



Components, Packaging, and Manufacturing Technology Society Newsletter



THE GLOBAL SOCIETY FOR MICROELECTRONICS SYSTEMS PACKAGING

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President's Column....



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With the solstice behind us, summer has officially begun. Looking back on the first half of the year, I'm excited to see that CPMT has been playing a pivotal role in the new wave of R&D in innovative electronics and system applications. CPMT's presence and influence has been felt through local chapter activities, conferences, and webinars as well as through growing collaborations with other professional societies and associations. Together, we are witnessing how the Internet of Things (IoT) is not only expanding the possibilities of smart sensors and smart devices, but also shifting and disrupting all aspects of packaging design, assembly, manufacturing, and applications.

Since my last message in February, I attended two major CPMT-sponsored, international conferences. In April, at the end of cherry blossom season, I attended the **International Conference on Electronics Packaging and iMAPS All Asia Conference (ICEP-IAAC 2015) in Kyoto, Japan**. This year's conference was the result of a joint effort by CPMT and iMAPS. The conference program featured key topics in packaging technologies trends as well as leading edge device technologies and other topics key to this age of the Internet of Things. After giving an opening day talk on "Enabling System Scaling in Data Center Application," I had the great pleasure to meet the CPMT leadership in Japan. I look forward to the continued growth of the CPMT Japan chapter, the largest in Asia.

In May, I attended CPMT's flagship conference, the **65th Electronics Components and Technology Conference (ECTC)**, in San Diego, CA, USA. It was a great success with an all-time high attendance of over 1500 attendees. This 20% increase over last year reflects the strong growth in the semiconductor packaging area.

Beyond an increase in numbers, there was also a greater diversity in attendees. Due to the blurring of boundaries between front end and back end and the impact of Moore's Law beyond traditional scaling, ECTC has gained strong recognition and piqued interest in new audiences from Si foundries to OEM system companies.

While ECTC continued to hold strong sessions on 3D and wafer level packaging, there was also tremendous excitement around new technology and innovations fueled by the Internet of Things (IoT), packaging for bio-medical technologies, Nano-packaging, wearables, and power electronics. Here are a few notable highlights:

- I was a panelist for the first ever CPMT Women's Panel session titled "Own Your Professional Success—What You Should Do." Intended to encourage diversity and networking, the session was popular and lively with great participation from both women and men. Recognizing the positive feedback, CPMT plans to continue hosting this event at future ECTC conferences.
- I am also very proud of the future talent pipeline that our CPMT members are building through our high school STEM mentoring program. One of the mentees was the youngest

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NEWSLETTER SUBMISSION DEADLINES:

30 August 2015 for Fall issue 2015

1 November 2015 for Winter issue 2016

1 February 2016 for Spring issue 2016

30 May 2016 for Summer issue 2016

Submit all material to nsltr-input@cpmt.org

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2017 term-end:	Regions 1–6,7,9—Avram Bar-Cohen, Darwin Edwards, Beth Keser, CP Wong; Region 8—Mervi Paulasto-Kröckel; Region 10—Masahiro Aoyagi

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Distinguished Lecturers

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Lecturers: Muhannad Bakir, Ph.D., Avram Bar-Cohen, Ph.D., Moises Cases, Rajen Chanchani, Ph.D., William T. Chen, Ph.D., Badi El-Kareh, Ph.D., Xuejun Fan, Ph.D., Paul D. Franzon, Ph.D., Philip Garrou, Ph.D., George G. Harman, Ph.D., R. Wayne Johnson, Ph.D., Beth Keser, Ph.D., John H. Lau, Ph.D., Ning-Cheng Lee, Ph.D., S. W. Ricky Lee, Ph.D., Johan Liu, Ph.D., James E. Morris, Ph.D., Kyung W. Paik, Ph.D., Michael Pecht, Ph.D., Eric D. Perfecto, Karl J. Puttlitz, Ph.D., Dongkai Shanguan, Ph.D., Nihal Sinnadurai, Ph.D., Ephraim Suhir, Ph.D., Yutaka Tsukada, Ph.D., Rao Tummala, Ph.D., Walter Trybula, Ph.D., E. Jan Vardaman, Paul Wesling, CP Wong, Ph.D., Ralph W. Wyndrum Jr., Ph.D., Jie Xue, Ph.D., Kishio Yokouchi, Ph.D.

Chapters and Student Branch Chapters

Refer to cpmt.ieee.org for CPMT Society Chapters and Student Branch Chapters list

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paper presenter at ECTC: Yuci Shen, a 17 year old junior from Monte Vista High School in Cupertino, CA. His work on "Achieving Warpage-Free Packaging: A Capped-Die Flip Chip Package Design" was supervised by Dr. Xuejun Fan from Lamar University and Dr. Leilei Zhang from NVidia.

- As we do every year, CPMT presented several prestigious awards to recognize the extraordinary achievements across our profession, industry, and society. I would like to extend my congratulations to this year's winners:
 - 2015 IEEE- CPMT Award: **Nasser Bozorg-Grayeli**
 - Electronics Manufacturing Technology Award: **Steve Bezuk**
 - David Feldman Outstanding Contribution Award: **Shen-Li Fu**
 - Outstanding Sustained Technical Contribution Award: **GQ (Kouchi) Zhang**
 - Exceptional Technical Achievement Award: **Xiaowu Zhang**
 - Outstanding Young Engineer Award: **Liangliang Li, Jeffery C.C. Lo**
 - Regional Contribution Awards: **Paul Svasta, Arun Chandrasekhar**

You'll find more information about this awardees in this Newsletter. As a reminder, nominations for CPMT's 2016 awards will open in the Fall. Please visit our website at <http://cpmt.ieee.org/awards.html> to submit your nominations.

Also during the ECTC conference, CPMT held a Board of Governors (BoG) meeting where **new TC chairs for 2015–2016** were endorsed by the BoG and appointed by me. I highly encourage you to join one of the TC for your area of interest and participate in TC-organized meetings/workshops by **emailing your TC chair**. The TC chairs' contact information is listed on the CPMT website:

- Materials & Processes — **Myung Jin Yim**, Chair
- High Density Substrates & Boards — **Venky Sundaram**, Chair
- Electrical Design, Modeling & Simulation — **Dale Becker**, Chair
- Thermal & Mechanical — **Dereje Agonafer**, Chair
- Emerging Technology — **Chris Bower**, Chair
- Nanotechnology — Americas: **Raj M. Pulugurtha**, Chair; Europe: **Chris Bailey**, Asia: **Katsuaki Suganuma**
- Energy Electronics — **Patrick McCluskey** Chair
- RF & Thz Technologies — **Manos Tentzeris**, Chair
- Green Electronics — **Nils F. Nissen**, Chair
- Photonics — Communication, Sensing, Lighting — **Gnyaneshwar Ramakrishna**, Chair
- 3D/TSV — **Paul Franzon**, Chair

Upcoming events:

- **On August 11–14: ICEPT**, the largest IC packaging conference in China will be held in **Changsha, China**.
- **On October 21–23: IMPACT**, the largest semiconductor packaging conference in Taiwan will be held in **Taipei**.
- **On November 9–11: ICSJ**, sponsored by CPMT and CPMT Japan Chapter, will be held in **Kyoto, Japan**.
- **On December 2–4: EPTC**, CPMT's flagship conference in Asia will be held in **Singapore**.
- **On December 14–16, EDAPS**, CPMT's electrical design of advanced packaging and systems symposium will be held in **Seoul, Korea**.

Mark your calendars! I look forward to meeting you at these and other CPMT events this fall. In the meantime, enjoy a wonderful summer!

CPMT Society News....

Jean M. Trehwella, GLOBALFOUNDRIES, Elected 2016–2017 CPMT Society President



Every two years, the CPMT Society Board of Governors (BoG) elects a President and Vice Presidents to serve for a two-year term. The term for the current Officers ends on 31 December 2015.

The election takes place in two parts—with the President elected mid-year and the Vice Presidents elected in the Fall. The elected President and Officers take office on 1 January 2016 for a two-year term that runs to 31 December 2017.

The BoG elected Jean M. Trehwella as 2016–2017 CPMT Society President.

Jean M. Trehwella is currently the Director of Packaging Technology Integration for GLOBALFOUNDRIES, a semiconductor foundry located in Malta, NY. She has authored over 50 technical papers and holds over 20 US patents. Jean is a Sr. Member of IEEE. She is active in CPMT as the current VP of Education and the past VP of Conferences. She also continues to participate in

ECTC as a member of the Optoelectric subcommittee and host of women's networking lunch tables.

