotive, server, AI and other emerging technologies.

Booth 637
ASE
+1-408-636-9500
ase.aseglobal.com
1255 East Arques Ave
Sunnyvale, CA 94085
Contact: Patricia MacLeod
patricia.macleod@aseus.com

ASE, Inc. is the leading global provider of semiconductor manufacturing services in assembly and test. In a world running on semiconductor technology to achieve lifestyle, connectivity, and sustainability goals, packaging innovation is at the heart of what ASE does. ASE today is delivering on the promise of heterogeneous integration through advanced packaging, system-in-package, and chiplet solutions to meet growth momentum across AI, Automotive, HPC, IoT, 5G, and more. To learn about our technology, creativity, and VIPack™ platform that enables vertically integrated package solutions, please visit aseglobal.com or follow us on LinkedIn: @aseglobal.

Booth 430
ASMPT AMICRA GmbH
+49-9412082090
amicra.semi.asmpt.com/
Marie-Curie-Str. 6
Regensburg, 93055, Germany
Contact: Annette Brato
annette.brato@asmpt.com

Headquartered in Singapore, ASMPT is the only global company that offers high-quality solutions for major steps in the electronics manufacturing process: from equipment to multi-factory-level automation concepts for smart manufacturing. ASMPT encompasses wafer deposition and laser grooving, and various solutions that assemble and package delicate electronic and optical components into a vast range of end-user devices. ASMPT AMICRA, headquartered in Regensburg, Germany, is a worldwide leading supplier for ultra-high precision die attach systems. These specialize in submicron placement accuracy to $\pm 0.2\mu\text{m}@3\text{s}$ for photonics and semiconductor markets. AMICRA also supports die attach, flip chip, eutectic, epoxy and Mass Transfer Printing processes.

Booth 728
AT&S
+43-3842-200
ats.net
Fabriksgasse 13
Leoben, 8700, Austria
Contact: Alex Peng
alex.peng@cn.ats.net

Technology and digitalization are having an ever-growing impact on our lives and are increasingly shaping our daily routines at home and at work. As a global technology enterprise, AT&S is actively involved in these developments and plays a decisive role in shaping the digital world. This also represents an enormous responsibility, which AT&S has always accepted and fulfilled through its forward-looking vision, pioneering investments in R&D, and responsible use of resources. The high-end PCBs and IC substrates AT&S supplies influence future industry standards, products and applications in these key industries. Our products' unrivaled quality and constant innovation secures customers' long-term competitiveness.

Booth 510
Besi North America, Inc.
+1-480-497-6404
besi.com
33 East Comstock Dr, Suite 4
Chandler, AZ 85225
Contact: Tom Strothmann
tom.strothmann@besi.com

Besi is a leading supplier of semiconductor assembly equipment for the global semiconductor and electronics industries offering high levels of accuracy, productivity and reliability at a low cost of ownership. Besi enables leading edge assembly processes including advanced Hybrid Bonding with sub-micron accuracy as well as equipment for leadframe, substrate and wafer level packaging applications. Besi supports a wide range of end-user markets including electronics, mobile internet, computer, automotive, industrial, and solar energy. The principal brand names for Besi's assembly equipment include Datacon, Esec, Fico and Meco. Customers are primarily leading semiconductor manufacturers, assembly subcontractors and electronics and industrial companies.

Booth 725
Binghamton University/S3IP
+1-607-777-2833
binghamton.edu/s3ip
PO Box 6000
Binghamton, NY 13902
Contract: Caroline Pasquale
cpasqual@binghamton.edu

S3IP brings the capabilities and technical resources of Binghamton University, a leading research institution, at the disposal of electronics and energy systems manufacturers and similar manufacturing industries. Our 6 research centers address real-world challenges in microelectronics manufacturing, flexible hybrid electronics, heterogeneous integration of electronics, and thin film electronic devices. Advanced battery

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Booth 732
Brewer Science, Inc.
+1-573-364-0300
brewerscience.com
2401 Brewer Dr
Rolla, MO 65401
Contact: Antonette Hellebusch
ahellebusch@brewerscience.com

Brewer Science is a global leader in developing and manufacturing next-generation materials and processes that foster the technology needed for tomorrow. Since 1981, we've expanded our technology portfolio within advanced lithography, advanced packaging, smart devices, and printed electronics to enable cutting-edge microdevices and unique quality monitoring systems for water and air applications. We are Certified Employee-Owned and a Certified B Corporation™, using our business as a force for good. Our headquarters are in Rolla, Missouri, with customer support throughout the world. Learn more at www.brewerscience.com.

Booth 329
Cadence Design Systems
+1-408-943-1234
cadence.com
2655 Seely Ave
San Jose, CA 95134
Contact: Jolene Hall
jhall@cadence.com

Cadence is a pivotal leader in electronic systems design, building upon more than 30 years of computational software expertise. The company applies its underlying Intelligent System Design strategy to deliver software, hardware and IP that turn design concepts into reality. Cadence customers are the world's most innovative companies, delivering extraordinary electronic products from chips to boards to complete systems for the most dynamic market applications, including hyperscale computing, 5G communications, automotive, mobile, aerospace, consumer, industrial and healthcare. Fortune magazine has named Cadence one of the 100 Best Companies to Work For for nine years in a row.

Booth 605
Camtek USA, Inc.
+1-800-986-9540
Camtek.com
1815 NW 169th Pl, Suite 1080
Beaverton, OR 97006
Contact: Gail Duggan
gaild@camtek.com

Camtek is a leading developer and manufacturer of high-end inspection and metrology equipment for the semiconductor industry by inspecting and measuring wafers throughout the production process. Camtek's systems are in use in Advanced Interconnect Packaging, Memory, CMOS Image Sensors, MEMS and RF, serving the industry's leading global IDMs, OSATs and foundries. Our innovation has made us one of the technological leaders in the field it serves by delivering solutions that have become the industry standard for many applications. A winning combination of performance and flexibility together with ease of operation and reliability, delivers the optimal capital investment to our customers.

Booth 609
Canon USA
+1-408-468-2000
usa.canon.com/industrial
3300 N 1st St
San Jose, CA 95134
Contact: Asumi Kobayashi
akobayashi@cusa.canon.com

Canon Industrial Products Division (IPD) provides advanced wafer and panel process equipment for a wide range of applications and semiconductor fabrication processes including power, automotive and heterogeneous integration applications. Canon IPD helps enable advanced FEOL and More-Than-Moore applications including 3D-IC, Interposer, FOWLP and FOPLP Advanced Packaging. Canon offers cost-effective wafer and panel optical and nanoimprint lithography systems and Canon ANELVA PVD, etch and atomic diffusion bonding systems for room temperature permanent wafer bonding. Canon IPD enables a world of innovations for customers seeking to expand More-than-Moore markets.

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Carl Zeiss Microscopy, LLC
+1-800-233-2343
zeiss.com/microscopy
1 N. Broadway
White Plains, NY 10601
Contact: Karin Salerno
karin.salerno@zeiss.com

ZEISS has the most comprehensive portfolio of light, X-ray and electron/ion beam imaging technologies in the industry. Solutions span from wafer fab through packaging and assembly. ZEISS materials characterization and non-destructive FA solutions deliver actionable information to meet industry challenges for next-generation devices.

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CEA-Leti
+33-645150298
leti-cea.com/cea-tech/leti/english
17 rue des Martyrs
Grenoble, Cedex 9, 38054, France
Contact: Sylvie Joly
sylvie-j.joly@cea.fr

CEA-Leti, a technology research institute at CEA, is a global leader in miniaturization technologies enabling smart, energy-efficient and secure solutions for industry. Founded in 1967, CEA-Leti pioneers micro- & nanotechnologies, tailoring differentiating applicative solutions for global companies, SMEs and startups. CEA-Leti tackles critical challenges in healthcare, energy and digital migration. From sensors to data processing and computing solutions, CEA-Leti's multidisciplinary teams deliver solid expertise, leveraging world-class pre-industrialization facilities. With a staff of more than 1,900, a portfolio of 3,100 patents, 11,000 sq. meters of cleanroom space and a clear IP policy, the institute is based in Grenoble.

Booth 614
CPS Technologies Corp.
+1-508-222-0614
cpstechnologiesolutions.com
111 S. Worcester St.
Norton, MA 02766
Contact: Kevin Langley
klangley@cpstechnologiesolutions.com

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+1-704-777-9063
dataphysics-instruments.com/us
4424 Taggart Creek Rd, Suite 102
Charlotte, NC 28208
Contact: Bob Fidler

b.fidler@dataphysics-instruments.com
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Deca Technologies
+1-480-345-9895
thinkdeca.com
7855 S River Pkwy, Suite 205
Tempe, AZ 85284
Contact: Lori McDonald
lori.mcdonald@decatechnologies.com

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Booth 512
Disco Hi-Tec America, Inc.
+1-408-987-3776
discousa.com
5921 Optical Ct
San Jose, CA 95138
Contact: Aris Bernales
aris_b@discousa.com

For 55 years, DISCO Hi-Tec America, Inc. has been a leader in the semiconductor industry in cutting (Kiru), grinding (Kezuru), and polishing (Migaku) technologies. DISCO's focus has expanded beyond mechanical dicing to include laser and plasma singulation. DISCO continues to be the leader in wafer thinning and polishing/stress relief with technologies such as SDBG enabling thinning of die to 20um or less. To support research and development efforts, joint development initiatives, and next generation product prototyping, DISCO Hi-Tec America's new KKM Services lab in San Jose offers capability to process materials with our latest advanced cutting, grinding, and polishing technologies.

Booth 600 & 602
DuPont - HD Microsystems Ltd.
+1-800-346-5656
hdmicrosystems.com
250 Cheesecake Rd
Parlin, NJ 08859
Contact: Chris Milasincic
c.milasincic@dupont.com

Liquid Polyimides & PBO Precursors: HD MicroSystems™ is the premier supplier of polyimide and PBO chemistries specifically engineered for microelectronic applications. In 2017, HD MicroSystems™ celebrated its twentieth year as a joint venture. In 2020, HD MicroSystems L.L.C. begins a new JV between - Resonac and DuPont. Together, they create the largest and most experienced supplier in the industry. HDM's product line is broad, consisting of photosensitive coatings, standard coatings, thermoplastic adhesives, optically clear coatings and a full line of complementary ancillary products. HDM's worldwide organization allows it to provide technical support and expertise to its customers with local personnel.

Booth 339
DuPont Electronics (Rohm & Hass Electronic Materials)
+1-508-481-7950
dupont.com/electronics-industrial
455 Forest St
Marlborough, MA 01752
Contact: Ivy Li
ivy.li@dupont.com

DuPont's Advanced Packaging Technologies is a global leader in innovative materials for semiconductor packaging, assembly and device manufacturing; enabling improved connectivity, functionality and performance for electronic devices. Our portfolio addresses complex semiconductor fabrication, packaging and assembly challenges, and enables reliable transmission of data to and from ICs and semiconductor devices.

Booth 714
Ebina Denka Kogyo Co., Ltd.
+81-337420107
ebinadk.com/en/prOta-Kuofile/
Higashi-kojiya, 144-0033, Tokyo, Japan
Contact: Kenji Akiyama
akiyama-k@ebinadk.com

Ebinax provides advanced plating services. Our mission is to pursue new surface finishing possibilities to contribute to the future of manufacturing. Ebinax provides surface finishing that helps to solve the heat problems that occur with increased of circuit density and amount of information in communication devices. We have been providing ceramic (Al₂O₃, AlN, SiC, Si₃N₄, etc.) circuit boards for 40 years as heat dissipation substrates for Peltier modules and Submounts. Ebinax also provides new TGV (Through-Glass Via) substrates by combining high-density and smooth through-hole processing technology and our surface finishing technology.

Booth 601
Engent, Inc.
+1-678-990-3320
engentaat.com
3140 Northwoods Parkway
Suite 300A
Norcross, GA 30071
Contact: Jim Craig
jim.craig2@engentaat.com

ENGENT's renowned Advanced Assembly Technology center - Class 10,000 cleanroom manufacturing services specializing in SMT, Microelectronics, Advanced Packaging, Flip Chip, SIP, Chiplet Technology Development, Chip and Wire, MEMS, Wafer Level Assembly, Bare Die, Die Stacking, and many other cutting-edge technologies that enable next generation, high performance, small form factor electronic manufacturing and innovation. We have significant front end engineering expertise in support of Product and Process Development, Proof of Concept, New Technology Introduction, DFMA, NPI and of course Volume Production. We are ITAR Registered, have AS 9100 :2016 and

we have extensive failure analysis capability and competence.

Booth 532
ERS Electronic GmbH
+49-898941320
ers-gmbh.com
Stettiner Str. 3 + 5
Germering, 82110, Germany
Contact: Sophia Oldeide
oldeide@ers-gmbh.de

ERS electronic GmbH, based in the Munich suburb of Germering, has been providing innovative thermal management solutions to the semiconductor industry for over 50 years. The company has gained an outstanding reputation, notably with its fast and accurate air cooling-based thermal chuck systems. In 2008, ERS extended its expertise to the Advanced Packaging market. Today, their fully automatic and manual debonding and warpage adjust systems can be found on the production floors of most semiconductor manufacturers and OSATs worldwide. The company has received widespread recognition for their ability to tackle complex warpage issues that arise in the FOWLP manufacturing process.

Booth 522
EV Group, Inc.
+1-480-305-2400
evgroup.com
7700 South River Pkwy
Tempe, AZ 85284
Contact: Cori Ashley
c.ashley@evgroup.com

EV Group (EVG) is a leading supplier of high-volume production equipment and process solutions for the manufacture of semiconductors, MEMS, compound semiconductors, power devices and nanotechnology devices.

Booth 629
Evatec NA Inc.
+1-503-645-1680
evatecnet.com
5562 NE Clara Ln
Hillsboro, OR 97124
Contact: Allan Jaunzens
allan.jaunzens@vatecnet.com

Evatec provides PVD solutions tailored Advanced Packaging market. Our "wafer" platforms process up to 300mm formats, and are designed for highest levels of throughput including the use of long life targets and unique degassing technology that achieves the best in class contact resistance and layer uniformity performance required in WLCSP, FOWLP and 2.5D/3D devices. FOPLP applications and next generation IC substrate technologies are supported by Evatec's CLUSTERLINE® 600 equipment platforms capable of processing substrate sizes up to 650 x 650 mm, and delivering highest levels in outgassing performance, layer adhesion and stack uniformity.

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F&K Delvotec is a German based equipment manufacturer. We specialized in ultrasonic wire bonding and laser bonding processes for interconnect solutions. We also offer prototyping service, application optimization, and small volume production service. Our equipment is widely used in different market sectors such as semiconductors, automotive, medical, aerospace, government projects, and green energy. Please contact Dominic Sha at dominic.sha@fkdelvotecusa.com for more information.

Booth 723**ficonTEC Service GmbH****+1-800-674-9423****ficontec.com****3259 Progress Dr****Orlando, FL 32826****Contact: Kaja Dauelsberg****kaja.dauelsberg@ficontec.com**

ficonTEC is a recognized market leader for automated assembly and testing systems for high-end photonic components, devices and PICs. Considerable process capability and dedicated assembly technologies have been accumulated in serving the needs of a broad selection of industry segments – including telecom and datacom, high-power diode laser assembly, sensing from bio-med to automotive, micro-optics, and more.

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Sub-micron accuracy die bonders for die attach, advanced packaging and micro assembly applications. Manual, motorized and automated models provide a prototype to production pathway. High process flexibility within one platform allows a wide range of bonding technologies: thermo-compression, ultrasonic, eutectic, epoxy, sintering, ACF/ACP, Indium and precision vacuum die bonding. Application areas: optical packages, sensors, Si photonics, microLEDs, Cu pillar, flip chip, chip-on-glass, chip-on-flex, MCM, MEMs. The process knowledge we have gained through decades of experience adds value to our equipment. Our engineers work with customers to create solutions for specific applications-they understand that "one size" does not necessarily fit all.

Booth 415**Fraunhofer IZM****+49-30-46403-100****izm.fraunhofer.de****Gustav-Meyer-Allee 25****Berlin, 13355, Germany****Contact: Georg Weigelt****georg.weigelt@izm.fraunhofer.de**

Since 1993 Fraunhofer IZM has been one of the world's leading institutes for applied research and the development and system integration of robust and reliable electronics.

Booth 615**FUJIFILM Electronic Materials U.S.A., Inc.****+1-401-522-9409****fujifilm.com/em-global/en****80 Circuit Dr****North Kingstown, RI 02852****Contact: Sanjay Malik****sanjay.malik@fujifilm.com**

FUJIFILM Electronic Materials, U.S.A., Inc. is a wholly owned subsidiary of FUJIFILM Holdings America Corporation. FUJIFILM Electronic Materials, U.S.A., Inc. supplies the world's top semiconductor manufacturers with a broad array of products and services, including chemicals and advanced materials. The company's broad product portfolio includes photoresists, formulated products, CMP slurries, and polyimides for advanced packaging. The company has state-of-the-art manufacturing labs and facilities in the U.S., including Arizona, Rhode Island, California, and Texas. For more information, please visit <https://www.fujifilm.com/em-global/en>.

Booth 713**Fujimi Corporation****+1-503-682-7822****fujimi.com****11200 SW Leveton Dr****Tualatin, OR 97062****Contact: Ken Iwabuchi****kiwabuchi@fujimi.com**

Fujimi is a leading global manufacturer of high-quality polishing and CMP slurries for a wide range of industries, including semiconductor manufacturing, optoelectronics, and precision optics. With over 70 years of experience, we provide innovative solutions and outstanding customer service. Fujimi's continuous innovation and improvement are essential to meet the ever-evolving needs of the semiconductor and electronics industry. With a global network of manufacturing facilities and sales offices, Fujimi has the capability to provide local support and solutions to our customers worldwide. We are dedicated to helping our customers achieve the highest quality results.

Booth 503**GTI Technologies, Inc.****+1-203-929-2200****gti-usa.com****6 Armstrong Rd****Shelton, CT 6484****Contact: Heidi Hayashi****hhayashi@gti-usa.com**

GTI Technologies is a full service distributor and importer of high precision manufacturing equipment for the semiconductor and advanced materials industries. We are exclusive distributor for Takatori semiconductor equipment and multi wire saws. Since 1978 GTI has helped customers in North America and Europe expand and improve their manufacturing capabilities. With Takatori we have expanded our capabilities for thin wafer processing, and helped develop film lamination processes for advanced packaging and MEMS application. We are ready for your most demanding applications.

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Heidelberg Instruments is a world leader in the development and production of high-precision photolithography systems, maskless aligners and nano-fabrication tools. With over 35 years of experience and more than 1300 systems worldwide at industrial customers and academic facilities, we provide lithography solutions specifically tailored to meet the micro- and nano-fabrication requirements of our customers. The systems range from small and easy to use tabletop systems to highly complex photomask production equipment with exposure areas of several square meters, for the fabrication of binary layouts or complex 2.5 and 3D structures.

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Booth 604**IMAT, Inc.****+1-360-256-5600****imatinc.com****12516 NE 95th St, Suite D110****Vancouver, WA 98682****Contact: Eric Feigner****ericf@imatinc.com**

IMAT is a global source for wafers of all sizes with thermal oxide, metal thin films, patterned photoresist and dry films, plated copper, and other processes. Established in 1995, our staff has met the needs of a wide range of IC manufacturers, equipment vendors, and other semiconductor research facilities. Metal films

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Booth 716**Institute of Microelectronics (A Star Research Entities)****+65-67705456****ime.a-star.edu.sg****2 Fusionopolis Way****Innovis #08-02****Singapore, 138634, Singapore****Contact: Surya Bhattacharya****bhattass@ime.a-star.edu.sg**

Established in 1991, the Institute of Microelectronics (IME) is a research institute under Singapore's Agency for Science, Technology and Research (A*STAR). In IME, we focus on delivering high impact research and development for the global semiconductor industry. IME's role is to collaboratively develop and innovate next-generation technologies to enable a dynamic semiconductor ecosystem. Together with our highly skilled talent pool, we develop strategic capabilities and innovative technologies through state-of-the-art infrastructure. IME's core research areas are in Advanced Packaging, piezoMEMS, SiC, mmWave GaN, and photonics & sensors. We will continue to shape the semiconductor industry's roadmap for many years to come.

Booth 439**Institute of Microelectronics, Assembling, and Packaging Fukuoka University****cis.fukuoka-u.ac.jp****1963-4 Higashi****Fukuoka, Itoshima, 819-1122, Japan****Contact: Tadashi Suetsugu****suetsugu@fukuoka-u.ac.jp**

The Institute of Microelectronics Assembling and Packaging, Fukuoka University (IMAP-FU) offers assembling semiconductors in three dimensions and developing high-density, high-performance electronic components collaborating

with the Research Center for Three Dimension Semiconductor of the Fukuoka Industrial and Technology Promotion Foundation (Fukuoka IST) in Itoshima City, Fukuoka Prefecture. We perform a series of processes from design to prototyping, analysis, and testing, and we have established a development system in collaboration with Fukuoka IST to support the development activities of hightech companies world wide. We also aim to standardize installation methods and reliability test methods.

Booth 538**Intekplus****+1-480-456-3025****intekplus.com****90 S Kyrene Rd, Suite 1****Chandler, AZ 85226****Contact: Harry Yun****harry.yun@intekplus.com**

Intekplus is a visual inspection equipment specialist with 3D/2D measurement and inspection technology. We apply our technology in various applications including 2.5D, 3D, SiP, FCBGA, FOWLP, FOPLP, heterogeneous packages, and substrates. Intekplus equipment can identify bump height, coplanarity, warpage, scratch, chipping, crack, misalignment, shift, missing, stain, FM, etc. Other than advanced packaging, we serve other products like CMOS image sensors, Memory, Medical, OLED, and MEMS. We have advanced 2D and 3D sensor technology and develop image processing software. A single qualified recipe can be transferred to other systems in the same or in other locations for hassle-free recipe management.

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We create world-changing technology that improves the life of every person on the planet. Intel put the silicon in Silicon Valley. For more than 50 years, Intel and our people have had a profound influence on the world, driving business and society forward by creating radical innovation that revolutionizes the way we live. Today we are applying our reach, scale, and resources to enable our customers to capitalize more fully on the power of digital technology. Inspired by Moore's Law, we continuously work to advance the design and manufacturing of semiconductors to help address our customers' greatest challenges.

Booth 502
JS Electronic Co, Ltd.
+86-0592-5730717
jscircuit.com
No.118, Xianghai Rd
Xiang'An, Xiamen, Fujian 361006, China
Contact: Eric Wong
fxh@jselectronic.com

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Booth 417
JSR
+1-408-543-8800
jsrmicro.com
1280 N. Mathilda Ave
Sunnyvale, CA 94089
Contact: Pam Zapffe
pzapffe@jsr-nahq.com

JSR's THB series of thick film photoresists, along with WPR series of dielectric coatings and LP series of lift-off photoresists, offer advanced packaging technology portfolios to enable manufacturing of WL-CSP, Flip Chip, TSV, LED and MEMS devices with fine-pitched and cost effective micro-bump, Cu-pillar, RDL, and lift-off processes.

Booth 409
KAO Corporation
kao.com/global/en
2-1-3 Bunka
Sumida-ku, Tokyo, 131-8501, Japan
Contact: Sanae Doki
doki.sanae@kao.com

Kao Corporation is a Japanese chemical company. We develop consumer and industrial businesses to contribute to the realization of a rich lifestyle and culture in a sustainable society. For electronic market, harnessing its interface control technologies, Kao helps to contribute to the realization of environmentally friendly, cutting-edge products through the provision of a range of polishing agents, cleaners, and additives.