Ms. Trehwella was always interested in STEM, she received her B.S. in Physics from Antioch College (1987) and her M.S. in Applied Physics from Columbia University (1992). She joined the T.J. Watson Research Center, IBM, in 1988 where her work included polymer optical waveguides fabrication, electrical modeling, and opto-mechanical package design for data communication systems. In 2000 she formed the High Speed Electrical and Optical Packaging Group in IBM Research directing work in electrical link signal integrity, advanced 1st and 2nd level electronic chip packaging, and low cost high speed opto-mechanical packaging. She received an Outstanding Technical Achievement Award for her work on 10Gbps Ethernet Transceiver Development in 2003. In 2005 she drove an IBM wide team of engineers and scientists to highlight key disruptive technologies in the IBM Global Technology Outlook. From 2006–2008 she was responsible for the Electronic Packaging Integration Group in IBM STG where her team developed system interconnection hardware for IBM servers. She spent 5 years as Director of IBM Packaging

Research and Development Center high performance first level packaging technology with responsibility for organic, ceramic, and emerging electronic packaging technologies. In her 26th year at IBM Ms. Trehwella moved back to her roots to spearhead STG's optical interconnect initiative including SiPhotonics.

During her career Ms. Trehwella has participated in a variety of volunteer STEM related activities including leading IBM Research's Diversity Council. From 2004 to 2008 Ms. Trehwella was on the Strategic Advisory Board for NSF STC—Materials & Devices for Information Technology Research. She served as the General Chair of the 60th ECTC Conference

Congratulations to 2015 CPMT Award Recipients

The CPMT Society annually recognizes individuals for contributions to the profession through technical achievements, service to the industry and to the Society. The following individuals received their awards at the 65th Electronic Components and Technology Conference (ECTC), May 2015.

The **Electronics Manufacturing Technology Award** is given to recognize major contributions to Electronic Manufacturing Technology in fields encompassed by the CPMT Society. The 2015 recipient:



Steve Bezuk, Qualcomm Technologies, Inc USA

For pioneering development, manufacturing and implementation work in mobile device packaging in the areas of interconnect technology, package structures, and package and substrate materials development and reliability.

The **Outstanding Sustained Technical Contribution Award** is given to recognize outstanding sustained and continuing contributions to the technology in fields encompassed by the CPMT Society. The 2015 recipient:



GQ (Kouchi) Zhang, Delft University of Technology, The Netherlands

For 20 years of technical leadership in technology strategy development and scientific excellence in heterogeneous micro/nano-electronics packaging, system integration and reliability.

The **Exceptional Technical Achievement Award** is given to recognize an individual, or group of individuals for exceptional technical achievement in the fields encompassed by the CPMT Society. The 2015 recipient:



Xiaowu Zhang, Institute of Microelectronics, A*STAR, Singapore

For major contributions in the area of 2.5D/3D ICs integration, focusing primarily on process development and reliability, and stress sensor technology.

The **David Feldman Outstanding Contribution Award** is given to recognize outstanding contributions to the fields encompassed by the CPMT Society through executive or managerial directions. The 2015 recipient:



Shen-Li Fu, I-Shou University, Taiwan

For outstanding, sustained contributions to CPMT through leadership of the CPMT Taipei Chapter; operation of multiple international conferences and promotion of strategic professional and educational collaborations.

The **Outstanding Young Engineer Award** is given to recognize outstanding contributions to the fields encompassed by the CPMT Society by a young (less than 35 years old) member through invention, technical development, publications, or new product implementation. The 2015 recipients:



Liangliang Li, Tsinghua University, China

For outstanding technical contributions to thermal interface materials and lead-free soldering materials through novel material synthesis and technology development, as well as service to the CPMT Society as organizer and Advisor of the CPMT Tsinghua University—Qing Hua Student Branch Chapter.



Jeffery C.C. Lo, Hong Kong University of Science and Technology, Hong Kong

For outstanding technical achievements in LED packaging development and component reliability assessment, and leadership within the CPMT Hong Kong Chapter.

The **Regional Contribution Awards** are given to recognize significant and outstanding leadership and contributions to the growth and impact of CPMT programs and activities at the Region level. One award may be given annually for each Region/Groups of Regions: Regions 1-7 & 9; Region 8; and Region 10. The 2015 recipients:

Region 8



Paul Svasta, POLITEHNICA University of Bucharest, Center for Technological Electronics and Interconnection Techniques, Bucharest, Romania

For sustained contributions to electronic packaging technology and education and to IEEE CPMT activities in Region 8, through leadership in the CPMT Joint Hungary and Romania Chapter; and for establishing the IEEE SIITMEC conference and student TIE competition.

Region 10



Arun Chandrasekhar Intel India, Bangalore, India

For significant contributions to CPMT activities in Region 10, through establishing and leading the CPMT Bangalore Chapter; while simultaneously organizing and chairing IEEE EDAPS 2014.

E-mail Alias and IEEE Web Account Needed 2015 CPMT Society Board of Governors Election On-Line

In order to vote in this year's CPMT Board of Governors election, members will need to have a valid e-mail alias on record with IEEE and also have an IEEE Web Account.

Eligible voting members will receive notification by e-mail soon with instructions for voting on-line. You will need an IEEE Web Account to access the ballot and cast your vote. This Web Account is the same one you may use for IEEE services such as renewing membership and accessing IEEE Xplore.

If you do not recall your Web Account username and password, or aren't sure whether you have established an account, please go

to <http://www.ieee.org/web/accounts> to recover your password or establish a new account.

Please be sure to update your IEEE membership record with your current e-mail alias. If you DO NOT HAVE AN E-MAIL address or would prefer to receive a paper ballot by mail, please send your name, mailing address and IEEE Member Number by 1 October to:



*Marsha Tickman
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Congratulations to IEEE CPMT Senior Members

The members listed below were elevated to the grade of Senior Member between January and June 2015.

The grade of Senior Member is the highest for which application may be made and shall require experience reflecting professional maturity. For admission or transfer to the grade of Senior Member, a candidate shall be an engineer, scientist, educator, technical executive, or originator in IEEE designated fields for a total of 10 years and have demonstrated 5 years of significant performance.

Individuals may apply for Senior Member grade online at: www.ieee.org/web/membership/senior-members/index.html

- **Md Ershad Ali**, Buenaventura Section
- **Mario Bolanos**, Malaysia Section
- **Cyril Buttay**, France Section
- **Moses Chan**, Buenaventura Section
- **Bok Eng Cheah**, Malaysia Section
- **Kuo-Sheng Chin**, Taipei Section
- **Cleon Davis**, Baltimore Section
- **Salah Faik**, Cedar Rapids Section
- **Ira Feldman**, Santa Clara Valley Section
- **Don Frye**, Connecticut Section
- **Rohit Dev Gupta**, Bangalore Section
- **Barbara Haney**, Phoenix Section
- **Swee Har Khor**, Malaysia Section
- **Arun Krishnamoorthy**, Oregon Section
- **Ning-Cheng Lee**, Mohawk Valley Section
- **SeungJae Lee**, Seoul Section
- **Michael J. Liptak**, Eastern North Carolina Section
- **Patrick F. Mccluskey**, Baltimore Section
- **Rohit Sharma**, Delhi Section
- **Dwayne Shirley**, San Diego Section
- **Larry Smith**, San Diego Section
- **Suresh Subramanyam**, Bangalore Section
- **Lin- Sheng Wu**, Shanghai Section

CPMT Chapter News....

CPMT Tsinghua University Student Branch Chapter Organizes Seminar

A seminar organized by IEEE CPMT Student Branch Chapter at Tsinghua University was successfully held at Microelectronics Institute of Tsinghua University on June 9, 2015. The seminar was hosted and chaired by Prof. Qian Wang in Electronic Packaging R&D Center of Microelectronics Institute. Prof. Tadatomo Suga, the chairman of Japan Institute of Electronics

Packaging, and Prof. Yinghui Wang from the University of Tokyo were invited to the seminar. Prof. Suga gave a lecture on surface activated bonding (SAB) for packaging and bonding of metals, semiconductors, glasses and polymers at room temperature. Prof. Yinghui Wang gave a detailed introduction on School of Engineering, the University of Tokyo and research activities of Wuxi representative office. This seminar has attracted about 30 attendees. The reports made by the two professors were very helpful for present students and raised a lot of interests among the audiences.



Publication News....

2014 CPMT Best Transactions Paper Awards

Each year, the Editors of the IEEE Transactions on Components, Packaging and Manufacturing Technology select the best papers published in the prior year. The papers are selected from among over 200 published papers and represent the best, based on criteria including originality, significance, completeness and organization.

The awards were presented at the 65th Electronic Components and Technology Conference (ECTC), May 2015.

Subscribers to this publication can access the papers on-line in IEEE Xplore at: <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=5503870>

Advanced Packaging Technologies Category

“Self-Aligned Silicon Interposer Tiles and Silicon Bridges Using Positive Self-Alignment Structures and Rematable Mechanically Flexible Interconnects” Hyung Suk Yang; Chaoqi Zhang; Bakir, M.S., Volume 4, Issue 11, November 2014

Abstract: A novel large-scale silicon system platform is proposed and demonstrated. In this paper, three silicon interposer tiles are aligned and mounted on a printed wiring board (PWB), and

two silicon bridges are aligned and mounted on top of the three interposer tiles; each silicon bridge spans two interposer tiles. Four positive self-alignment structures and four inverted pyramid pits self-align a tile to the PWB and a bridge to two tiles. Mechanically flexible interconnects (MFI) form nonbonding electrical connections between the three interposer tiles and two silicon bridges; MFIs are fabricated on the interposer tiles. Pointy tips on the MFIs form low contact resistance with the pads on the silicon bridges. Less than 4 μm alignment error is demonstrated on a stack of silicon substrates, and $<8 \mu\text{m}$ alignment error between a silicon bridge and tiles is also demonstrated on a FR4 substrate. Daisy chain and four-point measurements are performed to verify electrical connections between the three interposer tiles via MFIs and silicon bridges.

URL: http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6922501&filter%3DAND%28p_IS_Number%3A6942286%29e%3Dasc_p_Sequence%26filter%3DAND%28p_IS_Number%3A6552858%29

Electrical Performance of Integrated Systems Category

“5-Gb/s and 10-GHz Center-Frequency Gaussian Monocycle Pulse Transmission Using 65-nm Logic CMOS With On-Chip

Dipole Antenna and High- κ Interposer", Kubota, S.; Toya, A.; Sugitani, T.; Kikkawa, T.; Volume 4, Issue 7, July 2014

Abstract: Interchip data transmission was demonstrated using impulse radio ultrawideband complementary metal-oxide-semiconductor (CMOS) transmitter integrate circuits with on-chip dipole antennas. A differential pseudorandom binary sequence of 27 data of Gaussian monocycle pulse (GMP) was formed by 65-nm CMOS logic circuits using up and downpulses with certain gate delays. The CMOS transmitter generated 5-Gb/s GMP with the center frequency of 10 GHz. To improve transmission gains, an interposer with the high dielectric constant ($\epsilon_r = 38$) and optimized thickness was inserted under the CMOS chips as a dielectric slab waveguide. 2-Gb/s GMP signals were transmitted and received in the distance of 10 mm by use of the CMOS on-chip antennas and the high- κ interposer.

URL: http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6822529&refinements%3D4230702480%26filter%3DAND%28p_IS_Number%3A6845385%29

Electronics Manufacturing Category

"Photonic Flash Soldering of Thin Chips and SMD Components on Foils for Flexible Electronics", van den Ende, D.A.;

Hendriks, R.; Cauchois, R.; Kusters, R.H.L.; Cauwe, M.; Groen, W.A.; van den Brand, J.; Volume 4, Issue 11, November 2014

Abstract: Ultrathin bare die chips and small-size surface mount device components were successfully soldered using a novel roll-to-roll compatible soldering technology. A high-power xenon light flash was used to successfully solder the components to copper tracks on polyimide (PI) and polyethylene terephthalate (PET) flex foils by using a lead-free solder paste. Results are compared with oven-reflowed solder joints on PI substrates. The delicate PET foil substrates were not damaged owing to the selectivity of light absorption, leading to a limited temperature increase in the PET foil while the chip and copper tracks were heated to a temperature high enough to initiate soldering. The microstructure of the soldered joints was investigated and found to be dependent on the photonic flash intensity. Reliability of the photonic soldered joints during damp heat testing and dynamic flexing testing was comparable with the reflowed benchmark and showed increased reliability compared with anisotropic conductive adhesives bonded on PET foils.

URL: http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6923428&refinements%3D4229912995%26filter%3DAND%28p_IS_Number%3A6942286%29

Conference News....

65th ECTC Sets an All-Time Record for Attendance

*Submitted by Mark D. Poliks,
Assistant Program Chair, IEEE ECTC 2016*

This year's ECTC conference was a year of record-setting statistics in our sixty-five year history: the largest number in attendance, the largest number of sponsorships, the largest number of exhibitors and the largest number attending the Professional Development Courses (PDCs.) One thousand five hundred fifty-nine was the number of attendees that took advantage of the 36 oral and 5 interactive presentation sessions, the 16 Professional Development Courses (PDCs), and the 6 special panel, plenary sessions, and seminars at the 65th Electronic Components and Technology Conference (ECTC) held at the Sheraton San Diego Hotel & Marina, San Diego, California, USA, from May 26 to May 29, 2015. The number of the Technology Corner Exhibitors again crossed the one-hundred mark for the second time in ECTC history, which is a reminder of the important role ECTC plays in bringing the global key players together under one roof.

Preparations for ECTC 2015 started almost a year ago, when members of its ten different technical committees critically reviewed the 586 abstracts that were submitted, ultimately leading to 361 presentations (62% acceptance rate). 42% of these abstracts were submitted by universities, 48% by corporations, and 10% by research institutions. The abstracts came from 32 different countries, the second highest number in the recent history of ECTC. The US contributed approximately one-third of these abstracts



General Chair, Beth Keser honors Paul and Gail Wesling for their many contributions to ECTC.

and it also topped the ranking of countries with the largest number of accepted abstracts. The notable metric in this ranking was the steady rise of China from a shared 7th position in 2011 all the way to the 3rd position in 2014 and 4th in 2015 and only three abstracts short of being tied with Taiwan for 3rd place.

The session line-ups were finalized by the Technical Program Committee in the planning meeting near Dallas, Texas, USA, on November 6 and 7, 2014. As in the recent past, the Executive Committee had formed a 3D/TSV work-group, this year under the leadership of Jianwei Dong from Dow Electronic Materials, to jointly evaluate all abstracts on TSV based 2.5D/3D integration. This



The attendance at the 65th ECTC was an all-time record.



Students enjoying the Student Reception.

workgroup came up with 11 sessions, up from the 9 last year and closer to the number in 2013. The Subcommittee chairs and session chairs did a great job in the follow up with the authors for the manuscripts and presentation material, which enabled all the manuscripts to be publication ready well before the start of the conference.

For over 15 years, Paul and Gail Wesling have been helping to organize the ECTC proceedings. Their work directly with ECTC authors and with the Program Committee has made the enormous task of collecting manuscripts and putting them into print run smoothly for so many years. Paul and Gail were recognized for their many years of contribution and service to ECTC during the Wednesday General Chair's luncheon; our thanks to them for all of their hard work!

The conference began on Tuesday, May 26th, morning with eight Professional Development Courses and another eight in the afternoon. The number of PDC attendees also increased from 417 last year for 18 courses (joint with IEEE iTHERM) to 417 this year for the 16 courses. Each day's program, starting on this Tuesday all the way through Friday, was preceded by a Speakers Breakfast in which the presenters and session chairs met and took care of the preparatory work for their respective session/courses. The PDC Chair, Kitty Pearsall, provided instructions to the PDC instructors and Proctors at this breakfast on Tuesday, and Henning Braunisch, the Program Chair, hosted these breakfast meetings for the benefit of the Session chairs and speakers on the other three days.

Concurrent with the PDCs, the conference attendees were treated on Tuesday morning with a Special Session on "Sustainability in Microelectronics," chaired by Ibrahim Guven from Virginia Commonwealth University. The speakers in this session were William Bullock of University of Illinois at Urbana-Champaign, Karen Butner from IBM, Corey Gough from Intel, Michelle Lee of Qualcomm Technologies, Inc., and Michael Pierce of Texas Instruments. Sustainability in microelectronics industry was analyzed from different perspectives including, business, data centers and servers, social responsibility, and conflict minerals; outlook for future was addressed.

There was another special session in the afternoon that day on "Advancement in Bio-Medical Technology & Associated Packaging," jointly organized by the Assembly and Manufacturing Technology Subcommittee and the Advanced Packaging Subcommittee and co-chaired by Shawn Shi of Medtronic and John Knickerbocker of IBM Corporation. Invited talks were given by Gaurav Jain of Medtronic, Kaustubh Nagarkar of General Electric, Gabriel Mouchawar of St. Jude Medical, Robert Schuelke from the Mayo Clinic, and Navin Govind of Aventyn.