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+1-408-875-3000
kla.com
1 Technology Dr
Milpitas, CA 95035
Contact: Jayne Gates
jayne.gates@kla.com

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Kleindiek Inc.
+1-925-400-8306
kleindiek.us
4862 Chabot Dr. #10363
Pleasanton, CA 94588
Contact: Kevin Kaime
info@kleindiek.us

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Koh Young Technology, Inc.
+1-704-651-2860
kohyoungamerica.com
1950 Evergreen Blvd., Suite 200
Duluth, GA 30096
Contact: Brent Fischthal
brent.fischthal@kohyoung.com

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Kulicke & Soffa Pte Ltd.
+65-31402723000
kns.com
23A Serangoon North Avenue 5 #01-01
Singapore, 554369, Singapore
Contact: Tanja Lieshout
tlieshout@kns.com

Kulicke & Soffa (NASDAQ: KLIC) is a leading provider of semiconductor, LED and electronic assembly solutions serving the global automotive, consumer, communications, computing and industrial markets. Founded in 1951, K&S prides itself on establishing foundations for technological advancement - creating pioneering interconnect solutions that enable performance

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LB Semicon
+82-31-680-1600
lbsemicon.com
138, Cheongbuksandan-ro
Cheongbuk-myeon
Pyeongtaek-si, Gyeonggi-do, 17792,
South Korea
Contact: Andrew Kim
kimkihong@lbsemicon.com

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Lintec of America, Inc.
+1-480-966-0784
lintec-usa.com
15930 S 48th St, Suite 110
Phoenix, AZ 85048
Contact: Mary Snow
order@lintec-usa.com

LINTEC's semiconductor manufacturing related products, Adwill, includes a wide array of lines consisting of high-function adhesive tapes and equipment: Non UV and UV dicing tape, wafer mounting systems, and UV systems; non UV and UV Backgrinding tape, lamination, and detaping systems; 2 in 1 Dicing, Die attach tape; and Backside Coating tape and laminating equipment. LINTEC is relied on by the largest semiconductor manufacturers, and has received multiple supplier awards, for innovations which have moved semiconductor manufacturing forward. LINTEC is there to provide 30+ years of expertise to answer your dicing, grinding, and packaging tape related process questions.

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LPKF Laser & Electronics
+1-503-454-4200
lpkfusa.com
12555 Southwest Leveton Dr
Tualatin, OR 97062
Contact: Judith Jacobs
judith.jacobs@lpkf.com

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Booth 704
LQDX
+1-408-496-1010
LQDX.com
550 Nuttman St
Santa Clara, CA 95054
Contact: Rozalia Beica
info@lqdx.com

LQDX formerly Averatek Corp., pioneers advanced materials for AI and high-performance computing applications, unlocking new possibilities for the semiconductor industry. Founded in collaboration with the Stanford Research Institute (SRI), the company, based in Silicon Valley California, has developed a suite of cutting-edge chemistries and process technologies to revolutionize chip interconnect architecture. As the demand for computing power skyrockets with the rapid rise of AI and ML computing, new tools are needed in the semiconductor packaging and Ultra High-Density Interconnect (UHDI) toolbox. At the heart of LQDX' portfolio lies LMI x™ - or Liquid Metal Ink technology - a novel metallization chemistry suite that enables the production of circuits up to 250 times denser than conventional Printed Circuit Boards (PCBs) and the most advanced interconnects used as redistribution lines (RDLs) for chiplet integration and 3D die stacking using through-silicon-vias (TSVs) These advanced features, previously exclusive to silicon, are essential to meet the exponential growth demand in signal density required by advanced chips, chiplets and heterogeneous integration. As an alternative to highly expensive wafer processing which uses Physical Vapor Deposition (PVD) technology, LMI x™ is a simple PVD-in-a-Bottle™ substitute that integrates seamlessly into existing infrastructure. Learn what LQDX can do for you and find your Liquid-X.

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Metalor
+1-508-699-8800
metalor.com
255 John L. Dietsch Blvd
North Attleboro, MA 02763
Contact: Michelle Wheeler
michelle.wheeler@metalor.com

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+1-508-699-8800
metalor.com
52 Gardner St
Attleboro, MA 02703
Contact: Gary Nicholls
gary.nicholls@metalor.com

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+1-610-228-0161
microcircuitlabs.com
630 N Mill Rd
Kennett Square, PA 19348
Contact: Rich Richardson
rich@microcircuitlabs.com

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Micross Components
+1-855-426-6766
micross.com
225 Broadhollow Rd, Suite 305
Melville, NY 11747
Contact: Paul Whitbeck
paul.whitbeck@micross.com

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Mini-Systems, Inc.
+1-508-695-0203
mini-systemsinc.com
20 David Rd
North Attleboro, MA 02760
Contact: Craig Tourgee
ctourgee@minisystemsinc.com

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+1-714-352-6100
mmc.co.jp/adv/en
3535 Hyland Avenue, Suite 200
Costa Mesa, CA 92626
Contact: Yaeko Minakawa
yminakawa@mmus.com

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Mitsui Chemicals America
+1-408-487-2888
mc-tohcello.co.jp/icros
101 Metro Dr, Suite 550
San Jose, CA 95110
Contact: Jeff Wishes
j.wishes@mitsuichem.com

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MKS Atotech
+1-803-817-3500
atotech.com/usa
1750 Overview Dr
Rock Hill, SC 29730
Contact: Christine Finger
christine.finger@atotech.com

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Booth 504
Nagase ChemteX Corporation
+81-791-63-4561
nagasechemtex.co.jp/en
236 Tatsunocho-Nakai
Tatsuno-shi, Hyogo, 679-4124, Japan
Contact: Kenta Imamura
kenta.imamura@nagase.co.jp

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NAMICS Technologies Inc.
+1-408-516-4611
namics-corp.com
226 Airport Pkwy, Suite 660
San Jose, CA 95110
Contact: Corinne Gardner
cgardner@namics-usa.com

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Nepes
+1-669-264-6385
nepes.co.kr/EN
9808 Scranton Rd, Suite 4100
San Diego, CA 92121
Contact: Masayuki Oe
masayukioe@nepes.co

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Neu Dynamics Corp
+1-215-355-2460
neudynamics.com
110 Steamwhistle Dr
Ivyland, PA 18974
Contact: Don Johnson
donjohnson@neudynamics.com

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NICHING Industrial Corporation
+886-4-23588966
niching.com.tw/
Rm. 5, 5F., No. 767, Sec. 4, Taiwan Blvd.,
Xitun Dist.
Taichung City, 407201, Taiwan
Contact: Sin Chen
sin_chen@niching.com.tw

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Nova Ltd.
+972-73-229-5600
www.novami.com
5 David Fikes St.
Rehovot, 7632805, Israel
Contact: Moran Ofer
moran-o@novami.com

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nScript Inc.
+1-407-275-5730
nScript.com
12151 Research Pkwy, #150
Orlando, FL 32826
Contact: Brandon Dickerson
marketing@nScript.com

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We are OKUNO Chemical Industries, which are established in 1905. We have supplied plating additives for PCB industries for decades. Our customer is mainly key players of FCBGA industries. Furthermore anodizing chemical, electroless chemicals and so on are our product line up. Our service is tailor made. Based on your request, we fully make our best commitment to fulfill your dream. Hope we have fruitful business with you for a long time. Even trivial things, please kindly let us know.

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Onto Innovation is a leader in process control, combining global scale with a portfolio of leading-edge technologies that include: Unpatterned wafer quality; 3D metrology spanning chip features from nanometer scale transistors to large die interconnects; macro defect inspection of wafers and packages; elemental layer composition; overlay metrology; factory analytics; and lithography for advanced semiconductor packaging. Our breadth of offerings across the entire semiconductor value chain helps our customers solve their most difficult yield, device performance, quality, and reliability issues. Headquartered in Wilmington, Massachusetts, Onto Innovation supports customers with a worldwide sales and service organization.

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PacTech is a technology-focused company specialized in advanced packaging equipment manufacturing and WLP services. We are known to be highly adaptive to customization and unique applications. Our team of technical experts is striving to resolve various packaging challenges faced by the industry to provide our customers and partners more competitive solutions in terms of cost, time-to-market, and technology advancement. Our headquarter is located in Nauen, Germany with two operation and manufacturing sites in Santa Clara, CA, USA and Penang, Malaysia. Together with our sales and

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Panasonic Electronic Materials Division features a broad portfolio of leading-edge IC Packaging Materials. LEXCM semiconductor substrates and encapsulation materials enable next-generation semiconductor package designs to meet the challenges of emerging heterogeneous advanced packaging architectures. The MEGTRON series of circuit board laminates products are the industry benchmark for lead-free, high-layer count, ultra-high speed circuit boards. FELIOS flexible circuit board materials offer superior thermal performance and quality. The temperature-resistant BEYOLEX film is suitable for soft-circuits and printed electronic applications.

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Plan Optik AG is the leading manufacturer of structured wafers when it comes to technology. In sectors such as consumer electronics, automotive, aerospace, chemistry and pharmaceuticals these wafers are essential components used as active elements for numerous applications in MEMS technology. The wafers of glass, glass-silicon compounds or quartz are available in sizes up to 300 mm diameter. Wafers by Plan Optik provide high-precision surfaces in the ångström range, which are achieved through the use of the MDF polishing process developed by the company. Plan Optik wafers are available to minimum tolerances with application-specific structuring and complex material combinations.

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At QP Technologies (formerly Quik-Pak), we offer a range of services to meet your packaging and assembly requirements. These include wafer preparation (backgrinding, dicing, die sort and inspection); IC assembly for a variety of package types and materials, as well as die attach, wire

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QualiTau offers a variety of reliability test equipment for characterization and development of new materials used in the manufacturing of IC's, as well as process monitoring and process qualification. The MIRA, Infinity, ACE, and Multi-Probe reliability test systems perform tests for Hot Carrier Injection (HC), Dielectric Breakdown (TDDDB), and electromigration (EM) of interconnects, TSV, Solder Bump (8 amperes max) at test temperatures of up to 450°C. QualiTau's Test Lab service is ideal for both fabless companies and foundries seeking: Reliable, independent evaluation and analysis. "Virtual" capacity during times of under-capacity. Cost-effective means of performing tests on an irregular or infrequent basis.

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Rochester Electronics, LLC
rocelec.com
Rochester Electronics
16 Malcolm Hoyt Dr
Newburyport, MA 01950
Contact: Mariamne Shin
mshin@rocelec.com

Rochester Electronics is the world's largest continuous source of semiconductors. For over 40 years Rochester, in partnership with over 70 leading semiconductor manufacturers, has provided our customers with a continuous source of critical semiconductors. Rochester offers the world's largest range of semiconductors with over 15 billion finished devices in stock, combined with extensive manufacturing capabilities from the world's largest die bank at over 12 Billion. Rochester offers a full range of manufacturing services including Design, Wafer Processing, Assembly, Test, Reliability, and IP Archiving providing single solutions through to full turnkey manufacturing, enabling faster time-to-market. Rochester is the Semiconductor Lifecycle Solution.

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Royce Instruments (V-TEK, Inc.)
+1-707-255-9078
royceinstruments.com
480 Technology Way
Napa, CA 94558
Contact: Sarah Parrish
sparrish@royceinstruments.com

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S-Cubed
+1-973-263-0640
s-cubed.com
6 Mars Ct
Montville, NJ 7045
Contact: Mark Hillman
markh@s-cubed.com

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SANYU REC Co., Ltd.
+81-726695206
sanyu-rec.jp
3-5-2001
Doucho
Takatsuki, Osaka, 569-8558, Japan
Contact: Yuki Ishikawa
ishikawa@sanyu-rec.jp

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SavanSys Solutions LLC
+1-512-402-9943
savansys.com
10409 Peonia Ct
Austin, TX 78733
Contact: Amy Lujan
amyl@savansys.com

SavanSys is the industry leader for electronics packaging cost modeling, in business since 1995. Our cost modeling methods are widely recognized as the most accurate on the market. SavanSys cost models include the following technologies: PCB fabrication and assembly, wire bonding, flip chip substrate and assembly, fan-in WLP, fan-out WLP, panel-level fan-out, interposer-based packaging, chiplet packaging, and more.

Booth 613
Scientech
+1-886-3-5165177
scientech.group
No. 182, Bade Rd
Hsinchu City, 30069, Taiwan
Contact: Eric Lee
eric.lee@scientech.com.tw

Being a leading semiconductor equipment and wafer reclaim supplier in Taiwan, Scientech Corporation has launched the development of wet process equipment in 2003. Scientech has successively supported customers in Mini/Micro LED, compound semi and power components such as IGBT, SiC and GaN industries, as well as advanced packaging process such as Bumping, Fan-out, Chip-On-Wafer and so on. Our wet process equipment has been successfully verified in the latest Chiplet's 2.5D/3D packaging process technology and smoothly introduced into mass production. Scientech wet process equipment with single-wafer and wet-bench type, can be highly customized to adapt new process flow and operational interface.