For the first time this year a third event was held from 4:00 to 5:00 pm that afternoon. "2015 CPMT Women's Panel & Reception: Own Your Professional Success—What You Should Do" was chaired by Beth Keser, 65th ECTC General Chair of Qualcomm Technologies, Inc. Invited talks were given by Jie Xue, CPMT President and Senior Director Component Quality and



One of the packed technical sessions at the 65th ECTC.



The 65th ECTC saw a record number of 106 exhibitor booths at the Technology Corner Exhibits.

Technology Group, Cisco Systems, Inc.; Jean Trehwella, Director of Packaging, GLOBALFOUNDRIES; Navrina Singh, Director, Product Management, Qualcomm Labs, Inc. The panel discussed very useful information not only for women but also for every engineer. Specifically the panel addressed importance of networking, mentoring (finding a good mentor and becoming a mentor later in career) as well as strategies for getting one's voice heard in professional settings.

The ECTC Student Reception was held on Tuesday evening and sponsored by IBM Corporation. It was located in the Executive Center Foyer with a picturesque view of the Sheraton's Marina. A steady stream of student attendees took advantage of the opportunity to speak with professionals from companies such as IBM, Intel, Qualcomm, and Broadcom, on successful career paths and opportunities. Right after this, a General Chair's Reception was given for Speakers and Session Chairs, in the Grande Ballroom. These receptions provided a great start to the next three days of intense networking among the conference attendees.

Tuesday's program ended with the ECTC Panel Session, "Nanopackaging: Hype, Hope, or Happening?" which had the distinction of being co-chaired by James E. Morris of Portland State University and Jie Xue, CPMT President, of Cisco Systems, Inc. The invited speakers and panelists included: Alexander Balandin of the University of California, Riverside, Taisuke Iwai of Fujitsu Laboratories, Nancy Iwamoto of Honeywell, Ravi Mahajan of Intel Corporation, and Katsuaki Suganuma of Osaka University.

Wednesday marked the start of technical paper presentation sessions with six sessions running in parallel, both in the morning and in the afternoon each day. The morning sessions included two parallel 3D Technology sessions on TSV fabrication and reliability and high-speed components and modeling as well as four other technical sessions. Word spread quickly that Session 1: Flip Chip Packaging in Harbor Island 1 was "standing room only" and that attendees were gathered outside the open doors of the room to listen. This is not surprising as non-3D sessions on varied topics such as flip chip technologies and wafer level packaging continue to be of great interest among the attendees, some of these sessions often had over 200 people listening to the presentations at any given time.

The keynote speech at the ECTC luncheon on Wednesday was given by Matt Grob, Executive Vice President and CTO of Qualcomm Technologies, Inc. who gave an excellent presentation on the topic "Smartphone-Powered Future." Matt described a future where mobile devices begin to transform our lives in increasingly meaningful ways: Healthcare—by transmission of high quality medical images, using improved digital zoom mobile cameras, from remote locations to help lower the cost of diagnostics; Transportation—with 60% of all new cars by 2018 are expected to be connected via mobile technologies that can communicate with the vehicles surroundings; Cognitive technologies—by using computer vision and machine learning algorithms in our favorite handheld devices.

Awards for best and outstanding papers from the ECTC 2014, both in oral presentation sessions and interactive sessions, were presented by the ECTC 2015 General Chair, Beth Keser, at this luncheon. Also presented was the Intel Best Student Paper Award for ECTC 2014.



Amanpreet Kaur from Michigan State University receives the 2015 ECTC Best Interactive Presentation Paper Award from the General Chair, Beth Keser.

The Technology Corner Exhibits area was bustling with activity during every break between the presentation sessions. The exhibitors hosted a reception on Wednesday evening that provided more opportunities for technical and business discussions between them and the other attendees of the conference.

Wednesday evening also saw the ECTC Plenary Session on "The Internet of Things and the Future of Interconnected Electronics," chaired by E. Jan Vardaman of TechSearch International, Inc.. The invited speakers included: Jerry Tzou from Taiwan Semiconductor Manufacturing Company Ltd. (TSMC), Li Li of Cisco Systems, Inc., Ilyas Mohammed of Jawbone, and Subramanian Iyer from the IBM Corporation; University of California, Los Angeles. The session was very well attended and was hosted by Jan Vardaman in a dynamic, interactive and sometimes entertaining manner. The panel discussed the importance of connecting people, process, data, and things; emphasizing the key drivers such as manufacturing, transportation and logistics, utilities, smart cities, finance, retail and the importance of security.

The IEEE CPMT Society President, Jie Xue, presided over the luncheon on Thursday and presented the CPMT Society Awards. The 2015 IEEE CPMT Field Award was presented to Nasser Bozorg-Grayeli of Intel Corporation for his contributions to the advancement of microelectronics packaging technology, manufacturing, and semiconductor ecosystems. The Electronics



The Interactive Presentations were impressive, as a large number of attendees participated in one-to-one and small group discussions with the authors.



The Gala Reception was the time for socializing after a day full of technical meetings and brainstorming.

Manufacturing Technology Award was presented to Steve Bezuk of Qualcomm Technologies, Inc., the Outstanding Sustained Technical Contribution award to GQ (Kouchi) Zhang of Delft University of Technology, The Netherlands, the 2015 Exceptional Technical Achievement Award to Xiaowu Zhang of the Institute of Microelectronics, A*STAR, Singapore and the David Feldman Outstanding Contribution Award to Shen-Li Fu of I-Shou University, Taiwan. Also presented at this luncheon were the 2015 Outstanding Young Engineer Award and the Regional Contribution Awards.

The ECTC 2015 Program Committee meeting was held on Thursday evening. Sam Karikalan, who will serve as the Program Chair for ECTC 2016, chaired this meeting and presented the statistics of the 65th ECTC and also the timeline for run up to the 66th ECTC that will be held in Las Vegas next year. The CPMT Representative on the ECTC Executive Committee, C. P. Wong, introduced Mark Poliks of Binghamton University as the Assistant Program Chair of the 66th ECTC. This meeting also enabled the ECTC technical program Subcommittees to get in touch with potential new members of their committees.

The Gala Reception on Thursday evening maintained its reputation as the highlight of the week for all the conference attendees, exhibitors, sponsors, and their guests. It was a time to celebrate the success of the 65th ECTC with great food and socializing together on the Sheraton's Bayview Lawn.



The 65th ECTC Executive Committee Leadership Team: Sam Karikalan, Assistant Program Chair; Beth Keser, General Chair; Alan Huffman, Vice-General Chair; Henning Braunsch, Program Chair.

The 2015 CPMT Seminar on "Liquid and Phase-Change Cooling for High-Performance Systems" followed the Gala Reception and was chaired by Venkatesh Sundaram from Georgia Institute of Technology and Yasumitsu Orii from IBM Research Tokyo. The invited speakers included: Jie Wei of Fujitsu, Hitoshi Sakamoto of NEC Corporation, Kousuke Suzuki of Dai Nippon Printing Co., Ltd., and Yasuhiro Kawase of Mitsubishi Chemical Corporation. This team of system architects and thermal engineering experts discussed that the pervasive use of mobile and handheld electronics and emerging applications such as "Internet of Things" and "Autonomous Driving," are place increasing demands for high performance computing in the data centers and internet backbone. Energy efficiency is becoming a critical factor in high performance computing system design. Cooling technologies at IC, package and system level can significantly improve computing efficiency.

The presentations given at most of the special panel sessions and seminars can be found on the ECTC website, from the home page use the link for the 65th ECTC Highlights or <https://www.ectc.net/about/65highlights.cfm>

Friday's Luncheon had the usual fun and excitement with Tom Reynolds, the ECTC Treasurer, conducting the raffle drawing. The luncheon ball room was nearly silent whenever he announced the winning numbers only to then erupt with applause for the lucky winner. The technical sessions continued well past 5:00 PM on Friday, demonstrating the depth and breadth of the material presented at ECTC.

Besides the ECTC paper presentations, the ITRS 2.0 Assembly & Packaging Working Session was held all-day on Tuesday and was open to all conference attendees. The ITRS 2.0 is an effort to refocus to enable the Roadmap needs in the world of smart mobility, IoT, and migration to the Cloud and to ensure the relevance of the roadmap to global stakeholders in the industry. In addition, the iNEMI Technical and Research Committee held their meetings all day on Tuesday. They are expected to hold their iNEMI Roadmap, North American Workshop again at an upcoming ECTC.