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SCREEN Holdings Co., Ltd.
+81-754147
screen.co.jp/en
Tenjinkita-machi 1-1, Teranouchi-agaru
4-chome,
Horikawa-dori, Kamigyō-ku
Kyoto, Kyoto 6028585, Japan
Contact: Yoshiteru Takaya
y.takaya@screen.co.jp

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+1-972-277-2950
sekisui.co.jp/electronics
1501 West LBJ Freeway, Suite 530
Dallas, TX 75234
Contact: Takaishi Hiratsuka
takaichi.hiratsuka@sekisui.com

SEKISUI is a Japanese chemical company established in 1947. Our various solutions are used in the electronics and mobility area. For the semiconductor market, our products like the interlayer insulation film are used in the high spec semiconductor, the thermal interface materials with unique and high dissipation using carbon fibers are used in high thermal management, and the specialty adhesives are used in the processing of materials with temporary adhesion and for easy peeling.

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Semiconductor Equipment Corp
+1-805-528-2293
semicorp.com
5154 Goldman Ave
Moorpark, CA 93021
Contact: Lester Salvatierra
lsalvatierra@semicorp.com

Semiconductor Equipment Corporation is a small innovative company that has designed and manufactured back end manual equipment for the semiconductor and related industries for more than 46 years. In that time we have expanded our business to distribute products for Nitto Denko and Hugel Electronics. We service everything we sell.

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Senju Comtek Corp is the Americas subsidiary of Senju Metal Industry Co (SMIC) of Japan, a global leader in soldering materials and related equipment. Senju provides world class solder spheres (balls), solder pastes, attach flux and various other unique soldering technologies for your semiconductor application. Senju manufactures solder pastes in the USA at our Silicon Valley and Chicago regional facilities.

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SETNA sells SET device bonders and Ontos atmospheric plasma equipment. SETNA has a long and rich history with-in the semiconductor packaging industry. Bonding chip to chip, chip to wafer using the most flexible platform for every type of bonding interface, including TCB/Reflow/Hybrid/Direct/High Force/Low Force. Both SET device bonders and OES plasma systems provide the most flexible platforms for cleaning and activating surfaces (removing oxides/Organics/Passivation of surfaces) while also successfully and consistently achieving the highest placement accuracy in the industry.

Booth 426**SHIKOKU CHEMICALS CORPORATION****+1-714-978-0347****shikoku.co.jp****301 N. Rampart St, Suite C****Orange, CA 92868****Contact: Noritake Furuki****furukin@shikoku.co.jp**

SHIKOKU CHEMICALS Co. has synthesized a number of unique resin crosslinking agents using our organic synthesis technology. Among them, we have discovered that the isocyanuric acid skeleton has excellent electrical properties, and are developing a new crosslinking agent with this skeleton as its core structure. Also, GliCAP is a new interface chemical developed based on our organic synthesis technology. Unique organic coating formed on copper surface directly improves adhesion between copper and resin effectively. SHIKOKU CHEMICALS Co. will continue to design and create materials that can balance the characteristics that have become issues in the market.

Booth 311**Shin-Etsu MicroSi****+1-480-893-8898****microsi.com****10028 S 51st St****Phoenix, AZ 85044****Contact: Ian Holden****iholden@microsi.com**

Founded in 1984 as a subsidiary of the General Electric Company, Shin-Etsu MicroSi is a driving force in both the semiconductor and microelectronics industries worldwide. By infusing science and chemistry with innovation and collaboration, we create leading-edge solutions that turn possibilities into realities—while providing the proven quality and time-tested dependability on which our customers rely. From computers to cell phones, 5G, automobiles, coatings, and more, our products are used by companies throughout the world to make the integrated circuits and semiconductor devices that power everyday living.

Booth 407**Shinkawa USA Inc.****+1-408-510-2157****yamaha-robotics.com/en/corporate/
outline/shinkawa****104 S 54th St****Chandler, AZ 85226****Contact: William Crockett****crockett@yamaha-robotics.com**

Yamaha Robotics Holdings is a leading company in semiconductor manufacturing equipment. Under Yamaha Robotics Holdings are three Group companies; Shinkawa, APIC Yamada and PFA Corporation. Shinkawa: Wire Bonders, Die Bonders, Flip Chip Bonders, Bump Bonders. APIC Yamada: Molding System, Package Singulation System, Test Handler & Transport System, Trim & Form System, Precision DIE SET. PFA Corporation: Crystal oscillation manufacturing equipment, Camera module manufacturing equipment, Flat Panel inspection equipment (AOI), MEMS Related equipment & Other automatic assembly systems. We aim to provide a total solution that exceeds our customers' expectation as the "Turn-Key" provider in the field of semiconductors back-end processing.

Booth 636**Shinko Electric America****+1-408-232-0499****shinko.com****2077 Gateway Pl, Suite 250****San Jose, CA 95110****Contact: Justin Goodman****justin.goodman@shinko.com**

Shinko develops and produces Semiconductor Packages for the miniaturization, acceleration and performance of semiconductors. We aim to enrich and contribute to the lives of people all over the world by providing cutting-edge packaging for markets including AI/ML, HPC, Data and Networking, mobile and automotive

Booth 410**Sigray, Inc.****+1-925-446-4183****https://www.sigray.com****5750 Imhoff Dr, Suite I****Concord, CA 94520****Contact: Jeff Gelb****jgelb@sigray.com**

Sigray is a San Francisco Bay Area based company, specializing in the development & integration of high-resolution, high-throughput 3D X-ray microscopes. Our team is comprised of x-ray professionals with extensive experience in x-ray source, optics, and instrumentation development, with a unified focus on bringing next-generation X-ray technologies to labs & fabs. The latest release, Apex XCT, is capable of producing sub-micron 3D X-ray images of large PCBs and wafers, with only minutes required for each data collection.

Booth 631**SkyWater Technology****+1-952-851-5200****skywatertechnology.com****2401 E 86th St****Bloomington, MN 55425****Contact: Robyn Miesner****robyn.miesner@skywatertechnology.com**

SkyWater Technology is a U.S.-based semiconductor manufacturer and a DMEA-accredited Trusted supplier. SkyWater's Technology as a Service model streamlines the path to production for customers with development services, volume production and heterogeneous integration solutions in its world-class U.S. facilities. This pioneering model enables innovators to co-create the next wave of technology within diverse categories including mixed-signal CMOS, ROICs, rad-hard ICs, MEMS, superconducting ICs, photonics, and interposers. SkyWater serves growing markets including aerospace & defense, automotive, biomedical, cloud & computing, consumer, industrial and IoT.

Booth 712**Smart High Tech****+46-736178090****smarthightech.com****Arendals Allé 3****Gothenburg, 41879, Sweden****Contact: Johan Moller****johan.moller@smarthightech.com**

Smart High Tech is a Swedish company focusing on manufacturing and developing heat-dissipating materials reinforced with graphene with a focus on cooling electronics, processors, graphics cards, LEDs, and other heat-sensitive and heat-intensive products. We offer high-performance graphene-reinforced materials and associated process know-how. Our standard GT-TIM product line offers up to 90 W/mK through plane thermal conductivity and an effective thermal resistance below 6.5 Kmm²/W at a mounting pressure of 40 Psi/275kPA with no plastic deformation, drying, or pump out in high power density

applications. Smart High Tech offers solutions for air cooled systems, immersion, aerospace, optoelectronics, automotive, and other sectors.

Booth 711

Sono-Tek
+1-845-795-2020
sono-tek.com
2012 Route 9W
Milton, NY 12547

Contact: Aleta Eriksen
aeriksen@sono-tek.com

Sono-Tek's ultrasonic coating technology is currently being used at the package level for EMI shielding coatings. Tested and approved using market-available EMI materials, our unique non-clogging spray coating systems, with a low temperature heat cure, offer a cost effective and faster alternative to costly sputtering equipment. Our FlexiCoat EMI system was designed to run continuously in production at a higher throughput than sputtering, at roughly 1/10th the cost. Sono-Tek's ultrasonic coating technology is known for thin, repeatable, and low waste coatings. Other applications include: Photoresist deposition, polyimide, flux dispensing for flip chip applications, and nano suspensions (CNT, graphene, nano-wires, etc).

Booth 424

Surfx Technologies
+1-310-558-0770
surfxtechnologies.com
2631 Manhattan Beach Blvd
Redondo Beach, CA 90278
Contact: Graham Bay
gray@surfxtechnologies.com

Founded in 1999, Surfx Technologies has developed and brought to market a true low-temperature, variable chemistry, atmospheric pressure plasma. Our products incorporate the most advanced plasma technology and are covered by multiple U.S. patents. Surfx's mission is to be the worldwide leader in the surface treatment of materials for the semiconductor, electronics assembly, aerospace, and medical device industries. We are driven by a total commitment to our customers. We take pride in our products and service. Our promise is to deliver to you the highest quality product for your manufacturing needs.

Booth 627

SUSS MicroTec Inc.
+1-951-817-3700
suss.com
2520 Palisades Dr
Corona, CA 92882
Contact: Emyr Edwards
emyr.edwards@suss.com

SUSS MicroTec is a leading supplier of equipment and process solutions for microstructuring in the semiconductor industry and related markets. Our portfolio covers a comprehensive range of products and solutions for backend lithography, wafer bonding and photomask processing,

complemented by micro-optical components. In close cooperation with research institutes and industry partners SUSS MicroTec contributes to the advancement of next-generation technologies such as 3D Integration and Imprint Lithography as well as key processes for Wafer-Level Packaging, MEMS and LED manufacturing. With its global infrastructure for applications and service, SUSS MicroTec supports more than 8,000 installed systems worldwide.

Booth 416

Taiyo Ink
+1-775-885-9959
taiyo-hd.co.jp/en
1731 Technology Dr, Suite 595
San Jose, CA 95110

Contact: Yuya Suzuki
yuyas@taiyo-america.com

High performance and high reliability materials showcased by TAIYO INK are beneficial for advanced IC packaging, as well as conventional packaging applications. Examples of the advanced materials include photo-imageable dry film dielectric, PVI-3 for high density packaging, and ultra-low loss dry film dielectric, Zaristo for high speed/frequency packaging. Taiyo also develops variety of new dielectric materials with special performances, such as magnetic, optical, or electrical, based on our industry-proven solder resist material technologies. Talk to you at our booth!

Booth 403

TATSUTA Electric Wire & Cable Co., Ltd.
+81-774665550
tatsuta.com
6-5-1 Kunimidai
Kizugawa, Kyoto 619-0216, Japan
Contact: Susumu Chiba
s-chiba@tatsuta.co.jp

Tatsuta Electric Wire & Cable Co., Ltd is a leading manufacturer of innovative advanced paste for high performance electronics. By using our electrically and thermally conductive paste, higher density interconnection, longer product life and outstanding reliability are achievable. With our knowledge of metal-resin formulation technology, our materials support your development cycles/process time shorten and process temperature lower as well, which enables lower carbon emission and eco-friendly process. For more information, please visit our website and you will find our latest developments.

Booth 436

TAZMO
+1-510-438-4890
tazmo.co.jp/en
42840 Christy St, Suite 103
Fremont, CA 94538
Contact: Takashi Abe
takashi.abe@tazmo.co.jp

Tazmo is a semiconductor manufacturing equipment company, offering: (1) Temporary

bonding and de-bonding tool for Silicon wafers and support glass for back grinding process. (2) Coater/Developer for semiconductor manufacturing processes. Coating with highly viscous materials and other materials that are difficult to work with while achieving good coating uniformity. (3) Cleaning tools and surface treatment for semiconductor manufacturing processes. Cleaning machines for manufacturing of semiconductor, slurry supply units, chemical supply units and phosphoric acid recycling. (4) Wafer transfer systems. Tazmo provides various wafer transfer systems to other semiconductor manufacturing equipment suppliers. These products include robots, aligners and EFEM.

Booth 501

TDK Corporation
+1-972-409-4519
product.tdk.com/en/products/fa/index.htm

475 Half Day Rd, Suite 300
Lincolnshire, IL 60069
Contact: Sara Lambeth
sara.lambeth@tdk.com

TDK is a leader in factory automation systems. Our products include TDK precision AFM 15 Thermosonic and AFM 15 Thermal Compression flip chip die bonders. TDK flip chip die bonders use a micro scrub process to lower heat required for die attach process. TDK micro scrub process eliminates flux and supports 5~10 mm line width and 3 mm spacing.

Additionally, TDK load ports feature high-performance that meet your needs for particle-free operation, high throughput and high durability of continual motion. In addition to the TAS300 load port, we also offer the TAS300 J1 and the TAS200.

Booth 606

Technic Inc.
+1-401-781-6100
technic.com
47 Molter St
Cranston, RI 02910
Contact: Felicity Moore
fmoore@technic.com

Technic supplies chemistry solutions for advanced semiconductor packaging. Marketed under the name Elevate, Technic's electrodeposition chemistries are well respected for innovation and high quality in such applications as RDL, pillars, microbumps, and LED packaging. Technic also supplies several high-performance photoresist strippers for liquid and dryfilm resists, as well as a full range of metal etchants and cleaners marketed under the names, TechniStrip®, TechniEtch, and Techniclean. For analytical controls, the Technic RTA 3D will be on display. The RTA has become the leading analytical control system for damascene copper processes and backend packaging applications for controlling TSV and copper pillar processes.

Booth 325**TechSearch International Inc.****+1-512-372-8887****techsearchinc.com****4801 Spicewood Springs Rd, Suite 150****Austin, TX 78759****Contact: Jan Vardaman****jan@techsearchinc.com**

TechSearch International, Inc. has a 37-year history of market and technology trend analysis focused on semiconductor packaging, materials, and assembly. Research topics include WLP, FO-WLP and panel-level processing, Flip Chip, CSPs, BGAs, 3DICs including hybrid bonding, Si Interposers, System-in-Package (SiP) and Heterogeneous Integration, embedded components, automotive electronics, and power devices. Multi-client and single client consulting services are offered. TechSearch International professionals have an extensive network of more than 24,000 contacts in North America, Asia, and Europe and travel extensively, visiting major electronics manufacturing operations and research facilities worldwide.

Booth 537**Teikoku Taping System, Inc.****+1-480-794-1926****teikoku-taping.com****5090 N 40th St, Suite 140****Phoenix, AZ 85018****Contact: Robert Garrett****robert.garrett@teikoku-taping.com**

Manufacturer of tape lamination, tape removal, wafer/substrate mounting to film frame, and UV irradiation equipment for back-grinding, dicing, dry film resist and other taping applications.

Booth 435**Tektronix CSO****+1-503-627-1071****tek.com/en/component-solutions****2905 SW Hocken Ave****Beaverton, OR 97005****Contact: Brad Delano****brad.delano@tektronix.com**

Tektronix Component Solutions has a rich history of delighting customers by solving tough technical challenges through our microelectronics design, test, and manufacturing services. In addition, we take pride in – and are known for – our deep collaboration and responsiveness to delight customers. We have more than 50 years of manufacturing experience across a diverse range of products and customers, specializing in partnerships with the defense industry.

Booth 413**TOKYO OHKA KOGYO America, Inc.****+1-503-693-7711****tokamerica.com****4600 NE Brookwood Pkwy****Hillsboro, OR 97124****Contact: Satoshi Teranishi****satoshi.teranishi@tokamerica.com**

TOK's Micro Processing Technology Creates Inspiration. TOK's state-of-the-art micro

processing technology produces groundbreaking and innovative products. We have pioneered the development of polymer-containing functional photoresists based on photolithography technologies that are essential for the formation of semiconductor circuits. Along with advancement in the micro-fabrication of an electronic circuit, our sophisticated technologies provide solutions to enhance the functionality of semiconductors, such as miniaturization, high-integration, multi-functionality, and high-speed. We offer various new materials necessary for many device manufacturers, including advanced immersion photoresists enabling the formation of several tens nanometer scale features.

Booth 619**Toray International America Inc.****+1-650-524-2735****electronics.toray/en****411 Borel Ave., Suite 520****San Mateo, CA 94402****Contact: Koichi Maruyama****koichi.maruyama.p6@mail.toray**

Toray Industries is a leading Non-Conductive Film (NCF) provider for flip chip packages, photo-definable adhesive film for build-up substrates and packages with cavity structures. Toray's unique polyimide and film processing technologies provide excellent reliability and performance. "Photoneece" is Toray's photo-definable polyimide coatings for the front-end buffer layer and back-end re-distribution layer for WLP and TSV. We also offer environmentally friendly NMP-free materials. Toray Engineering Co., Ltd. provides state-of-the-art Flip Chip Bonding Equipment for semiconductor packaging with alignment accuracy. And Vacuum Encapsulation Equipment for void-free printing, Wafer Inspection Equipment with high speed, and a Coating system for substrate manufacturing are lined-up.

Booth 427**TOWA USA Corporation****+1-408-779-4440****towajapan.co.jp/en****1430 Tully Rd, Suite 416****San Jose, CA 95122****Contact: Terence Koh****tkoh@towa-usa.com**

TOWA is a leading company in the semiconductor molding equipment market. We offer equipment using our high quality / flow free compression molding method and our proven transfer molding method. We also manufacture ultra-precision molds that have been highly acclaimed by customers. Together with our molding equipment, our singulation system was developed from both aspects of the dicer and product handler to provide the optimal method of singulation for each product type. The result is high quality cutting whilst improving customers' productivity with high throughput. Located in the heart of Silicon Valley, TOWA USA San Jose Package Development Center was

established to support customers' development programs. Our activities are centered around Compression Molding for Advanced Packaging and we collaborate with a broad spectrum of industry members from IDMs, OSATs, Fabless Companies, Government Contractors, Technical Institutes and Consortiums. Please contact us for more information.

Booth 508**TOYOICHEM Co., Ltd.****+32-720827****toyo-chem.com/en****2-1, Kyobashi-2****Chuo-ku, Tokyo 1048379, Japan****Contact: Takeki Nakamura****takeki.nakamura@toyoincgroup.com**

Leveraging its original resins, a core material used in Group products, the Polymers and Coatings segment develops a variety of solutions tailored to the needs of the times. Based on its synthesis and coating processing technologies, a large number of its functional products are used in many applications indispensable to everyday life, such as automotive and electronics, solar cells for energy, medical and healthcare, and many more.

Booth 718**Toyota Tsusho America, Inc.****+1-650-524-2735****taiamerica.com****34505 West 12 Mile Rd, Suite 200****Farmington Hills, MI 48331****Contact: Akio Azuma****akio_azuma@taiamerica.com**

Toyota Tsusho America, Inc is the trading arm of Toyota Motor Group and we are developing the business in seven divisions such as Electronics & Chemical, Automotive, and the supporting administrative division. We have 35 locations in North America, in addition to 43 affiliate and subsidiary locations to provide valuable products and services for enterprise-level industries such as automotive, electronics, and more. As the Electronics & Chemical division, we are providing and developing services and cutting-edge products for semiconductor products such as Photoresist, CMP Slurry, High-frequency CCL, and Encapsulants to contribute to the growth of the electronics industries.

Booth 433**USHIO Inc.****+81-3-565-71033****ushio.co.jp/en****1-6-5 Marunouchi****Chiyoda-ku, Tokyo 100-8150, Japan****Contact: Yuki Sashiwa****y.sashiwa@ushio.co.jp**

Established in 1964, USHIO INC. (TOKYO: 6925) is a leading manufacturer of light sources such as lamps, lasers, and LEDs, in a broad range from ultraviolet to visible to infrared rays, as well as optical equipment and cinema-related products that incorporate these light sources. It also makes products in the electronics field (such as semiconductors, flat panel displays and electronic

components) and in the visual imaging field (including digital projectors and lighting). Many of these products enjoy dominant market shares. In recent years, USHIO has undertaken business in the life science area, such as the medical and the environmental fields.

Booth 715

Vanguard Automation GmbH
vanguard-automation.com
Gablonzler Straße 10
Karlsruhe, 76185, Germany
Contact: Sandra Schmieding
sandra.schmieding@vanguard-automation.com

Headquartered in Karlsruhe, Germany, Vanguard Automation develops process technology and machines for creating low-loss photonic connections between passive and active components leveraging its unique IP portfolio for Photonic Wire Bonding and facet-attached micro-optics. Augmenting nano-print technology, Vanguard Automation's solutions enable high packaging density, increased design flexibility and fabrication throughput.

Booth 617

XYZTEC, Inc.
+1-978-880-2598
xyztec.com
170 Commerce Way, Suite 200
Portsmouth, NH 03894
Contact: Thomas Haley
tom.haley@xyztec.com

With over 20 years of experience, XYZTEC has established our name as the technology leader in bond testing throughout the world. With 100%

of our focus on bond testing, XYZTEC teams with customers to offer innovative solutions that address their specific bond test needs. Our mission is to take on the challenges of many different industries by offering customers products that improve their quality and increase their bottom line.

Booth 535

Yole Group
+33-4-72830180
yolegroup.com
75 Cours Emile Zola
Villeurbanne, 69100, France
Contact: Helene Gonin
helene.gonin@yolegroup.com

Yole Group specializes in the strategic analysis of markets, the supply chain, and technological developments related to the semiconductor industry and adjacent industries. Leveraging our network in the field of semiconductors and the multidisciplinary profile (scientific, technical, and market-oriented) of our analysts, we support our clients in the understanding of markets, the evolution of technologies, and their implementation in industry.

Booth 730

Zuken USA Inc.
+1-978-692-4900
zuken.com
238 Littleton Rd, Suite 100
Westford, MA 01886
Contact: Amy Clements
amy.clements@zukenusa.com

Zuken is a leading global software company specializing in electrical and electronic design

solutions. Established in 1976, Zuken is consistently at the forefront of technology innovation, offering a comprehensive range of system-level 2D/3D electrical and electronic toolsets, including the CR-8000 and E3.series product families. With integrated design data management capabilities, Zuken empowers businesses with robust and efficient design solutions.

Booth 327

Zymet, Inc.
+1-973-428-5245
zymet.com
7 Great Meadow Ln
East Hanover, NJ 07936
Contact: Deanna Catanzaro
deanna_catanzaro@zymet.com

Zymet manufactures Adhesives & Encapsulants and has been serving the electronics industry for over 30 years. Products include reworkable underfills and edgebond adhesives for high reliability and harsh environment applications. Other products include ultra-low stress adhesives, electrically conductive adhesives, thermally conductive adhesives, and non-conductive pastes.



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TU Dresden
karlheinz.bock@tu-dresden.de

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floherrault@gmail.com

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University of Waterloo
mmayer@uwaterloo.ca

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pgromala@ieee.org

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iguven@vcu.edu

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alan.huffman@ieee.org

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patrick.thompson@ti.com

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braunsch@ieee.org

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eric.perfecto.us@ieee.org

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treynolds@ieee.org

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samkarikalan@ieee.org

IT Coordinator

Bora Baloglu
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bora.baloglu@intel.com

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Boss Precision, Inc.
kitty.pearsall@gmail.com

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Renzi & Company, Inc.
lrenzi@renziandco.com

IEEE EPS Representative

Annette Teng
AIM Photonics
ateng@sunypoly.edu

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Applied Reliability

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Advanced Semiconductor Engineering, Inc.
Gvikas.Gupta@outlook.com

Assistant Chair

Sandy Klengel
Fraunhofer Institute for Microstructure of Materials
and Systems
sandy.klengel@imws.fraunhofer.de

Seung-Hyun Chae
SK Hynix
seunghyun1.chae@sk.com

Tz-Cheng Chiu
National Cheng Kung University
tcchiu@mail.ncku.edu.tw

Darvin R. Edwards
Edwards Enterprise Consulting, LLC
darvin.edwards1@gmail.com

Deepak Goyal
Intel Corporation
deepak.goyal@intel.com

Nokibul Islam
JCET Group
Nokibul.islam@jcetglobal.com

Tae-Kyu Lee
Cisco Systems, Inc.
taeklee@cisco.com

Pilin Liu
Intel Corporation
pilin.liu@intel.com

Varughese Mathew
NXP Semiconductors
varughese.mathew@nxp.com

Keith Newman
AMD
keith.newman@amd.com

Donna M. Noctor
Nokia
donna.noctor@nokia.com

S. B. Park
Binghamton University
sbpark@binghamton.edu

Scott Savage
Medtronic Microelectronics Center
scott.savage@medtronic.com

Christian Schmidt
NVIDIA Corporation
christians@nvidia.com

Jeffrey Suhling
Auburn University
jsuhling@auburn.edu

Paul Tiner
Texas Instruments
p-tiner@ti.com

Pei-Haw Tsao
Mediatek
ph.tsao@mediatek.com

Dongji Xie
NVIDIA Corporation
dongjix@nvidia.com

Assembly & Manufacturing Technology

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Habib Hichri
Ajinomoto Fine-Techno USA Corporation
hichrih@ajiusa.com