Finally, one additional first at the 65th ECTC was at the last oral presentation on the last day by the youngest speaker ever, Mr. Yuci Shen, a 17-year old high school student, from Monta Vista High School in Cupertino, CA. Mr. Shen presented his work "Achieving Warpage-Free Packaging: A Capped-Die Flip Chip Package Design," that was performed during an internship at Lamar University. Those attending session 35 "Package Warpage, Delamination and Thermal Modeling" were very impressed by the quality of the research and the clarity of the presentation. Mr. Shen was supervised by Dr. Xuejun Fan from Lamar University and Dr. Leilei Zhang from Nvidia.

Overall, the 65th ECTC was a great success in terms of its record attendance and the participation from the record number of exhibitors. The ECTC Executive Committee sincerely thanks all the attendees, exhibitors, and conference sponsors for their support. The 66th ECTC will be held at The Cosmopolitan of Las Vegas, Las Vegas, Nevada, USA, May 31-June 3, 2016. Alan Huffman of RTI International will be the General Chair of this conference. The Call for Papers and PDC Proposals will be available on www.ectc.net and the abstract submission will close on October 12, 2015. So, get those abstracts ready and submit them as soon as abstract submission opens online.

See you all in Las Vegas in 2016!

Student Review of the 65th Electronic Components and Technology Conference

Evangeline Wong, Graduate Student Researcher, UC Irvine

The 65th Electronic Components and Technology Conference (ECTC2015) was my first ECTC and I was impressed.

Weather and Location. As a native Californian who is numbed by California's incessant sunshine, the fog that blanketed the San Diego coast on the first day of ECTC2015 was a welcome relief. The Sheraton San Diego Hotel & Marina is positioned in a prime location with easy access to the airport as well as bus stop for those commuting. Its proximity to the ocean means clouds roll inland as the day cools into night.

Attendees disappointed by the overcast weather did not need to worry, however, as the sun soon broke through the sky later in the week, revealing a gorgeous view of white sails floating on the sparkling blue waters of the harbor—truly refreshing scenery for the mind, body, and soul.

I was also happy that the internet worked, and outlets were aplenty in the conference areas, in addition to the multiple workstations and free printing offered by the hotel.

The Conference. To describe this conference in a word: intimate. Nametags with enlarged first names encouraged attendees to eschew formality and greet each other as close friends. The collegiality carried over into the sponsored luncheons and receptions, where attendees reunited and refueled.

While large conferences must book multiple venues to accommodate all the sessions—three hotels and the convention center at the last Materials Research Society's Spring Meeting, for example—ECTC2015 was contained within one hotel, creating a streamlined and intimate atmosphere.

Attendees can focus on sessions leavened by breaks for refreshments and receptions, rather than expend time and energy on rushing between locations.

By no means does this mean a shortage of events; on the contrary, there was not enough time to attend all. The organizers did a great job of ensuring a packed schedule enriched with Professional Development Courses, Special Sessions, Program Sessions, and Receptions. Some events that I attended:

2015 CPMT Women's Panel & Reception: Own Your Professional Success—What You Should Do.



San Diego Harbor on a sunny day.

Don't let the title mislead you. Turns out, the inaugural session of CPMT Women's Panel would benefit women *and* men. Panelists Beth Keser, Jie Xue, Jean Trehwella, and Navrina Singh shared insights of pursuing a career in industry, imparting advice on nurturing mentor relationships, work-life balance, and leadership. Attendees were encouraged to ask questions, though Beth Keser had also prepared a slate of questions that ensured the panelists were a continuous flow of wisdom. A reception afterward allowed attendees to ask questions of the panelists directly.

The Program Sessions. With 36 Program Sessions it is impossible for me to summarize them all, but for the ones that I attended, the speakers were knowledgeable and prepared. Slides were also quite beautiful in some cases.

The Luncheons and Receptions. Arguably the best part of the conference. The respite was a welcome time to eat, meet, and be merry. I was touched by ECTC's graciousness in feeding all attendees and cultivating the atmosphere for people to socialize in a fulfilling way.

By the way, if you have any dietary restrictions, whether dairy-free, gluten-free, or vegetarian, indicate it during registration—you will be accommodated. Remind the wait staff again if they forget.

A few notes of gratitude:

Luncheons: Thank you, ASE Group, for sponsoring the keynote luncheon. I was happy to be fed and had the pleasure



Luncheon



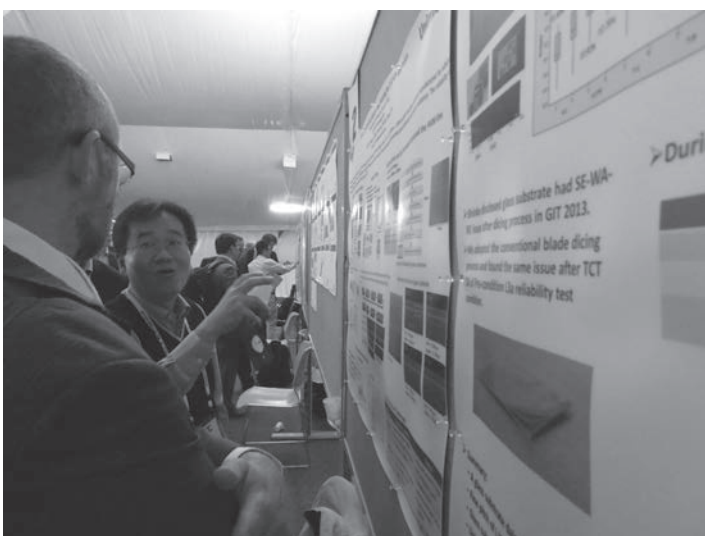
CPMT Women's Networking Table at the Keynote Luncheon.



Women's Panel (from left to right): Beth Keser, Navrina Singh, Jean Trehwella, and Jie Xue.



IBM sponsored the Student Reception on Tuesday evening.



Interactive Presentations in the Bayview Pavilion alongside the exhibits.



Chocolate fondue fountain at the Gala Reception Thursday evening.

of meeting wonderful people at the Women's Networking Table. It was also a very clever way of convincing attendees to stay put while giving speeches and announcing the name of award winners.

ECTC Student Reception: Thank you, IBM Corporation, for sponsoring this reception. The Mexican fiesta gave us students a great opportunity to meet industry professionals and other students from all over the world. The starving student thanks you.

Technology Corner Reception: Thank you, exhibitors, for sponsoring this reception. The reception encouraged attendees to visit the Pavilion and Exhibitors. The reception also alerted me to where the Interactive Presentation Sessions were located.

65th ECTC Gala Reception. Thank you, Gold Gala sponsors, for the Gala Reception, especially the giant seafood paella, the fountain of dark chocolate fondue, and drinks.

My heart goes out to the Chairs whose CPMT seminar had to compete with this reception.

Thanks to ECTC2015's programming, I was well-fed in mind, body, and spirit. I was also delighted to discover a warm and welcoming community. To those that I met, it was an honor and a pleasure.

Thank you all for the warm welcome and excellent experience. I look forward to ECTC2016 at the Cosmopolitan in Las Vegas.

Evangeline Wong is a graduate student in the Department of Chemical Engineering and Materials Sciences at the University of California, Irvine. She earned her B.S. in Chemistry from the University of California, Berkeley. Thanks to NSF's awarding of the EAPSI 2015 Fellowship, she is currently conducting research at KAIST in Daejeon, South Korea this summer.

Summary of the 36th IEMT 2014 in Johor Bahru, Malaysia

Submitted by Siow Kim Shyong, IEMT General Co-Chair

The 36th IEEE-CPMT International Electronics Manufacturing Technology (IEMT) Conference was successfully organized at the Renaissance Johor Baru Hotel from the 11th to the 13th of November 2014. IEMT is the flagship conference hosted by the CPMT Malaysia Chapter once every two years. The technical co-sponsors of this conference were the Institute of Electrical and Electronics Engineers (IEEE) and the Components, Packaging & Manufacturing Technology (CPMT).

This year, IEMT 2014 had a total of 9 keynotes, 5 short-courses and 4 parallel sessions. More than 80 technical papers and posters covering the latest technology and industry trends in electronic packaging and manufacturing technology were presented. A panelist forum was organized, entitled “IoT: Roles of Packaging and Industry Trends” that touched on the packaging cost, investment comparison of 18” wafer versus Panel/FOWLP, SiP versus SoC, and low-cost innovation. The keynote and short-course speakers were Prof CP Wong (Georgia Tech/ City University of Hong Kong), Prof Andrew Tay (National University of Singapore), Prof Simon Ang (University of Arkansas), Dr Rolf Aschenbrenner (Fraunhofer Institute for Reliability and Micro-integration Berlin (IZM)), Dr John Xie (Altera), Dr. Knoblauch Andreas (Infineon), Dr Xavier Baraton (ST Microelectronics), Dr Koh Byeong Cheon (formerly Samsung), Shubada (Intel), Dr Sandeep (Intel), Mr YK Sow (Intel) and Christian Burmer (Infineon).

The Best Industry Posters were awarded to Tan Chee Voon from Infineon Malaysia (*Package Mounting Considerations from Product Thinking to System Understanding (P2S) to Create Greater*



The successful IEMT 2014 organizing committee.

Value for Customers) and Ben Shiao Lin from MMU/Infineon Malaysia (*Prediction and Prevention of Mold Compound Chipping Using Empirical and Simulation Methods*). The Best Student papers were won by Kim Seah Tan from USM (*Effect of Sintering Environment on Silver-Copper Die-Attach Nanopaste*) and Nashrah Hani Jamadon from UM/Tokai University (*Addition of Porous Cu Interlayer to Sn-3.0Ag-0.5Cu Lead-Free Solder Joint for High Temperature Application*). The best Industry Papers were handed out to CE Tan from ON Semiconductor (*Challenges of Ultimate Ultra-Fine Pitch Process with Gold Wire & Copper Wire in QFN Packages*) and MJ Lee from Altera Corporation (*Packaging Technology and Design Challenges for Fine Pitch Cu Pillar and BOT (Bond on Trace) Using Thermal Compression Bonding*). Congratulations to all the winners!

Overall, IEMT 2014 was well received and was attended by over 400 local and international participants, 20 exhibitors and 50 companies. The next IEMT in 2016 will be held in Malaysia’s beautiful Pearl of the Orient, Penang Island. We are looking forward to seeing all of you there!



(L) Prof. Mohd Nasir Tamin; (R) The keynote address.



(L) Attendees at the coffee break; (R) The panel forum discussion.



38th ISSE—A Success
Submitted by Attila Geczy, ISSE Co-Chair
BME—Dept. of Electronics Technology

The 38th edition of the International Spring Seminar on Electronics Technology held in Eger, Hungary, 6–10 May, 2015) was a success. Organized by the Budapest University of Technology and Economics, Hungary and chaired by Prof. Gabor Harsanyi and his team, the Conference hosted 127 participants (professors, senior scientists, young scientists and students) from 13 nations and from 29 universities, scientific institutes and companies and featured 8 keynote presentations, 14 oral presentations and 97 poster presentations.

The Conference included presentations by two CPMT Society Distinguished Lecturers: James E. Morris, Portland State University, USA, “Nanomanufacturing R&D for Electronics Packaging” and Nihal Sinnadurai; ATTAC, United Kingdom, “The Use and Abuse of HAST for Assessment of Reliability for Severe Climates.”

The International Steering Committee evaluated the talks and the poster presentations and awarded:

Best Presentation Award for Young Scientists

Beatrice Miccoli, Politecnico di Torino, Italy: *Interface of a Single ZnO-Nanowire Assembled onto Custom-Fabricated Nanogap Device for Versatile Sensing Applications*

Best Poster Award for Young Scientists (ex aequo)

Anton Mysziwiec, Warsaw University of Technology, Poland. *Solder Joints for Flexible Connection Working at Low Temperatures*

Peter Lukács, Technical University of Kosice, Slovakia, *UWB Antenna Based on Nanoparticles of Silver on Polyimide Substrate*

Best Poster Award

Agata Skwarek, Institute of Electron Technology Warsaw, Poland, *Induction of Tin Pest Transformation in Solder Joints in Ceramic Packages of Sub-THz Scanner*

Excellent Presentation Award for Young Scientists

Thomas Reitberger, FAPS Nürnberg, Germany, *Aerosol Jet® Printing of Optical Waveguides*

Excellent Presentation Award for Young Scientists

Alkaios Bournias-Varotsis, Loughborough University, United Kingdom, *The Effect of Ultrasonic Excitation on the Electrical Properties and Microstructure of Printed Electronic Conductive Inks*

Excellent Poster Award for Young Scientists

Alessia Damilano, Istituto Italiano di Tecnologia Torino, Italy, *Capacitive-Resistive ReadOut Circuit for Nanosensors based on ZnO Nanowires*

Kornel Ruman, Department of Technologies in Electronics, Kosice, Slovakia, *Development of $I - Q$ Demodulator Based on LTCC for M-Sequence UWB Sensor System*

Martin Schubert, TU Dresden, Germany, *Characterization of Polymeric Encapsulation for Implantable Microsystems applying Dynamic Fluidic and Electrical Load*



Excellent Poster Award

Radek Soukup, University of West Bohemia in Plzen, Czech Republic, *A Comparison of the Interdigital Electrodes Prepared by Aerosol Jet Printing and Lift-off Technique*

The 2016 39th ISSE will be organized by Dr. Tomas Blecha, University of West Bohemia Plzen Czech. It is planned for Plzen, May 18–22, 2016.

First Call for Papers

First Call For Papers IEEE 66th Electronic Components and Technology Conference www.ectc.net

To be held May 31st - June 3rd, 2016
at the Cosmopolitan Hotel of Las Vegas, Las Vegas, Nevada, USA

The Electronic Components and Technology Conference (ECTC) is the premier international electronics symposium that brings together the best in packaging, components and microelectronic systems science, technology and education in an environment of cooperation and technical exchange. ECTC is sponsored by the Components, Packaging and Manufacturing Technology (CPMT) Society 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 as given below under each technical program subcommittee name. Authors are encouraged to review the sessions of the previous ECTC programs to determine the committee selection for their abstracts.

Advanced Packaging:

2.5 & 3D technologies, embedded, wafer and panel level packaging, flip chip, advanced substrates, interposers, novel assembly technologies, fan-out, internet-of-things, bio-compatible, wearables, TSVs, MEMS and sensors, heterogeneous integration, electronic (power & RF) and optoelectronic packaging.

Applied Reliability:

System level reliability testing/modeling, reliability test methods and life models, failure analysis techniques/physics of failure, TSV/3D reliability and packaging challenges, interconnect reliability, solder and materials characterization, drop and dynamic mechanical reliability, probabilistic design for reliability (PDR), automotive reliability requirements.

Assembly and Manufacturing Technology:

Advancement of packaging and manufacturing technologies in large OEMs, innovation in enabling high density packages including 3D integration, challenges and solutions of mainstream packaging and manufacturing technologies, challenges and solutions for medical applications.

Emerging Technologies:

Internet-of-things components: wearable electronics, flexible & stretchable electronics packaging, compact & autonomous sensor packaging; bioelectronics packaging: microfluidics and MEMS, bio-sensing packaging, new materials for bio packaging; power technologies: small form factor packaging, high power packaging; novel advanced packaging: energy harvesting electronics packaging, photovoltaic packaging, components for wireless packaging, novel approaches to packaging; complex packaging: security, redundancy, repair, directed assembly, built-in test, multifunction integration; emerging packaging concepts and technologies: organic IC & TFT, anti-counterfeiting packaging.

High-Speed, Wireless & Components:

Components, modules and novel packaging technology solutions for high-frequency, high-speed digital, power, and wireless applications; embedded/integrated chips & passives; signal and power integrity; sensors, RFID, RF MEMS, low-power RF design, wireless power transfer and energy harvesting; cutting-edge component/module technologies for power, RF, millimeter-wave & THz applications; bio/wearable applications, flexible & printed electronics; meta-materials, magneto-dielectric nano-composites; SiP, heterogeneous integration.

Interconnections:

First- and second-level interconnections: designs, structures, processes, performance, reliability (e.g., electromigration), test; technologies including TSV, interposers (Si, glass, organic), interconnections for 3D integration &

SiP, flip chip, solder bumping and Cu pillar, wafer-level packaging, wafer and panel level fan-out, advanced wirebonds, non-traditional interconnections (e.g., electrically conductive adhesives, carbon nano-tubes, graphene, optical), substrates and PCB solutions for next generation systems, system packaging and heterogeneous integration; topics of special interest include new applications in wearables, internet-of-things, cloud, and automotive electronics.

Materials & Processing:

Adhesives and adhesion, lead free solder, novel materials and processing; underfills, mold compounds, dielectrics, emerging materials, and processing for 2D and 3D.