Assistant Chair

Ralph Zoberbier
Evatec AG
ralph.zoberbier@evatecnet.com

Sai Ankireddi
Maxim Integrated
sai.ankireddi@alumni.purdue.edu

Christo Bojkov
UT Dallas
cbojkov.ectc@gmail.com

Pascale Gagnon
IBM Canada
pgagnon@ca.ibm.com

Mark Gerber
Advanced Semiconductor Engineering, Inc.
mark.gerber@aseus.com

Omkar Gupte
AMD
Omkar.Gupte@amd.com

Paul Houston
Engent
paul.houston@engentaat.com

Li Jiang
Texas Instruments
l-jiang1@ti.com

Zia Karim
Yield Engineering Systems
zkarim@yieldengineering.com

Wei Koh
Pacrim Technology
kohmail@gmail.com

Wenhao (Eric) Li
Intel Corporation
wenhao.li@intel.com

Venkata Mokkalapati
AT & S
v.mokkalapati@ats.net

Jae-Woong Nah
IBM Corporation
jnah@us.ibm.com

Valerie Oberson
IBM Canada Ltd
voberson@ca.ibm.com

Jason Rouse
Taiyo America, Inc.
jhrouse@taiyo-america.com

Andy Tseng
Qualcomm Technologies, Inc.
andytseng2000@yahoo.com

Jobert Van Eysden
ATOTECH USA LLC
Jobert.van-Eysden@atotech.com

Jan Vardaman
TechSearch International
jan@techsearchinc.com

Shaw Fong Wong
Intel Corporation
shaw.fong.wong@intel.com

Jin Yang
Samsung Electronics
jin1.yang@ieee.org

Katie Yu
NXP
katie.yu@nxp.com

Cong Zhao
Meta
zhaocong@meta.com

Emerging Technologies

Chair

Zhuo Li
Fudan University
zhuo_li@fudan.edu.cn

Assistant Chair
Tengfei Jiang
University of Central Florida
Tengfei.jiang@ucf.edu

Isaac Robin Abothu
Siemens Healthineers
Isaac.abothu@siemens-healthineers.com

Karlheinz Bock
TU Dresden
karlheinz.bock@tu-dresden.de

Xinpei Cao
Henkel Corporation
xinpei.cao@henkel.com

Benson Chan
Binghamton University
chanb@binghamton.edu

Vaidyanathan Chelakara
Cisco
cvaidy@cisco.com

Rabindra N. Das
MIT Lincoln Labs
rabindra.das@ll.mit.edu

Dongming He
Qualcomm Technologies, Inc.
dhe@qti.qualcomm.com

Florian Herrault
PseudolithC, Inc
floherrault@gmail.com

Jae-Woong Jeong
KAIST
jjeong1@kaist.ac.kr

Hee Seok Kim
University of Washington Tacoma
heeskim@uw.edu

Jong-Hoon Kim
Washington State University Vancouver
jh.kim@wsu.edu

Ramakrishna Kotlanka
Analog Devices
rama.krishna@analog.com

Santosh Kudtarkar
Analog Devices
santosh.kudtarkar@analog.com

Kevin J. Lee
Qorvo Corporation
KevinJ.Lee@qorvo.com

Yang Liu
Nokia Bell Labs
yang3d@gmail.com

Chukwudi Okoro
Corning
OkoroC@corning.com

Dishit Parekh
Intel Corporation
dishit.parekh@intel.com

C. S. Premachandran
319prem@gmail.com

Jintang Shang
Southeast University
shangjintang@hotmail.com

Rohit Sharma
IIT Ropar
rohit@iitrpr.ac.in

Nancy Stoffel
National Institute of Standards and Technology
nstoffel1194@gmail.com

Ran Tao
National Institute of Standards and Technology
ran.tao@nist.gov

W. Hong Yeo
Georgia Institute of Technology
whyeo@gatech.edu

Hongqing Zhang
IBM Corporation
zhangh@us.ibm.com

Interconnections
Chair
Chaoqi Zhang
Qualcomm Technologies, Inc.
chaoqi.gt.zhang@gmail.com

Assistant Chair
Ou Li
Advanced Semiconductor Engineering, Inc.
ou.li@aseus.com

Jian Cai
Tsinghua University
jamescai@tsinghua.edu.cn

C. Key Chung
TongFu Microelectronics Co. Ltd.
chungkey@hotmail.com

David Danovitch
University of Sherbrooke
David.Danovitch@USherbrooke.ca

Gang Duan
Intel Corporation
gang.duan@intel.com

Bernd Ebersberger
Infineon Technologies
bernd.ebersberger@infineon.com

Takafumi Fukushima
Tohoku University
fukushima@lbc.mech.tohoku.ac.jp

Thom Gregorich
Infinaera
tmgregorich@gmail.com

Yoshihisa Kagawa
Sony
Yoshihisa.Kagawa@sony.com

Seung Yeop Kook
GlobalFoundries
seung-yeop.kook@globalfoundries.com

Kangwook Lee
SK Hynix
steward.lee@sk.com

Li Li
Infinaera
packaging@yahoo.com

Changqing Liu
Loughborough University
c.liu@lboro.ac.uk

Wei-Chung Lo
ITRI, Industrial Technology Research Institute
lo@itri.org.tw

Nathan Lower
Consultant
nplower@hotmail.com

James Lu
Rensselaer Polytechnic Institute
luj@rpi.edu

Vempati Srinivasa Rao
IME A-star
vempati@ime.a-star.edu.sg

Katsuyuki Sakuma
IBM Research
ksakuma@us.ibm.com

Jean-Charles Souriau
CEA Leti
jcsouriau@cea.fr

Chuan Seng Tan
Nanyang Technological University
tancs@alum.mit.edu

Chih-Hang Tung
Taiwan Semiconductor Manufacturing Company
chtungc@tsmc.com

Tiwei Wei
Purdue University
tiwei@purdue.edu

Matthew Yao
GE Aerospace
matthew.yao@ge.com

Dingyou Zhang
Broadcom Inc.
dingyouzhang.brcm@gmail.com

Wei Zhou
Micron
zhouwei@micron.com

Materials & Processing
Chair
Qianwen Chen
IBM Research
chenq@us.ibm.com

Assistant Chair
Vidya Jayaram
Intel Corporation
vidya.jayaram@intel.com

Tanja Braun
Fraunhofer IZM
tanja.braun@izm.fraunhofer.de

Yu-Hua Chen
Unimicron
yh_chen@unimicron.com

Jae Kyu Cho
GlobalFoundries
jaekyu.cho@globalfoundries.com

Bing Dang
IBM Corporation
dangbing@us.ibm.com

Yung-Yu Hsu
Meta Platforms, Inc.
yungyu.hsu@gmail.com

Lewis Huang
Senju Electronic
lewis@senju.com.tw

C. Robert Kao
National Taiwan University
crkao@ntu.edu.tw

Alvin Lee
Brewer Science
alee@brewerscience.com

Yi Li
Intel Corporation
yi.li@intel.com

Ziyin Lin
Intel Corporation
ziyin.lin@intel.com

Yan Liu
Medtronic Inc. USA
yan.x.liu@medtronic.com

Mikel Miller
Apple Inc.
mikel_miller@apple.com

Praveen Pandojirao-S
Johnson & Johnson
praveen@its.jnj.com

Mark Poliks
Binghamton University
mpoliks@binghamton.edu

Dwayne Shirley
Marvell Semiconductor, Inc.
shirley@ieee.org

Ivan Shubin
Raytheon Technologies
ishubin@gmail.com

Bo Song
HP Inc.
bo.song@hp.com

Yoichi Taira
Keio University
taira@appi.keio.ac.jp

Frank Wei
DISCO Corporation
frank_w@discousa.com

Lingyun (Lucy) Wei
Dupont
lingyun.wei@dupont.com

Kimberly Yess
Brewer Science
kyess@brewerscience.com

Myung Jin Yim
Apple Inc.
myung27@hotmail.com

Hongbin Yu
Arizona State University
yhnb@asu.edu

Zhangming Zhou
Qualcomm Technologies, Inc.
zhou.zhming@gmail.com

Packaging Technologies

Chair

Jie Fu
Apple Inc.
fujie6@gmail.com

Assistant Chair

Mike Gallagher
DuPont Electronic and Imaging
michael.gallagher@dupont.com

Lihong Cao
Advanced Semiconductor Engineering, Inc.
lihong.cao@aseus.com

Glenn Ning Ge
TetraMem
glenn.ge@tetramem.com

Kuldip Johal
MKS Instruments- MSD
kuldip.johal@atotech.com

Sam Karikalan
Broadcom Inc.
sam.karikalan@broadcom.com

Beth Keser
Zero ASIC
beth@zeroasic.com

Young-Gon Kim
Renesas Electronics America
young.kim.jg@renesas.com

Andrew Kim
Apple Inc.
hkim34@apple.com

John Knickerbocker
IBM Corporation
knickerj@us.ibm.com

Steffen Kroehnert
ESPAT Consulting, Germany
steffen.kroehnert@espat-consulting.com

Albert Lan
Applied Materials
Albert_Lan@amat.com

John H. Lau
Unimicron Technology Corporation
John_Lau@Unimicron.com

Jaesik Lee
SK Hynix USA
Jaesik.Lee@us.skhynix.com

Kyu-Oh Lee
Intel Corporation
kyu-oh.lee@intel.com

Markus Leitgeb
AT&S
m.leitgeb@ats.net

Pau Monita
Onto
monita.pau@ontoinnovation.com

Luu Nguyen
Psi Quantum
lgyuen@psiquantum.com

Raj Pendse
Facebook FRL (Facebook Reality Labs)
rajd@fb.com

Min Woo Rhee
Samsung
mw.daniel.lee@gmail.com

Subhash L. Shinde
Notre Dame University
sshinde@nd.edu

Joseph W. Soucy
Draper Laboratory
jsoucy@draper.com

Peng Su
Juniper Networks
pensu@juniper.net

Eric Tremble
Marvell
etremble@marvell.com

Kuo-Chung Yee
Taiwan Semiconductor Manufacturing Corporation, Inc.
kcyee@tsmc.com

Photonics

Chair

Richard Pitwon
Resolute Photonics Ltd
richard.pitwon@resolutephotonics.com

Assistant Chair

Takaaki Ishigure
Keio University
ishigure@appi.keio.ac.jp

Ankur Agrawal
Intel Corporation
ankur.agrawal@intel.com

Stephane Bernabe
CEA Leti
stephane.bernabe@cea.fr

Surya Bhattacharya
IME
bhataass@ime.a-star.edu.sg

Christopher Bower
X-Display Company, Inc.
chris@xdisplay.com

Nicolas Boyer
Ciena
nboyer@ciena.com

Mark Earnshaw
Nokia
mark.earnshaw@nokia-bell-labs.com

Gordon Elger
Technische Hochschule Ingolstadt
gordon.elger@thi.de

Z. Rena Huang
Rensselaer Polytechnic Institute
zruhuang@ecse.rpi.edu

Ajeay Jacob
University of Southern California
ajeay@isi.edu

Aditya Jain
Lightmatter
ajain@lightmatter.co

Soon Jang
ficonTEC USA
soon.jang@ficontec.com

Harry G. Kellzi
Micropac Industries
harrykellzi@micropac.com

Hideyuki Nasu
Furukawa Electric
hideyuki.nasu@furukawaelectric.com

Vivek Raghuraman
Broadcom Corporation
vivek.raghuraman@gmail.com

Henning Schroeder
Fraunhofer IZM
henning.schroeder@izm.fraunhofer.de

Dadi Setiadi
Lightelligence
dadi.setiadi@lightelligence.ai

Christopher Striemer
AIM Photonics
cstriemer@gmail.com

Hiren Thacker
Cisco Systems
hithack@cisco.com

Masao Tokunari
IBM Corporation
tokunari@jp.ibm.com

Stefan Weiss
II-VI Laser Enterprise GmbH
stefan.weiss@II-VI.com

Ping Zhou
LDX Optronics, Inc.
pzhou@ldxoptronics.com

RF, High-Speed Components & Systems

Chair

Rajen M Murugan
Texas Instruments
r-murugan@ti.com

Assistant Chair

Jaemin Shin
Qualcomm Technologies, Inc.
jaemins@qti.qualcomm.com

Amit P. Agrawal
AMD
amit.agrawal@amd.com

Kemal Aygun
Intel Corporation
kemal.aygun@intel.com

Wendem Beyene
Meta
wendem@gmail.com

Eric Beyne
imec
eric.beyne@imec.be

Prem Chahal
Michigan State University
chahal@msu.edu

Zhaoqing Chen
IBM Corporation
zhaoqing@us.ibm.com

Charles Nan-Cheng Chen
WinWay Technology Co.
hi2018.charles@gmail.com

Craig Gaw
NXP Semiconductor
c.a.gaw@ieee.org

Abhilash Goyal
Velodyne LIDAR, Inc.
abhilash.goyal@gmail.com

Xiaoxiong (Kevin) Gu
Metawave
xgu@ieee.org

Rockwell Hsu
Cisco Systems, Inc.
rohsu@cisco.com

Lih-Tyng Hwang
National Sun Yat-Sen University
FiftyOhm@mail.nsysu.edu.tw

Lianjun Liu
NXP Semiconductor, Inc.
lianjun.liu@NXP.com

Sungwook Moon
Samsung Electronics
sw2013.moon@samsung.com

Ivan Ndip
Fraunhofer IZM/Brandenburg University of Technology
ivan.ndip@izm.fraunhofer.de