Modeling & Simulation:

Electrical, thermal and mechanical modeling & simulation, including: component, board and system level modeling for microelectronics including 3D interconnects (TSV, stacked die), 2.5D packaging (Si interposers), wafer-level package (WLP), ball grid array (BGA), embedded packages with active and passive components, system-in-package (SiP), power electronic modules, LED packaging, MEMS; novel high-speed interconnects and power delivery architectures; fab/thin wafer handling, wire bonding and assembly manufacture process; reliability modeling related fracture mechanics, fatigue, electromigration, warpage, delamination/moisture, drop test, material constitutive relations; novel modeling including multi-scale and multi-physics techniques and solutions; measurement methodologies and correlations.

Optoelectronics:

Fiber optical interconnects, single mode or multicore connectors, parallel optical transceivers, silicon and III-V photonics packaging, optical chip-scale and heterogeneous integration, micro-optical system integration and photonic system-in-package, 3D photonics integration, optoelectronic assembly and reliability, materials and manufacturing technology, high-efficiency LEDs and high power lasers, integrated optical sensors.

Interactive Presentations:

Abstracts may be submitted related to any of the nine major program committee topics listed above. Interactive presentations of technical papers are highly encouraged at ECTC as it allows significant interaction between the presenter and attendees. It 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.

Professional Development Courses

In addition to abstracts for papers, proposals are solicited from individuals interested in teaching educational professional development courses (4 hours) on topics described in the Call for Papers. Using the format "Course Objectives/Course Outline/Who Should Attend," 200-word proposals must be submitted via the website at www.ectc.net by October 12, 2015.

If you have any questions, contact:

Kitty Pearsall, 66th ECTC Professional Development Courses Chair
Boss Precision, Inc.
1806 W. Howard Lane, Austin, TX 78728, USA
Phone: +1-512-845-3287
E-mail: kitty.pearsall@gmail.com

You are invited to submit an abstract of no more than 750 words that describes the scope, content, and key points of your proposed paper via the website at www.ectc.net.

If you have any questions, contact:
Sam Karikalan, 66th ECTC Program Chair
Broadcom Corporation
5300 California Ave., Irvine, CA 92620, USA
Phone: +1-949-926-7296
E-mail: samk@broadcom.com

Abstracts must be received by October 12, 2015. All abstracts must be submitted electronically at www.ectc.net. You must include the mailing address, business telephone number, and email address of presenting author(s) and affiliations of all authors with your submission.

IEEE ITherm CONFERENCE

May 31 - June 3, 2016 Las Vegas

Abstracts due September 4, 2015



ITherm 2016: Fifteenth Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems

May 31 – June 3, 2016

Cosmopolitan Hotel of Las Vegas, Las Vegas, Nevada, USA (www.cosmopolitanlasvegas.com)

ITherm 2016 is the leading international conference for scientific and engineering exploration of thermal, thermomechanical and emerging technology issues associated with electronic devices, packages, and systems. ITherm 2016 will be held along with the **66th Electronic Components and Technology Conference (ECTC 2016, www.ectc.net)**, a premier electronic packaging conference, at the Cosmopolitan Hotel in Las Vegas, Nevada, USA. Based on the success of ITherm 2014 in Orlando, Florida, USA, papers will be presented in oral and selected topical poster sessions. All papers will be peer reviewed by two or more reviewers, and will be published in the ITherm proceedings. In addition to paper presentations and vendor exhibits, ITherm 2016 will include panel discussions, keynote lectures by prominent speakers, and professional short courses. Original papers are solicited in the following general areas (but not limited to):

Thermal Management:

- Novel Materials: Thermal Vias, Heat Spreaders and Thermal Interface Materials
- Natural and Forced Convection Air Cooling
- Advances in Compact Air Movers
- Single-Phase Liquid Cooling
- Novel Phase Change Cooling Techniques: Boiling, Thin Film Evaporation, Heat Pipes, Thermosyphon, Spray and Jet Impingement
- Microfabricated Thermal Management Devices and Systems
- Sub-Ambient Cooling: Solid State, Vapor Compression, Absorption, Adsorption, Thermo-acoustic, Magnetocaloric
- Thermal Management in Wireless, Networking, Computing, Lighting, Harsh Environments, and Peripheral Hardware.
- Thermal and Energy Management in Data Centers
- Three-Dimensional Electronics
- Advances in Experimental Characterization
- Advances in Computational Characterization: Multi-Scale Modeling, Compact Modeling, Multi-Physics Modeling, Multi-Objective Design and Optimization

Mechanics:

- Modeling and Simulation for Reliability at Package, Board, and System Levels
- Failure Mechanics and Damage Modeling
- Experimental Techniques
- Constitutive Models
- Impact, Drop and Vibrational Analysis of Packages, Sub-Systems, and Systems
- Solder Profile Modeling, Fatigue Mechanics of Packages, Interconnects
- Materials Characterization, Simulation, Design

Emerging Technologies:

- Sensors (Medical, Military, Consumer, Structures, Diagnostic, etc.)
- Nanotechnology: Thermal, Mechanics, Material and Process Related Issues in Nanostructures
- Micro-Fluidics
- Chip-Integrated/Embedded Cooling Systems
- Fiber-Optics Interconnect Systems & Free Space Optical Interconnects
- MEMS: Device and Package Level Reliability Issues
- Integrated Biochips and Bioelectronics
- Medical, Telecommunication, and Automotive Systems
- Space Systems: Earth Orbiting and Deep-Space Missions

Please submit a 400 word text-only (no figures and tables) abstract on the ITherm website: www.ieee-itherm.org.

More information: www.ieee-itherm.org/author-center

Abstract and subsequent paper submissions are entirely web-based, with the following deadlines:

Some important dates:

- Deadline for Abstracts
- Notification of Acceptance
- Draft Paper Submission
- Final Paper Submission

September 4, 2015

October 2, 2015

December 4, 2015

March 4, 2016

Direct general inquiries to:

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Professor Michael Ohadi, Program Chair
University of Maryland, ohadi@umd.edu

Visit the ITherm Website: www.ieee-itherm.org



Call for Papers

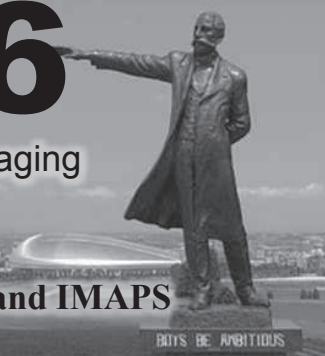
ICEP 2016

2016 International Conference on Electronics Packaging

April 20-22, 2016

Sapporo Education and Culture Hall, Hokkaido, Japan

Sponsored by JIEP, IEEE CPMT Society Japan Chapter and IMAPS



Technical Topics and Keywords for Conference Papers

1. Advanced Packaging

Wafer Level Packaging, System Integration, PoP, MCM, System on Package, Novel Assembly Technologies

2. Substrates and Interposers

Laminates, Interposers, Fine Pitch, Build-Up Substrates, Flexible Printed Circuits, Embedded, Conductive Paste, Thin Core, Coreless, Low CTE

3. Interconnection

Bump Formation, Chip-Package Interaction, Low k, Leadframe, Test of First- and Second- Level Interconnections, Interconnections for 3D Integration, Interconnections in Substrates, PCBs and Systems

4. 3DIC Packaging

TSV, Via Formation and Filling, 2.5D, Wafer Thinning, Silicon Stacking, Chip on Chip, Chip on Wafer, Wafer on Wafer, Wide Bus, Wireless Interconnection, Temporary Bonding/De-Bonding

5. Design, Modeling, and Reliability

Signal and Power Integrity, High-Speed Board Design, Mechanical Design and Reliability, Failure Analysis, Fracture and Warpage in Packages, Testing, Evaluation, TCAD, 3DIC Design

6. Thermal Management

Advanced Cooling Modules, Heat Pipes, Heat Sinks, Fans and Blowers, Thermal Interface Materials, Thermal Measurements, Micro and Nano Scale Heat Transfer, Thermal Issues in Devices

7. Materials and Processes

Novel Materials and Processing, Dielectrics, Emerging Materials and Processes for 3D, Thin Films, Underfills, Assembly Challenges and Solutions, Wafer Thinning, Plating, Equipment, Encapsulation

8. Printed Electronics

Inkjet, Screen Printing, Conductive Wiring, Insulation, Printed Organic TFTs, Device Applications