P. Markondeya Raj
Florida International University
mpulgur@fiu.edu

Hideki Sasaki
Rapidus Corporation
hideki.sasaki@rapidus.co.jp

Li-Cheng Shen
Universal Scientific Industrial Co. Ltd. (USI)
li-cheng_shen@usiglobal.com

Srikrishna Sitaraman
Marvell Technology
srikrishna.sitaraman@gmail.com

Manos M. Tentzeris
Georgia Institute of Technology
etentze@ece.gatech.edu

Chuei-Tang Wang
Taiwan Semiconductor Manufacturing Company (TSMC)
ctwang10492@hotmail.com

Maciej Wojnowski
Infineon Technologies AG
maciej.wojnowski@infineon.com

Yong-Kyu Yoon
University of Florida
ykyoon@ece.ufl.edu

Thermal/Mechanical Simulation & Characterization

Chair

Wei Wang
Qualcomm Technologies, Inc.
weiwang.cu@gmail.com

Assistant Chair
Karsten Meier
TU Dresden
karsten.meier@tu-dresden.de

Christopher J. Bailey
Arizona State University
christopher.j.bailey@asu.edu

Rui Chen
Eastern Michigan University
rchen7@emich.edu

Liangbiao Chen
On Semiconductor
bill.chen@onsemi.com

Kuo-Ning Chiang
National Tsinghua University
knchiang@pme.nthu.edu.tw

Ercan (Eric) Dede
Toyota Research Institute of North America
eric.dede@toyota.com

Xuejun Fan
Lamar University
xuejun.fan@lamar.edu

Nancy Iwamoto
niwamoto@prodigy.net

Pradeep Lall
Auburn University
lall@auburn.edu

Chang-Chun Lee
National Tsing Hua University
clee@pme.nthu.edu.tw

Sheng Liu
Wuhan University
shengliu@whu.edu.cn

Yong Liu
ON Semiconductor
Yong.Liu@onsemi.com

Erdogan Madenci
University of Arizona
madenci@email.arizona.edu

Tony Mak
Wentworth Institute of Technology
tmak@ieee.org

Patrick McCluskey
University of Maryland
mclupa@umd.edu

Jiamin Ni
IBM Corporation
nijiamin8910@gmail.com

Erkan Oterkus
University of Strathclyde
erkan.oterkus@strath.ac.uk

Suresh K. Sitaraman
Georgia Institute of Technology
suresh.sitaraman@me.gatech.edu

Zhi Yang
Groq
zyang@groq.com

Ning Ye
Western Digital
ning.ye@wdc.com

G. Q. (Kouchi) Zhang
Delft University of Technology
g.q.zhang@tudelft.nl

Xiaowu Zhang
Institute of Microelectronics (IME)
xiaowu@ime.a-star.edu.sg

Tieyu Zheng
Microsoft Corporation
tizheng@microsoft.com

Jiantao Zheng
Hisilicon
Zheng.jiantao@hisilicon.com

Interactive Presentations

Chair

Pavel Roy Paladhi
IBM Corporation
rpaladhi01@gmail.com

Assistant Chair
Frank Libsch
IBM Corporation
libsch@us.ibm.com

Karan Bhangaonkar
Intel Corporation
karan.r.bhangaonkar@intel.com

Rao Bonda
Amkor Technology
rao.bonda@amkor.com

Biao Cai
IBM Corporation
biaocai@us.ibm.com

Joshua Dillon
Marvell Govt. Solutions
JoshuaFDillon@gmail.com

Mark Eblen
Kyocera International SC
mark.eblen@kyocera.com

Mohammad Enamul Kabir
Intel Corporation
enamul101b@yahoo.com

Ibrahim Guven
Virginia Commonwealth University
iguven@vcu.edu

Alan Huffman
SkyWater Technology
alan.huffman@ieee.org

Amanpreet Kaur
Oakland University
kaur4@oakland.edu

Stephen Lee
NXP Semiconductors
Stephen.Lee@nxp.com

Jeffrey Lee
iST-Integrated Service Technology Inc.
jeffrey_lee@istgroup.com

Michael Mayer
University of Waterloo
mmayer@uwaterloo.ca

Saikat Mondal
Intel Corporation
saikat.mondal@intel.com

Mark Poliks
Binghamton University
mpoliks@binghamton.edu

Patrick Thompson
Texas Instruments, Inc.
patrick.thompson@ti.com

Kristina Young
Synopsys Inc
kristina.youngfisher@gmail.com

Professional Development Courses

Chair

Kitty Pearsall
Boss Precision, Inc.
kitty.pearsall@gmail.com

Assistant Chair
Jeffrey Suhling
Auburn University
jsuhling@auburn.edu

Xuejun Fan
Lamar University
xfan@lamar.edu

Vikas Gupta
Advanced Semiconductor Engineering, Inc.
vikas.gupta@aseus.com

FIRST CALL FOR PAPERS

IEEE 75th Electronic Components and Technology Conference • www.ectc.net May 27 – May 30, 2025 at the Gaylord Texan Resort & Convention Center, Dallas, Texas, USA

The Electronic Components and Technology Conference (ECTC) is the premier international conference that brings together the best in electronics packaging, components and microelectronic systems science, technology and education in an environment of cooperation and technical exchange. ECTC is sponsored by the Electronics Packaging Society (EPS) of the IEEE. You are invited to submit abstracts that provide non-commercial information on new developments, technology and knowledge in the areas including, but not limited to the topics in what follows for each technical program subcommittee. Authors are encouraged to review the sessions of the previous ECTC programs to determine which committees to select for their abstracts.

Applied Reliability: Reliability of 2D, 2.5D, Si-bridge, 3D, chiplets, SiP, WL CSP, FO WLP, FO PLP & heterogeneous integration; interconnect reliability in micro-bump, micro-pillar, Cu-pillar, TSV, TGV, RDL, HDI, stacked-die, hybrid-bond, flip chip & wire bonded packages; novel reliability test methods, life models, FA techniques & materials characterization; component and board level reliability in computing, HPC, mobile, networking, automotive, power electronics, harsh/hot-temp environments, IoT, sensors, AI, autonomous vehicles, medical, wearable electronics, LEDs, displays & memory; interfacial/bulk reliability of solder alloys, mold compound, epoxy, underfill, overcoat, build-up film, solder resist, & substrate laminate.

Assembly and Manufacturing Technology: Assembly and manufacturing challenges for new markets; Die bonding methods and processes; embedded packaging and modules; Wafer level process/materials technologies; Die and package singulation manufacturing; New & next generation substrates; Smart factory/manufacturing; Design for Manufacturing; Assembly related test/throughput development; Integrating advanced thermal solutions in manufacturing; Design/performance, integrating solutions, thermal materials, low stress/high thermal; Process advancements/throughput enhancements: Cost of inspection, sampling, metrology, new processes for fine RDL, small via fabrication, transfer/compression/injection mold; Heterogeneous integration and process: chiplets, 3D stacking, bridge technology, large body, warpage management; Shielding/protection technologies and manufacturing and market requirements.

Emerging Technologies: Emerging, novel and unique packaging and material technologies for: soft and intelligent packaging, flexible/stretchable hybrid electronics, bioelectronics, extreme harsh environment, nanomanufacturing, AI electronics packaging and its application, EV Power electronics and energy storage, MEMS & NEMS, packaging for wide band gap devices, anti-tamper, cryptography, additive, subtractive or hybrid manufacturing, smart manufacturing industry 4.0, packaging for quantum computing and other cryonic application, electro-optical integration, green and sustainable electronics, green and sustainable electronics, net zero strategy/technology.

RF, High-Speed Components & Systems: 5G/6G, IoT, cloud computing, autonomous vehicles, AI/machine learning; Antennas, sensors, power transfer, electromagnetic compatibility, wired/wireless communications, RF to THz; Electrical/multi-physics modeling and characterization of interconnects, modules, and heterogeneous integration system; chiplet, heterogeneous integration, chip-to-chip, die-to-die, SiP/MCM/system co-design (chip/pkg/board); opto-Electrical (OE) hybrid integration, analog packaging, power electronics modeling/characterization; high-speed/frequency (RF, mmWave, THz) signal integrity, power integrity, and EMI/EMC

Interconnections: Interconnects for chiplets, heterogeneous integration, hybrid bonding, C2W, W2W, fan-out, panel-level, TSV; Interconnects for 2.5D/3D, Si/glass/organic interposers, fine-pitch/multi-layer RDL, SiP; Interconnects for thermo-compression/laser assisted/transient liquid phase bonding, low temperature solder, flip-chip, micro-bump, Cu pillar, Wirebond, AI ribbon bond; Printable interconnects, flexible interconnect, quantum interconnects, optical interconnects; Interconnection material, characterization and reliability; Conductive/non-conductive adhesives, ACF, under-fill, molding compounds; Thermal interface materials, thermal/mechanical/electrical tests and reliability; Interconnects for AI, Silicon photonics, HPC, mobile, 5G, IoT,

power and rugged electronics, medical and health; Interconnects for automotive, aerospace, flexible hybrid electronics, micro-LED display

Materials & Processing: Wafer/panel level packaging materials and process advancements; Advanced materials and processes for FO WLP, FO PLP, 2.5D/3D, SiP, TSV, chiplets, and advanced packaging architectures; Harsh environment resistant materials; Packaging substrates; Flexible, stretchable, & wearable electronics; Temporary wafer bond/debond materials/processes; Permanent adhesives; TCB and hybrid bonding; Adhesives, dielectrics and underfills; Emerging electronic materials & processes; Conductive and Non-Conductive adhesives; 3D Materials and Thin Wafer Processing, Novel solder metallurgies; Molding compounds; Thermal interface materials; Advanced wire bonding, Novel Materials and Processing, Emerging Materials.

Thermal/Mechanical Simulation & Characterization: Thermal/mechanical simulation and characterization at component, board, and system levels for all packaging technologies: reliability related modeling including fracture mechanics, fatigue, electromigration, warpage, delamination, moisture, drop, shock and vibration, and modeling for harsh environments (thermal, chemical, etc.); material constitutive relations; chip-package interaction for heterogeneous integration, wafer fabrication and package assembly process related modeling; novel modeling techniques including multi-scale physics, co-design approaches; quantum computing; measurement methodologies, characterization and correlations, model order reduction, sensitivity analysis, optimization, statistical analysis; application of artificial intelligence on modeling, characterization, digital twin; and credible simulations for virtual release; CFD simulation including underfilling/molding process simulation.