9. N-MEMS

NEMS-MEMS/Sensor Devices, MOEMS, Assembly and Packaging, Nano Technology, Nano Imprint Lithography, Organic Semiconductors, Wireless Sensor Networks

10. Optoelectronics

Active Optical Cable, Photonic Devices, Optical Fibers, Waveguides, Optical Interconnects, Transceivers, Connectors, LD/PD, LED, OE/EO, TOSA/ROSA, WDM, Optical Wiring Boards

11. Self-Organization/Self-Assembly

Biomimetics, Nature-Guided, Bottom-Up Manufacturing, Smart Materials and Devices, Spontaneous Ordering/Patterning/Structuring, Self-Bonding/Debonding, Repairable, Self-Healing, Novel Micro/ Nano Processing

12. Medical Devices

Invasive, Low Invasive, Non Invasive, In Vitro, BAN, Cure, Treatment, Diagnosis, Screening, POC, Healthcare

13. Power Electronics Integration

Si, SiC or GaN Power Device/Module Packaging and Reliability; Packaging of High-temperature Power Electronics, Sensors; Inverters/Converters for Electric Vehicles; Magnetic Materials and Components; PE Substrate Technologies; PE Encapsulation Materials; PE Integration by 3D Printing

14. RF

RFID, High Frequency Devices, Packaging, Filters, EMI, EMC, Antennas, Wireless Power Transmission

15. Others

Market Trends, Environmentally Conscious Products and Processes, Cost Analyses

Conference Information

Registration Fees:

Member of JIEP / IEEE / IMAPS: 41,000 yen (including reception and the proceedings)

Non Member: 55,000 yen (including reception and the proceedings)

Students: 12,000 yen (including the proceedings)

Organizing Committee:

General Chair: J. Mizuno, Waseda University

General Vice Chairs: S. Uegaki, ASE Group; Y. Nogami, Toray Engineering; K. Yokouchi, Fujitsu Interconnect Technology

Contact:

Secretariat of ICEP 2016

The Japan Institute of Electronics Packaging

E-mail: icep2016@jiep.or.jp

URL: <http://www.jiep.or.jp/icep/>

Abstract Preparation

A 300-word abstract to be submitted to the web site below by **October 31, 2015**.

<http://www.jiep.or.jp/icep/>

Authors are requested to attach a figure, a picture or a table. Notification of acceptance by the middle of December, 2015.

Final manuscript of four to six pages should be submitted by February 20, 2016, for both oral and poster presentations.

Accepted and presented papers will be published in the conference proceedings and submitted to IEEE Xplore.





IEEE CPMT Symposium Japan 2015

(Formerly VLSI Packaging Workshop in Japan)

November 9–11, 2015
Kyoto Research Park, Kyoto Japan
Proceedings Due: Sep. 11
Registration Due: Nov. 1



"Packaging Everywhere"

About the conference

"IEEE CPMT Symposium Japan (ICSJ)" is a widely-recognized international conference of the IEEE CPMT Society, and held annually in Kyoto in November. ICSJ will provide a platform for you to communicate and interact with global leaders in packaging technology.

Packaging is everywhere! The conference started in 1992 as "The VLSI Packaging Workshop in Japan" and was renamed to "ICSJ" in 2010. Topics include a variety of packaging technologies, ranging from VLSI and 3D packaging, optoelectronics, bio and healthcare. In 2015 the conference will emphasize two main topics: **Optoelectronics** and **Bio-healthcare**. Optoelectronics will include optical interconnect, Si Photonics, telecom /datacom, and LEDs. Bio-healthcare will cover bioelectronics, sensing, biomimetics, and wearable devices. Other topics include Advanced Packaging, Thermal and Reliability, and RF and Electrical Interconnect. This year, ICSJ will have a special session on 3D Printing.

Plenary and Invited Speakers:

Plenary Speakers

Waguih Ishak (Corning Incorporated)
Richard Penty (University of Cambridge)
Susumu Kaminaga (SPP Technologies Co., Ltd.)
Masatsugu Shimomura (Chitose Institute of Science and Technology)

Invited Speakers

Optoelectronics:

Henning Schröder (Fraunhofer IZM)
Drew Guckenberger (Molex Incorporated)
Marika Immonen (TTM Technologies Inc.)
Koichi Takemura (PETRA)
Ken Weidner (Dow Corning Corporation)
Mitsuhiro Iwaya (Furukawa Electric Co., Ltd.)
Akinori Hayakawa (Fujitsu Laboratories, Ltd.)
Man Jiangwei (Huawei Technologies Co, Ltd.)
Michael Tan (HP Labs)
Jonas Weiss (IBM Research - Zurich)
Ulrich Keil (FCI Deutschland GmbH)

Advanced Packaging:

Shuzo Akejima (Toshiba Corporation)
Akio Katsumata (J-devices)
Masaki Hashizume (Tokushima University)
S.W. Ricky Lee (Hong Kong University of Science and Technology)
Yasumitsu Oorii (IBM Research - Tokyo)

Bio-Healthcare:

Norihiko Nishizawa (Nagoya University)
Toshiya Sakata (The University of Tokyo)
Kazuhiro Tanahashi (Toray Industries Inc.)
Katsumasa Fujita (Osaka University)
Akira Saito (Osaka University)
Takuji Ogawa (Osaka University)
Kouji Fujii (NTT)
Eiichi Tamiya (Osaka University)
Mamoru Hashimoto (Osaka University)
Tatsuo Kaneko (JAIST)

Special Session: 3D Printing

Akihiko Chiba (Tohoku University)
Yasuaki Hashizume (NTT DATA
ENGINEERING SYSTEMS Corporation)

Registration and Further Information:

Registration site will open on August 10.
Sponsorship is available for ICSJ2015.
Please visit ICSJ2015 WEB page : <http://www.ieee-csj.org/>

Upcoming CPMT Sponsored and Cosponsored Conferences

In pursuit of its mission to promote close cooperation and exchange of technical information among its members and others, the CPMT Society sponsors and supports a number of global and regional conferences, workshops and other technical meetings within its field of interest.

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For details go to: www.cpmnt.ieee.org

Name: 2015 International 3D Systems Integration Conference (3DIC)

Location: Sendai, Japan

Dates: August 31–September 2, 2015

Name: 2015 37th Electrical Overstress/Electrostatic Discharge Symposium (EOS/ESD)

Location: Reno, NV USA

Dates: September 27–October 2, 2015

Name: 2015 21st International Workshop on Thermal Investigations of ICs and Systems (THERMINIC)

Location: Paris, France

Dates: September 30–October 2, 2015

Name: 2015 IEEE 61st Holm Conference on Electrical Contacts (Holm)

Location: San Diego, CA USA

Dates: October 11–14, 2015

Name: 2015 10th International Microsystems, Packaging, Assembly and Circuits Technology Conference (IMPACT)

Location: Taipei, Taiwan

Dates: October 21–23, 2015

Name: 2015 IEEE 24th Electrical Performance of Electronic Packaging and Systems (EPEPS)

Location: San Jose, CA USA

Dates: October 25–28, 2015

Name: 2015 IEEE CPMT Symposium Japan (ICSJ)

Location: Kyoto, Japan

Dates: November 9–11, 2015

Name: 2015 IEEE 17th Electronics Packaging and Technology Conference (EPTC)

Location: Singapore

Dates: December 2–4, 2015

Name: 2015 IEEE Electrical Design of Advanced Packaging and Systems Symposium (EDAPS)

Location: Seoul, Korea (South)

Dates: December 14–16, 2015

Abstract Submission Date: August 15, 2015

Name: 2016 Pan Pacific Microelectronics Symposium (Pan Pacific)

Location: Kamuela, HI USA

Dates: January 25–28, 2016

Name: 2016 IEEE 20th Workshop on Signal and Power Integrity (SPI)

Location: Turin, Italy

Dates: May 8–11, 2016

Name: 2016 IEEE 66th Electronic Components and Technology Conference (ECTC)

Location: Las Vegas, NV USA

Dates: May 31–June 3, 2016

Abstract Submission Date: October 12, 2015

Name: 2016 15th IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITherm)

Location: Las Vegas, NV USA

Dates: May 31–June 3, 2016

Abstract Submission Date: September 4, 2015

IEEE Components, Packaging and Manufacturing

Technology Society

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3. *Multigrid Finite Element Methods for Electromagnetic Field Modeling* by Y. Zhu and A. Cangellaris; Publication Date: 2006
4. *Silicon Germanium: Technology, Modeling, and Design* by R. Singh, H. Oprysko and D. Hamee; Publication Date: 2004
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