Packaging Technologies: 2.xD/3D architecture/design of energy efficient C2C links, structures, thermal solutions, methods & processes for HPC; Heterogeneous (chiplet) integration for 2.5D / 3D-IC; Silicon / Glass / Organic Interposer & advanced package technology; DD Cu / Cu TSV / Hybrid Bonding; Embedded die / bridge, flexible, advanced substrates & modules; Fan-out wafer and panel level packaging; Advanced flip-chip, SiP, CSP, PoP & CPO; RF, wireless, MEMS sensors & IoT; Automotive, wireless power and power electronics; Bio, medical, flexible & wearable packaging.

Photonics: Assembly and packaging for all applications that leverages photonics components and circuits. Topics of specific interest include Packaging of Photonics Integrated Circuits for telecom, datacom, and 5G, Co-packaged and Near-packaged optics, Heterogeneous integration, artificial intelligence, quantum systems, and sensors, medical devices, automotive/LIDAR, aerospace, defense, and cryogenic/harsh environment, RF/MW photonics, free-space optics, AR/VR, WDM, and high power lasers, micro-LEDs and 3D light-field displays, imaging and environmental sensors, new materials, connectors, EDA tools, and test methods/equipment.

Interactive Presentations: Abstracts may be submitted related to any of the topics listed. Interactive presentations of technical papers are highly encouraged at ECTC. They allow for significant interaction between the presenter and attendees, which is especially suited for material that benefits from more explanation than is practical in oral presentations. Interactive presentation session papers are published and archived in equal merit with the other ECTC conference papers.

You are invited to submit an abstract that describes the novelty, scope, content, and key points of your proposed manuscript via the website at www.ectc.net.

If you have any questions, contact:
Przemyslaw Gromala, 75th ECTC Program Chair
Robert Bosch GmbH
pgromala@ieee.org

Abstracts cannot contain more than 700 words and must be received by October 7, 2024, together with a 50 words (or less) description of its novelty. All abstracts must be submitted electronically at www.ectc.net together with the affiliation, mailing address, business telephone number, and email address of all co-authors with your submission. The authors are notified about the abstract selection outcome by December 13, 2024.

Professional Development Courses

Proposals are solicited from individuals interested in teaching educational, four-hour long Professional Development Courses (PDCs) on a subset of the listed topics. From proposals

received, 16 PDCs are selected for offering at the 75th ECTC on Tuesday, May 27, 2025.

Each selected course is given a minimum honorarium of \$1,500. In addition, instructors of the selected courses are offered the speaker discount rate for the conference. Attendees of the PDCs are offered Continuing Education Units (CEUs). These CEUs can be recognized by employers as a formal measure of participation and attendance in "non-credit" self-study courses, tutorials, symposia, and workshops.

Using the format "Course Objectives/Course Outline/Who Should Attend," 200-word proposals can be submitted via the ECTC website at www.ectc.net by October 20, 2024. Authors are notified of course acceptance with instructions by December 13, 2024.

If you have any questions, contact:

Kitty Pearsall, 75th ECTC Professional Development Courses Chair – Boss Precision, Inc.
Phone: +1-512-845-3287 • E-mail: kitty.pearsall@gmail.com

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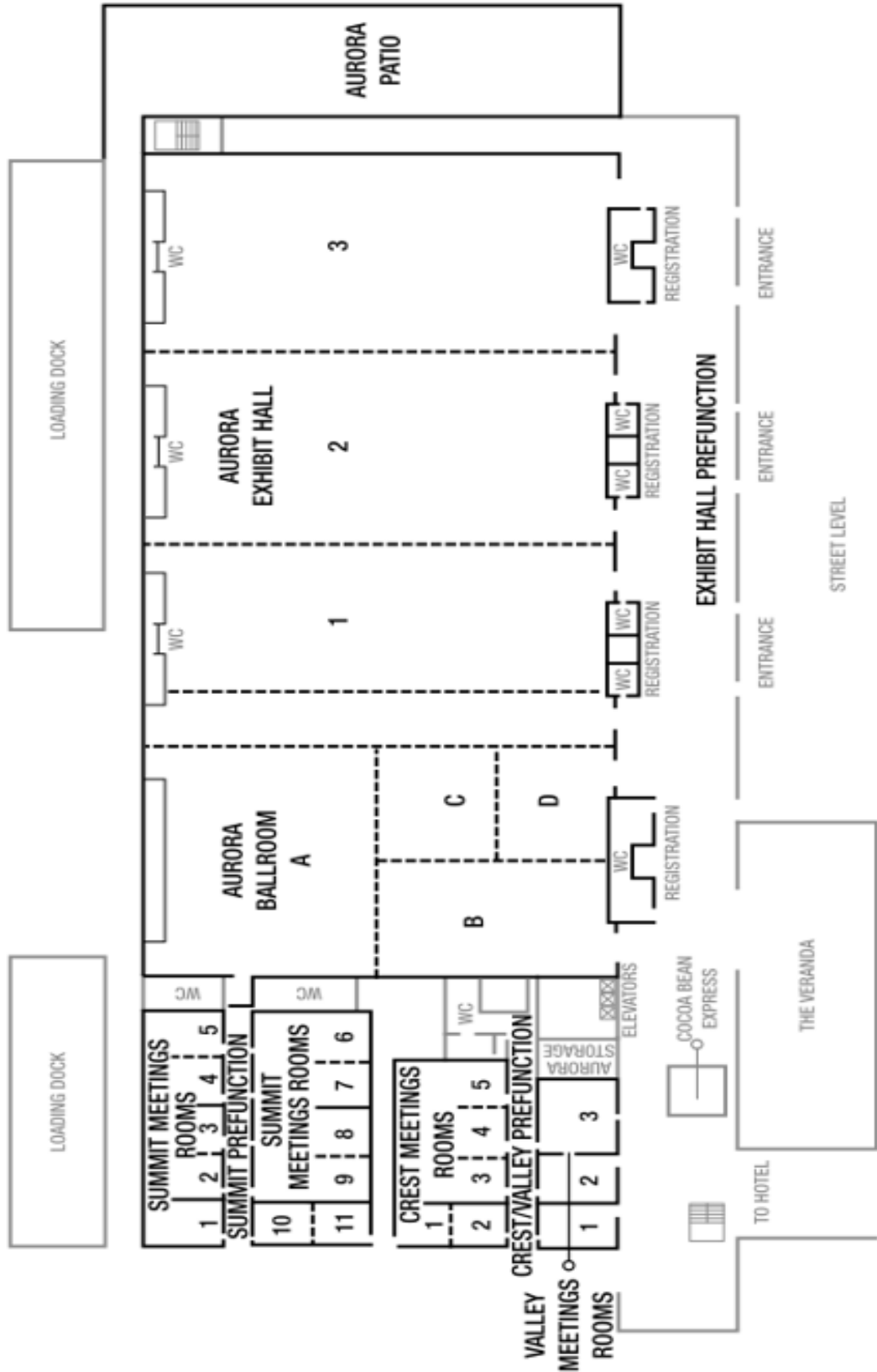


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AURORA BALLROOM / EXHIBIT HALL AND MEETING ROOMS LEVEL 2



75TH ELECTRONIC COMPONENTS & TECHNOLOGY CONFERENCE

Gaylord Texan Resort & Convention Center, Dallas, TX May 27 – 30, 2025



ECTC is turning 75 in 2025 and to celebrate we will be hosting the conference at the Gaylord Texan Resort & Convention Center! From the 10-acre Paradise Springs Water Park to an exciting lineup of family-friendly activities and entertainment, there's something for the entire family to enjoy. Guests can explore the four-and-a-half acres of airy, indoor garden atriums, four award-winning restaurants, bars, the world-class Relâche Spa, and a state-of-the-art fitness center.

Conference attendees will enjoy the resort's 490,000 sq. ft. of flexible meeting space, 1,814 beautiful guest rooms, and 127 spectacular suites as well as our lakeside events venue, Glass Cactus, perfect for live entertainment and events. Located near DFW Airport, LEGOLAND® Discovery Center, Cowboys Golf Club, Historic Downtown Grapevine, and water sports on Lake Grapevine itself, all are convenient so everyone can do more of what they love!



CONFERENCE AT A GLANCE

REGISTRATION

Monday, May 27, 2024
3:00 p.m. - 6:00 p.m.

Tuesday, May 28, 2024
6:45 a.m. - 7:45 p.m.*

*(AM PD Courses & Special Session Only)

Wednesday, May 29, 2024
6:45 a.m. - 4:00 p.m.

Thursday, May 30, 2024
7:00 a.m. - 4:00 p.m.

Friday, May 31, 2024
7:00 a.m. - 12:00 Noon

Rockies Square,
behind Cocoa Bean Coffee Shop

EXHIBITION HALL

Wednesday

9:00 a.m. - 12:30 p.m.

2:00 p.m. - 6:30 p.m.

Reception - 5:30 p.m. - 6:30 p.m.

Thursday

9:00 a.m. - 12:30 p.m.

2:00 p.m. - 4:00 p.m.

Aurora 1

SPEAKER PREPARATION ROOM

Tuesday – Friday

7:00 a.m. – 5:00 p.m.

Valley 3

MAIN STAGE MORNING SESSIONS

Wednesday: ECTC Keynote

Thursday: EPS Plenary Session

Friday: IEEE EPS President Panel

8:00 a.m. - 9:15 a.m.

Aurora A

MAIN STAGE EVENING SESSIONS

Tuesday: IEEE EPS Seminar

7:45 p.m. - 9:15 p.m.

Wednesday: ECTC / ITherm Diversity
Panel

6:30 p.m. - 7:30 p.m.

Aurora A

GALA RECEPTION

Thursday: 6:30 p.m.

OUTSIDE: Front Range Lawn
(Lower Level)

TUESDAY

PDC Instructors and Proctors

Briefing & Breakfast

7:00 a.m. – 8:30 a.m.

Summit 10 & 11

Professional Development

Courses (PDCs)

8:00 a.m. – 12:00 p.m.

1:30 p.m. - 5:30 p.m.

See page 8 for locations

IEEE EPS Heterogeneous Integration Roadmap (HIR) Workshop

8:00 a.m. – 4:30 p.m.

Aurora D

ECTC Special Sessions

No. 1: 8:30 a.m. – 10:00 a.m.

No. 2: 10:30 a.m. – 12:00 p.m.

No. 3: 1:30 p.m. – 3:00 p.m.

No. 4: 3:30 p.m. – 5:00 p.m.

Aurora B

Refreshment Breaks

10:00 a.m. – 10:20 a.m.

3:00 p.m. – 3:20 p.m.

Summit & Crest Foyers

Lunch

12:00 p.m. – 1:15 p.m.

Aurora A & C

ECTC Exhibition Setup

1:00 p.m. – 5:00 p.m.

Aurora 1

ECTC Student Reception

5:00 p.m. – 6:00 p.m.

Summit Foyer

General Chair's Speakers Reception

6:00 p.m. – 7:00 p.m.

Mountain Pass Restaurant, Upper
Level

By invitation only

Young Professionals Networking Panel

7:00 p.m. – 7:45 p.m.

Aurora D

WEDNESDAY – FRIDAY

Speakers Breakfast

7:00 a.m. – 7:45 a.m.

Crest 3-5

Sessions

9:30 a.m. – 12:35 p.m. or

2:00 p.m. – 5:05 p.m.

see pages 10-21 for specifics

Sessions 1, 7, 13, 19, 25, 31

Aurora B

Sessions 2, 8, 14, 20, 26, 32

Aurora D

Sessions 3, 9, 15, 21, 27, 33

Crest 3-5

Sessions 4, 10, 16, 22, 28, 34

Summit 8-9

Sessions 5, 11, 17, 23, 29, 35

Summit 6-7

Sessions 6, 12, 18, 24, 30, 36

Summit 4-5

Interactive Presentations

Sessions 37 - 41

10:00 a.m. - 12:00 p.m. or

2:30 p.m. - 4:30 p.m.

Aurora A-C Corridor

see pages 22 - 25 for specifics

Lunch

12:45 p.m. - 1:45 p.m.

Aurora A & C

Refreshment Breaks

10:30 a.m. – 11:15 a.m.

3:00 p.m. – 3:45 p.m.

Wednesday & Thursday

Aurora 1

Friday

Aurora, Crest, and Summit Foyers

The logo for the Electronic Components and Technology Conference (ECTC) is a white, bold, sans-serif font 'ECTC' centered within a dark blue diamond shape. The diamond is set against a background of a glowing blue circuit board with various components and traces.

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